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An Occurrence of Nitrogen in Steel

Effect of Gases on a Light Forging Left Accidentally in a Furnace Flue — Critical Analysis of the Resulting Structures

BY A. A. BLUE*

THE presence and effects of nitrogen in steel have recently received considerable study, especially as applied to arc welding, case hardening and the erosion of guns. The present instance is described, therefore, not as being of any practical value in itself but as a possible addition and confirmation to results already obtained in other cases.

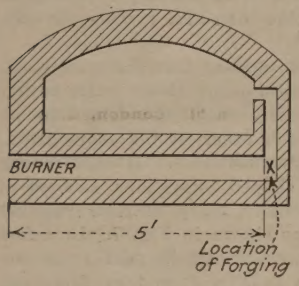


Fig. 1 (Left)—The Type of Furnace and the Location of the Forging

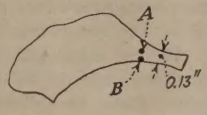


Fig. 2 (Above) Actual Size and Dimensions of the Piece Examined

A drop forged connecting rod of light weight design and made of steel conforming to the composition No. 1035, of the specifications of the Society of Automotive Engineers, was lodged in the flue of an underfired heat treating furnace, due to carelessness on the part of one of the helpers in charging the furnace. The type of furnace and relative location of forgings and burner are shown in Fig. 1. Some two months later, the highly oxidized remains of the forging were found and removed while repairing the furnace. During this time, the temperature in the furnace proper had at no time exceeded 1600 deg. Fahr. and generally was used for tempering heats, at from 1100 to 1200 deg. Fahr. The temperature in the flue probably did not exceed 1700 to 1800 deg. Fahr. The fuel used in the burners was natural gas and air was furnished by a low pressure blower system.

The portion of the forging that still remained solid steel was cut in half, longitudinally, the actual size and dimensions being shown in Fig. 2. The dimensions of the forging in the plane at right angles to that of the section shown, were approximately double those of the section.

Microscopic examination of the piece revealed the needle structure shown in Fig. 3, generally accepted to be typical of iron nitride. Similar structures have been stdied by Miller[1], Comstock[2], Rawdon[3], Knight, Northrup[4] and others, additional discussions and further references in connection with these articles furnishing additional information on the subject.

As might be expected, the needles were in greatest abundance in the narrowest part of the section, the number diminishing rather rapidly towards the heavy end. Thus, Fig. 3 is of the center of the thinnest section and Fig. 4 is from the center of the tapered por-

*Metallurgist Duff Mfg. Co., Pittsburgh.

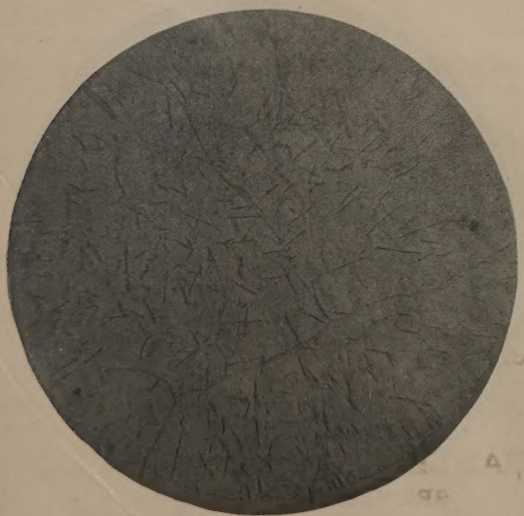


Fig. 3. 200 diameters

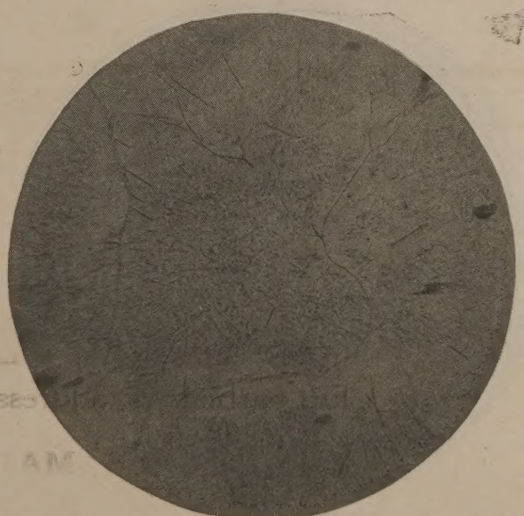


Fig. 4. 200 diameters

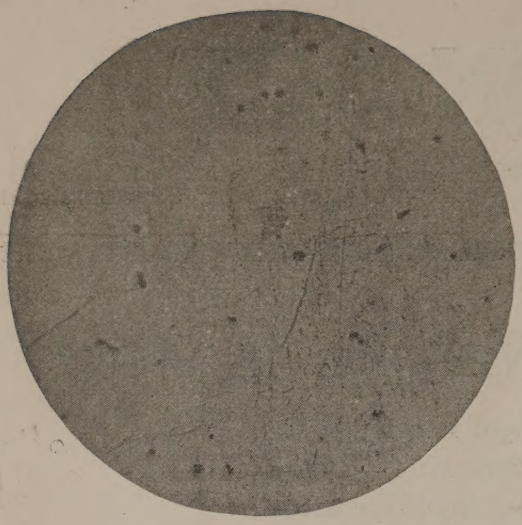


Fig. 5. 200 diameters

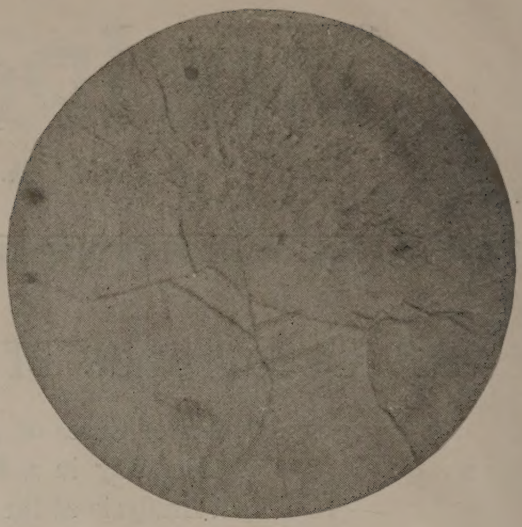


Fig. 8. 500 diameters

Fig. 6. 500 diameters

tion of the specimen, at A in Fig. 2. The reduction in the number of needles is very marked. In the heavy section, no needles at all were found. On the other hand, there appeared to be a tendency toward a greater concentration in the central portions of the section rather than at the edges; thus, Fig. 5 is taken at the edge of the tapered section, designated by B in Fig. 2, and shows much less nitride than Fig. 4, from the center of the same locality.

At first glance, it would appear that the needles are indiscriminate as to direction, but closer examination shows them to follow fairly consistent directions at well defined angles to each other in the same grain. This has been noted by Rawdon[3] also. Often twinning occurs, resulting in star shaped formations, as seen in Figs. 3 and 6. Occasionally, very marked parallel formations were found, as shown in Fig. 7. In a few rare instances, needles were found to pass from one grain into another, seen in Fig. 8, and as found by Rawdon[3] and others. Generally, however, what appeared to be cases of this nature were found upon closer examination to be two individual needles starting at the same point on the grain boundary.

Quite often needles originated at the same point on a grain boundary, extending into their respective grains at different angles. This is seen in Fig. 9 at a number of places. The needles do not always occur as continuous straight lines, being occasionally found in a zig-

Fig. 7. 200 diameters

Fig. 9. 200 diameters

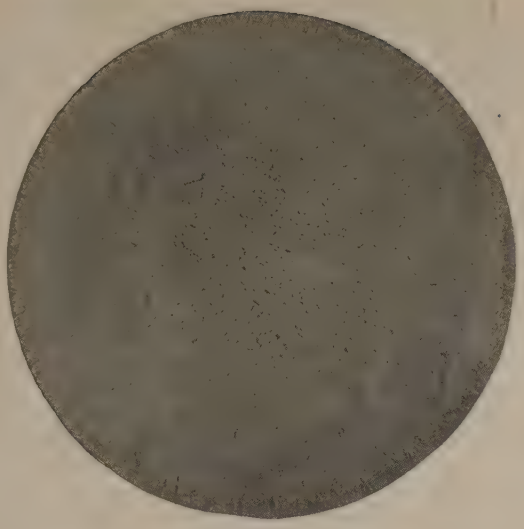


Fig. 10. 200 diameters

zag formation. Instances of this kind are shown in Figs. 3 and 6. This phenomenon is noticeable also in a number of photographs previously published. The appearance may be described as "side-stepping," that is, the needle appears to follow one cleavage plane for a distance, then turning into a crossing plane for a short distance, and turning again following the first direction but in a plane parallel to the original one.

Rawdon[3] and Miller[1b] report groups of fine small needles, which were found frequently in the present instance, in greater abundance where the larger needles were not so prevalent, as shown in Figs. 7, 8, 9, 10 and 13. It was found to be characteristic that large and small needles did not exist in close contact. Thus, reference to these photographs shows that where a large needle occurs in a field of small ones, the large one is always surrounded by a small area of clear metal. This appears to indicate a considerable tendency on the part of the nitride to form in larger masses. Thus, where conditions permit—probably a question of temperature—this tendency is great enough to cause so rapid a formation of a large plate as to leave the surrounding areas impoverished of this material.

Very frequently, the needles are found originating at the grain boundaries and it seems possible that those appearing in the central portions of the grains are, in reality, simply cross sections of needles, or really plates, which have grown up or down from grain

Fig. 11. 900 diameters

Fig. 12. 500 diameters

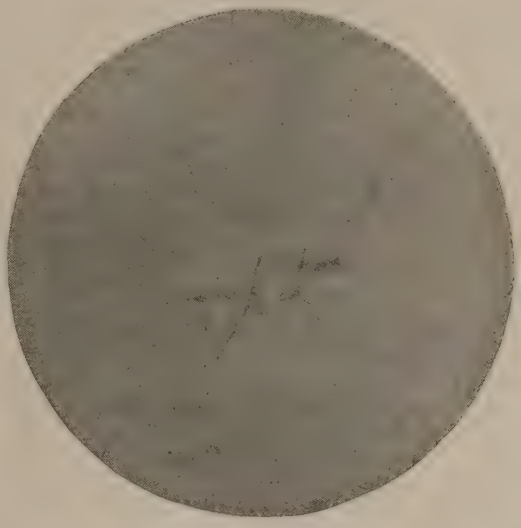


Fig. 13. 500 diameters

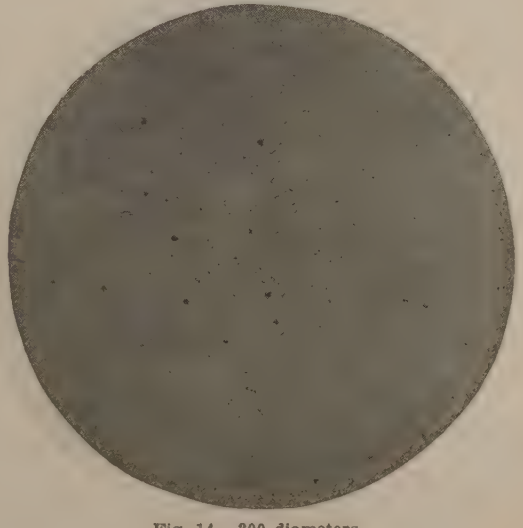


Fig. 14. 200 diameters

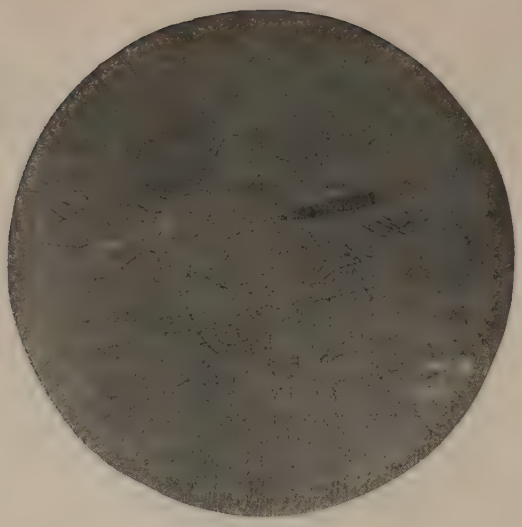


Fig. 15. 200 diameters

boundaries below the polished surface or from boundaries above the surface, and which have been removed in preparation of the sample, that is, that all needles originate at grain boundaries.

In many instances what appear to be distinct openings between the grains were found. Figs. 4 and 5 show such openings clearly. It will be noted these double lined openings extend a short distance and then close up to the normal single line grain boundary, indicating that their occurrence is not due to a polishing or etching condition. Fig. 11 shows one of these openings at higher magnification, and here, too, it is seen that the opening closes to a single line in the lower end of the photograph. These conditions seem to indicate a separation of the grains due to their long period at high temperatures, forming an avenue of entrance for nitrogen and oxygen.

The mechanism of the decarbonization is illustrated in Fig. 12 showing an area of pearlite only partially decarbonized, the outer portion, i.e., along the grain boundaries, being attacked first. Fig. 13 shows another instance of the same character.

This expansion between the grains no doubt is extended as well to the cleavage planes in the grains themselves, allowing the entrance and combination of the nitrogen.

The effects of heat treatment were studied in the following manner. The second half of the original specimen was heated in an electric muffle furnace to

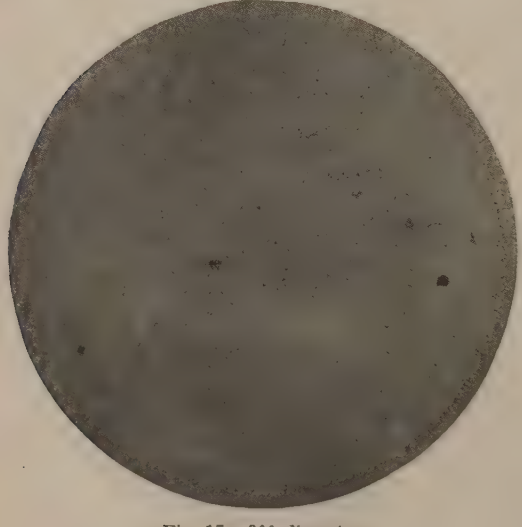


Fig. 17. 200 diameters

1780 deg. Fahr. held for half an hour and quenched in water. The resulting structure is shown in Fig. 14, taken of the thinnest section where the needles or plates were most prevalent previously. It is seen that they have entirely disappeared. This agrees with results obtained by Ruder, Rawdon and others. The sample was then reheated to 1200 deg. and allowed to cool slowly over night in the furnace. The resulting structure showed a reappearance of traces of nitride. Reheating again to 1780 deg. for half an hour, and cooling in the furnace resulted in the reappearance of additional nitride as in Fig. 15.

The sample was finally reheated to 1780 deg., held at this temperature for 24 hr. and cooled in the furnace. These various reheatings considerably reduced the size of the narrow section, the final dimensions being shown in Fig. 16. Examination of the sample after this final prolonged treatment showed results that were quite surprising. The narrow portion, where in all previous cases the concentration of the needles had been greatest, was found to contain practically no needles at all. Moving toward the heavier sections, at the location A, Fig. 16, a fairly great number of needles was found, as in Fig. 17. The thickness of the sample at this point is seen to be approximately the same as the thinnest portion in the original sample, indicating what might be termed a "critical thickness." Closer examination of the thinner sections revealed a number of areas at first taken for pearlite as shown in Figs. 18, 19 and 20. This section, previous to the last reheating, however, contained completely decarbonized ferrite, no pearlite being then present until well up in the thickened portions. These areas, therefore, were examined more closely and found to contain inter-

Fig. 16. Final Dimensions of the Narrow Section of the Original Forging After Various Retreatments

mixed in them a number of needles and presented other features not characteristic of pearlite; thus, several occurred at the edges of grain areas whereas it has been shown in an earlier paragraph pearlite decarbonizes inward from the grain boundary. The only explanation for them that appeared plausible was to assume them an eutectoid of nitride similar to pearlite, the nitride having coalesced due to the increased temperature.

The reasons for this eutectoid not being found in the original sample may be due to the "critical thickness" mentioned above. That is, with a thinner section, the partial pressure of the nitrogen becomes great enough to cause this formation. Temperature could hardly be the cause, as, judging from the grain size of the original and treated samples, the former was exposed to the higher temperature, as in Figs. 3 and 15, although the larger grain size in the original may have been due mainly to the longer time of heating at possibly lower average temperatures. Comstock[8] expresses the belief in such a eutectoid, stating the difficulty of distinguishing it from pearlite. In the present case, where no pearlite was found previously and a number of such areas prominent after heating, this contention would seem to be substantiated.

Various theories as to the nature of these needles or plates have been suggested, as cementite, martensite, etc., although the nitride explanation has been practically accepted. The present instance offers much in support of the latter, as in a completely decarbonized piece of steel, such as the thinnest section is found to be, the presence of cementite and martensite is, of

course, out of the question. In the combustion products to be found in the flue from the natural gas fuel, the only constituents of any quantity would be nitrogen, oxygen and carbon dioxide, making it evident the first named is responsible for the characteristic structure found.

As stated in an early paragraph, the present example of nitride in steel is in itself of no practical value, but it is felt the condition of the direct combination of ordinary inert atmospheric nitrogen with iron at moderate heating temperatures is quite unusual. Further, the specimen examined displayed excellent examples and confirmation of phenomena already found and described under entirely different conditions, as well as some not previously emphasized, so that it is hoped the present description may be of value in problems involving this interesting condition in more practical lines.

[1] S. W. Miller: (*a*) "Some Structures in Steel Fusion Welds," *Transactions* A. I. M. M. E., vol. 58, page 700, 1918. (*b*) "Path of Rupture in Steel Fusion Welds," *Transactions* A. I. M. M. E., vol. 62, page 524, 1920.

[2] G. F. Comstock: "Microstructure of Iron Deposited by Electric Arc Welding," *Transactions* A. I. M. M. E., vol. 62, page 555, 1920.

[3] H. S. Rawdon, "Metallography of Arc-fused Steel," *Chem. and Met. Eng.*, vol. 23, page 777, Oct. 20, 1920.

[4] O. A. Knight, "Some Notes on the Effect of Nitrogen in Steel," *Chem. and Met. Eng.*, vol. 23, page 1107, Dec. 8, 1920.

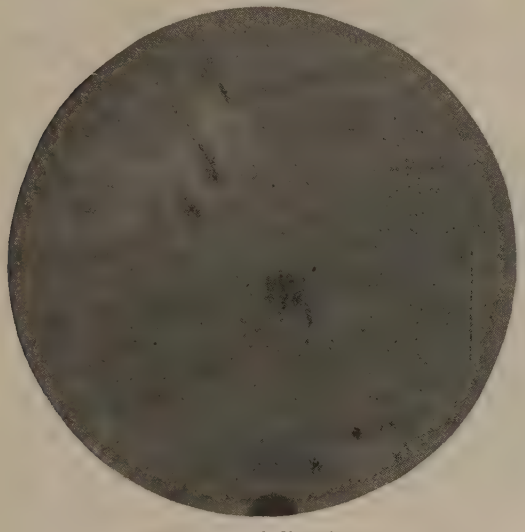


Fig. 18. 500 diameters

[5] G. F. Comstock, in a reply to discussion on paper on "Microstructure of Iron Deposited by Electric Arc," *Transactions* A. I. M. M. E., vol. 62, page 568, 1920.

Works Council Stands Severe Tests

Ninety-five per cent of the American workmen are on the square, and if they are furnished the facts on which to base their conclusions, their group judgment will be eminently fair, asserted Arthur H. Young, International Harvester Co., in discussing before the American Drop Forge Association the company's experience with the works council plan. The scheme is now 27 months old in 19 out of 20 plants in which it was submitted to the men. The McCormick Works, Chicago, which first rejected the plan, recently accepted it by a vote of 10 to 1. The representatives of the employees and management in the councils have come to agreement on all questions except two during the life of the plan, and these were settled through the offices of the president of the company.

In providing that controversial points such as wages, hours, and working conditions are decided by the employee and management representatives, the council plan is unique. In case of disagreement, questions go to the president, and if he cannot propose a settlement that is satisfactory to both sides, they may mutually agree to arbitration. At the same time they can refuse to arbitrate, if they choose. If the issue affects other plants, the president has the privilege of calling a general council of representatives of all plant councils, which consider the question de novo.

Fig. 19. 500 diameters

The council plan has had several severe tests, said Mr. Young. In the summer of 1919, when a strike was called at the McCormick works, the plant which rejected the council scheme, the neighboring tractor works and the Deering plant were closed at the request of the men themselves, because of the lack of police protection against the intimidation of the McCormick strikers. Within a few weeks, both of these plants were reopened, at the direction of their councils, and practically all of the employees returned to work.

During the steel strike of the fall of 1919 the Wisconsin Steel Works was similarly closed, for like reasons. Within three weeks all but 180 men returned, when the council decided to reopen the plant, and since that time all but 12 of the original employees have come back to the plant. During the coal strike late in 1919, the Benham, Ky., coal mine of the company was at first closed, practically all of the miners being union men, but inasmuch as they had no reason for controversy with the management, they soon held a council meeting and voted 463 to 17 to return to work—this despite the fact that all employee members of the council were union men.

Recent 20 per cent wage decreases in most of the Harvester plants have been negotiated in the works councils.

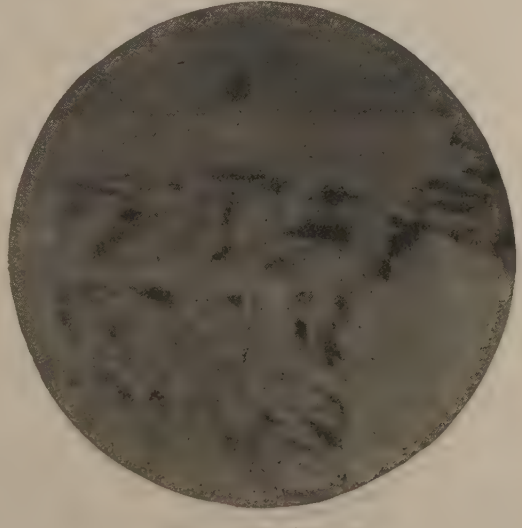


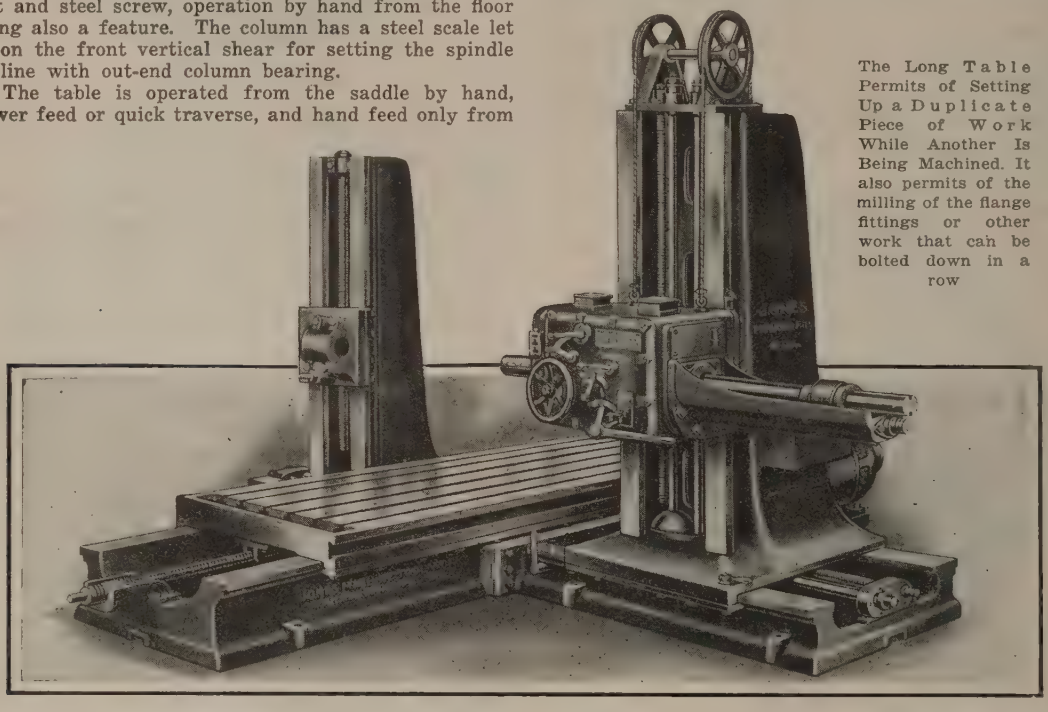
Fig. 20. 500 diameters

Boring, Drilling and Milling Machine

A horizontal boring, drilling and milling machine of the planer table type, shown in the illustration, is being offered by the Jones Machine Tool Works, Philadelphia. The machine is known as the Nos. 4½ and 5 and is designed for the boring of cylinders, motor housings and other horizontal boring mill work. The drive is by a constant or variable speed motor located at the base, transmitting power to a vertical shaft through spur and miter gearing. From the vertical shaft the drive is through a set of heat-treated miter gears and sliding change speed gears to a bull gear and quill to the spindle.

The saddle is raised and lowered on the column by a revolving bronze nut on a steel screw, either by hand wheel, power feed or quick traverse. The main column can be traversed in either direction on its base from the saddle by hand or power feed or quick traverse. It receives its power from the saddle gearing to bronze nut and steel screw, operation by hand from the floor being also a feature. The column has a steel scale let in on the front vertical shear for setting the spindle in line with out-end column bearing.

The table is operated from the saddle by hand, power feed or quick traverse, and hand feed only from the floor. It derives its power from the saddle gearing to a revolving bronze nut and steel screw. The table top is provided with tie slots, and its face side provided with a dovetail slot for holding special index plates and fixtures. The out-end column support is hand-operated and the column has let in on the face of the shear a steel scale for aligning the bearing with the spindle. A saddle platform (not shown in the illustration) is furnished, which is slipped into position on the saddle when doing work which takes the operator from the floor, the central controls on the saddle giving the operator easy control of the machine from the platform. This is pointed out as a special feature in reducing production time.



The Long Table Permits of Setting Up a Duplicate Piece of Work While Another Is Being Machined. It also permits of the milling of the flange fittings or other work that can be bolted down in a row

Among other details of construction it may be mentioned that all sliding speed and feed gears, except the electric steel bull gear, are from 0.60 to 0.70 per cent carbon steel, heat treated, the gear shafts running in bronze bearings with sight feed lubrication. The bull gear, in addition to being carried by a steel quill, sets in a large conical bearing to take the thrust when using the face plate, milling cutters and facing attachments. The quill runs in large bronze bearings at each end of the saddle, and drives the spindle by two splined keys diametrically opposite, the front end being provided with cone bearing adjustment and the rear end arranged for ball bearing thrust and adjustment. Power feed gears are provided with friction safety device, quick traverse being also of the friction type, providing against breakages should the spindle, saddle column or table become jammed when at the end of their respective traverses.

Nolan Patent Bill's Prospects Improve

WASHINGTON, July 5.—The Nolan patent bill has been given a privileged position on the House calendar, in order that it can be taken up for vote at an early date. The measure allows increases in a number of employees and in salaries at the Patent Office and has the support of prominent associations of producers throughout the country who have pointed out that industry will suffer severely unless relief as provided for in the bill is afforded.

Details of this bill, which failed to pass at the regular session of Congress, have been explained by THE IRON AGE. In brief, it carries an increase in salary amounting to $447,740 over the appropriation for the current fiscal year and makes many changes in grades of employees and increases the salary of the Commissioner of Patents from $5,000 to $6,000. Manufacturing interests are especially interested in that provision of the bill which allows the Patent Office to employ a larger number of more efficient examiners at material increases in salary.

Coal Bill Fails to Pass

WASHINGTON, July 5.—Proposed legislation urged by Senator Frelinghuysen to establish seasonal rates on coal and to stabilize the coal industry is considered to have been defeated so far as this session is concerned, when the Senate last Wednesday voted 38 to 26 to recommit the former measure. Motion to recommit was made by Senator Borah, of Idaho, who said he could not vote for the bill as presented. Following this action of the Senate, Senator Frelinghuysen made no attempt to bring up his bill authorizing Government agencies to gather coal statistics.

The Interstate Commerce Commission has dismissed a complaint of Suzuki & Co. vs. the Wharton & Northern, et al, by holding that the combination rate of 63.88c. per 100 lb. on pig iron in carloads from Wharton, N. J., to Seattle, Washington, for export shipped in the period from August 1917, to February 1918, was not unreasonable, unjustly discriminatory or unduly prejudicial.

Heat Treatment of Rock Drill Steel

Effect on Breakage—Steel Giving Longest Service—Maximum and Minimum Life Expected — Comparison with Eye-Bars

At the symposium on the breakage of drill steel which was held at the February meeting in New York of the American Institute of Mining and Metallurgical engineers, several papers were presented which were not printed by the institute. One of them was entitled "The Breakage and Heat Treatment of Rock Drill Steel," by A. E. Perkins, Western sales manager Colonial Steel Co., Pittsburgh. It was read by the vice-president of the company, Charles M. Brown. The paper was as follows:

First: Study of steels which give greatest service before failure by breakage.

Nature of Section.—Actual figures showing the superiority of one section or another are difficult to obtain, as I know of no company that has kept figures on this phase of the subject. However, I think I may state positively that in a given size of steel the cruciform section in that particular size shows far more breakage, the country over, than any other section.

Of course this section of steel is used almost exclusively in stopping machines drilling "up" holes which are more trying on steel than horizontal holes, but the cruciform section is, nevertheless, inherently a weak section. In the first place it contains less steel per foot than any other standard section of the same size and secondly conditions are encountered in its rolling which do not obtain in the other sections and which, in my opinion, make it weak. The other sections, namely, round, hexagon, octagon and quarter octagon, are compact, but when a cruciform bar is rolled the wings or ribs tend to cool off relative to the main body of the bar and we encounter the unavoidable condition, always undesirable, of rolling a bar made up of steel of unequal temperatures. This sets up cooling strains, which often give rise to minute cracks in the finished bar, which are the genesis of points of failure later when the steel is put into service.

Many companies have discarded the cruciform section entirely, substituting in its place quarter octagon steel, either hollow or solid, depending of course upon the machine and use and practically always with improved results. The chuck wear is always much less with quarter octagon than with cruciform and I look for the mining fraternity to practically abandon the cruciform section within the next few years.

Composition.—Too much importance cannot be attached to the quality of the drill steel. In general it may be said that the best steel to employ for a fixed set of conditions is the steel that will withstand the duty imposed upon it without undue breakage and that will withstand the abrasive action of the rock with the least amount of wear.

The chemical composition of drill steel is a matter that has been subjected to a great deal of experiment by the mining industry, the manufacturers of rock drills and the steel companies. It is an accepted fact that steel of a low carbon content will stand more abuse by the blacksmith and will lend itself more readily to welding than steel embodying a greater percentage of carbon.

In that connection I might recall a statement which I just made to Mr. Tillson, said Mr. Brown, taken from a paper read before the British Mining Engineers Institute in which the conclusion was reached that carbon content was about 0.60 per cent, but that was dependent upon the character of labor that they had to depend upon to make those drills; but that is so radically different from the results in this country and the results shown with the higher carbon steel as to be quite noticeable.

On the other hand, continues the paper, the consensus of opinion seems to be that the higher carbon steel will withstand the vibration shocks to which it is subjected in the hammer-drill service, and that the cutting bit, although requiring more care in the tempering and working, may be made to last much longer than is possible with lower carbon steel.

We believe that the following specifications are right for straight carbon drill steel under the average present day conditions:

	Per Cent		Per Cent
Carbon	0.85 to 0.90	Phosphorus	0.03
Manganese	0.30 to 0.40	Sulphur	0.03

In buying drill steel, however, one must not rely too strongly on chemical analysis as an indication of quality, for the quality of a steel which has to be hardened and tempered depends far more upon the process of manufacture and the character of the workman than on the chemist. Tool steel of good quality was made long before chemists were heard of and it is safe to say that steel of equally good quality can be produced today in small quantities without the assistance of chemists in any step of the process. Steel makers' chemists in their laboratories are valuable in enabling the works to maintain a uniformly high quality in producing tool and drill steel in the large quantities which are demanded at the present time. It takes pure iron and experienced satisfied workmen to make good steel.

Second: Maximum and minimum service which might be expected.

Life of Steel.—I find that I have no intelligent figures to present to answer the question: How long will a piece of drill steel last? There are so many variables that any such figures are bound to be individual rather than general and of doubtful value at best. Any figures along the above lines, to be at all comparable, should be expressed in terms of drilling hours rather than in drilling footage or in pounds of steel per ton of rock broken. I have a number of figures of this last class from different sources, showing the pounds of steel used per ton of rock broken, which vary from 0.05 lb. per ton to 0.51 lb. per ton, but they have no place here as they admit of no uniform basis of comparison.

Summary.—We may summarize the points which make for maximum service from drill steel as follows:

Keep your heat down. Ninety-five per cent of the trouble which results underground is the result of overheating in forging or in tempering or both. Never heat either the bit end or the shank end, preparatory to forging, higher than 1600 deg. Fahr. This may mean a little more work on the part of the blacksmith, but the gain in quality of the finished drills will greatly offset the slightly additional expense in forging. Overheating a piece of steel preparatory to forging produces coarseness of structure which cannot be restored or refined by merely allowing it to cool and then subjecting it to a tempering operation.

To harden successfully, plenty of time must be given to the heating and always leave the steel in the furnace long enough to insure its being heated uniformly and thoroughly. This may be best accomplished in a slow fire and only by slow uniform heating is it possible to secure the required uniformity in hardness.

Steels lying too long in the fire, especially when not turned about, are liable to show soft spots in hardening, due to a slow decarbonization which takes place.

After hardening and tempering either bit or shank always quench at the critical temperature on the rising heat.

When tempering shanks, do not overlook the fact that density and toughness provide wear-resisting qualities, and that hardness, except on the extreme outer surface, is not essential or desirable. Subject the part for a distance of 2 in. below the lugs or collar to the heat treatment.

Either keep the heated tool moving about in the quenching bath or keep bath agitated, otherwise soft places may result, due to the steam which is formed around a heated steel upon being plunged into the water.

To get uniform results in hardening, a good supply of liquid should be provided so that the temperature of the bath will be kept as nearly as possible a constant.

Discourage the practice of operating with a dull bit and

remember that the only reason drill steel will drill rock is because of the cushioning effect of penetration at every blow delivered. The effect of continued hammering on a dull steel is exactly the same as it would be in driving up against an impenetrable substance, such as a hardened anvil. Minute fatigue checks are established throughout the length of the drill steel. At the beginning they may be so small as to be hardly detected with the naked eye but with continued operation one of these fatigue checks, which will develop at the weakest point, will gradually grow larger by assuming a semi-circular or arc-shape appearance extending into the body of the steel. As this check enlarges it is caused to open and shut at each vibration or blow of the hammer in the drill.

A breathing action is thus established which, when the gap opens, causes an inrush of the surrounding air, carrying in with it impurities part of which are retained by the surface when the mouth closes. It is these foreign particles sucked in with the air which give to the surface of the check a discolored appearance. The smooth surfaces of the check are due to the hammering action to which they are subjected by the closing of the jaws for every blow or vibration. Eventually the steel is broken apart with the balance of the section, disclosing a good, clear fracture of the metal in its original condition.

Watch your drill-sharpening machine for worn dies and dollies. Worn parts of a sharpener often cause poor bits to get out. These bits are often feathered badly, which means that a feather or tip of steel is left on one or more of the corners. These feathers, of course, break off as soon as they are put in the drill and cause a rapid loss of gauge.

Watch your air pressure at your sharpening machine. Most sharpeners should have at least eighty pounds at the machine and if the machine is running on less pressure and the smith tries to forge the bit at the proper temperature, it gets cold before he can get the corners on, so to get out his work he usually yields to the temptation of putting the steel through hotter than he should. If the pressure were high enough he could complete the forging of his bit at the proper temperature before it got too cold.

Keep the chuck bushing up to size and remember that the worn end of a check bushing will prevent the transmission of a square, direct blow. This same statement will apply to the size of the drill shank.

That is the conclusion of Mr. Perkins' paper. I have a note here that I would like to read, added Mr. Brown, bearing on Mr. Foley's statement in which he showed that by far the largest number of breaks happened at or near the point to which extended the heat treatment in forging either the shank or the bit.

Heat treatment of drills after the shanks and bits are forged would undoubtedly increase greatly the time and service before breaking occurs in the bar. The heat should not be carried so high as to put the drill in an annealed condition, but be just a low faint red hardly visible in a dark place, or about 900 deg. Fahr., and then allowed to cool off naturally in air. After this is done the bit should be hardened and tempered and the shank tempered.

The same treatment applied to the drill bar after it has been used for some time would relieve the strains which have been set up in the bar and prolong its actual life before breakage.

Similar experience was found years ago in the manufacture of eye-bars for bridge work. The eyes at the ends of these bars are formed by an upsetting process which involved heating one of the ends of the bars and great trouble was experienced in breaking at or close to the point which was reached by the heat. It was found that by placing the entire bar in the furnace and giving it a mild heat treatment similar to the one referred to that this breakage was eliminated and this is now common practice.

DRILL STEEL SHARPENING*

Structure of the Carbon Steel in the Various Stages of Heat Treatment

BY CLARENCE M. HAIGHT

The general practice in drill sharpening shops, of which descriptions have been written, is about as follows:

The bit is heated to a forging heat of 1600 to 1900 deg. Fahr. for a distance back from the cutting edge necessarily greater than the length of the finished bit.

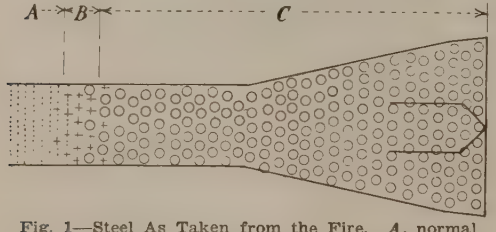


Fig. 1—Steel As Taken from the Fire. *A*, normal size; *B*, section of change from normal size to 1800 deg. Fahr. size; *C*, size at 1800 deg. Fahr., 4 in. long

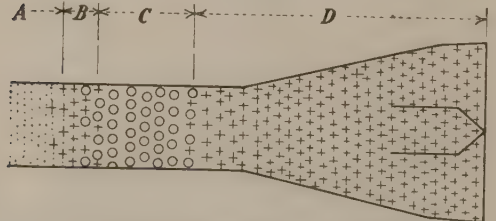


Fig. 2—Steel After Forging. *A*, *B* and *C* as in Fig. 1. *D*, size of grain at 1600 deg. Fahr., 3 in. long from hammering; this leaves *C* only 1 in. long with a section of change between *C* and *D*

After forging to the proper shape and size in the sharpening machine, the steel is allowed to cool and is then passed to a hardening furnace where the end only of the bit is heated to the critical temperature or a little higher, or to about 1450 deg. Fahr., and then quenched either in cold water or brine or, as in one case, in brine with a layer of oil on the top.

If the assumption is true that, as a steel cools whether slowly or rapidly from the highest heat to which it has been subjected, it retains the grain size that corresponds to that highest temperature; then there is a condition in the bit, and also in shanks if the same process is followed, that perhaps is detrimental for the best service from the steel.

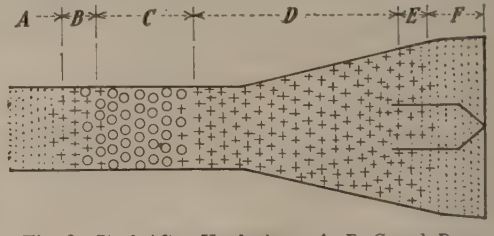


Fig. 3—Steel After Hardening. *A*, *B*, *C* and *D* as in Fig. 2. *E*, section of change from 1600 deg. Fahr. grain size to normal grain size; *F*, normal grain size in hardened portion; *D* has been reduced in length by *E* and *F*

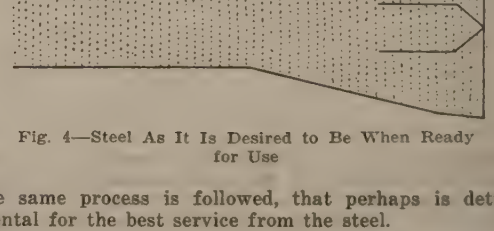


Fig. 4—Steel As It Is Desired to Be When Ready for Use

For the sake of clearness let the following assumptions be made:

That the forging temperature is 1800 deg. Fahr.
That the forging operation reduces the 1800 deg. grain

*From a paper read at the symposium on drill steel failures at the February meeting of the American Institute of Mining and Metallurgical Engineers in New York. The author is assistant mine captain, New Jersey Zinc Co., Franklin, N. J.

size to a size corresponding to that produced at 1600 deg.

That the proper grain size desired is that produced at 1450 deg.

That the bit is originally heated for 4 in. back from the cutting edge, that the hammering effect acts only to a point 3 in. back from the cutting edge, and that the hardening heat extends back only 1 in. from the cutting edge.

Then, as a steel is taken from the fire the grain condition is as shown in Fig. 1. After the forging operation has been performed a different condition exists as is shown by Fig. 2. The heating operation to harden the cutting edge produces still another effect as is shown in Fig. 3.

The questions that naturally arise from this are:

Will the cost of the extra heat treatment necessary to change this condition (annealing) be more than the saving that may be effected in the drill steel or will the extra heating be an economical as well as a wise thing to do?

Is this condition necessarily detrimental to the maximum service of the drill steel?

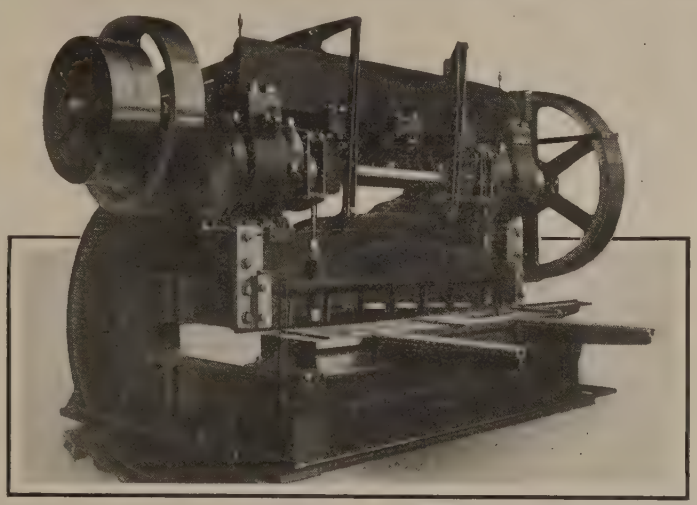
Can this annealing action be obtained in the hardening heat by heating more of the bit, say at least 5 in., to the hardening temperature but quenching only the end of the bit by a shallow immersion?

When taking up the question of heat treatment with the general run of mine blacksmiths it is difficult to get them to realize the part grain sizes play in the structure of the steel and the necessity for overcoming a wrong grain if obtained. Perhaps the presentation of the matter in this way may be of assistance.

New Series of Power Squaring Shears

The Niagara Machine & Tool Works, Buffalo, N. Y., is placing on the market a No. 8-H power squaring shear, which is said to introduce a new series recently added to the line of power squaring shears manufactured by that company. In offering the new machines the makers state that they have been able to build a shear with a capacity of ⅝ to ¾ in., that will make a much cleaner cut than any of the ordinary mill type.

Introducing the new series, the No. 8-H power squaring shear is shown in the accompanying illustration. Among its features may be mentioned the heavy crosshead of box section, guided in liberally proportioned guides and counterbalanced. The main shaft and eccentrics are forged in one piece and the clutch block, made of hammered steel forging, is equipped with hardened and ground removable striking jaws, as well as with hardened back lash jaws. The clutch wheel, bronze bushed, is provided with hardened and ground removable striking faces and with a back lash pin. Cam and throwout rollers for clutch disengagement are both of hardened steel.



Mainshaft and Eccentrics Are Forged in One Piece. The clutch block is from a hammered steel forging and equipped with hardened and ground removable striking jaws

The two center bearings for the main shaft are placed close to the eccentrics and hold-down cams. The latter are of hammered steel and are arranged to give positive action, both in lifting and in holding down. The cams are liberally proportioned and bear against hardened steel rollers lubricated through hollow pins. The hold-down rods are equipped with springs to compensate for various thicknesses of plates.

The brakes are made in two halves, hinged and lined with asbestos, and have automatic spring takeups for wear. The knife chuck is provided with pockets to enable bolts to be easily removed from the top, and has T-slots on the top for gages and on the front for gage brackets. The knife chuck is also provided with a screw and set screw on each end to facilitate easy adjustment. Housings are massive and do not require stay rods for cutting the maximum capacity rating, stay rods and stay bolts being furnished to special order only. Counterbalance rods are regularly placed so as to pass outside of housings.

A complete set of gages is provided, including a front, side, bevel and slitting gage and a patented automatic screw adjusting back gage. The driving mechanism is overhead. The pressure of the cutter bar toward the back is taken up by solid metal rather than by loose gibs. Gears are machine cut and pinions of hammered steel with wide face.

The specifications give the following dimensions: Capacity, mild steel, ⅝ in.; nominal cutting length, 96 in.; weight, 54,000 lb. and 61,000 lb., 24 in. and 36 in. gap respectively; horsepower required, 30; and double geared ratio, 15 to 1. The flywheel is 62 x 9 in., and weighs 2300 lb, the pulleys being 36 x 9 in., and running at 240 r.p.m. The floor space occupied is given as 132 in., front to back; 197 in., right to left; the overall height being 123 in.

Wage Agreement Expected

Representatives of the Western Sheet and Tin Plate Manufacturers' Association and the Amalgamated Association of Iron, Steel and Tin Workers met Tuesday at an adjourned conference in Columbus, Ohio, to attempt to negotiate a new wage agreement covering these branches of the industry.

James H. Nutt of Youngstown, secretary of the employers' association, stated: "The conference will probably last all week, but we look for an agreement. Nothing was said in the previous conference at Atlantic City which indicated that we might not get together.

Conferees are meeting at the New Southern hotel.

Upon expiration June 30 of the 1920-21 contract, sheet and tinplate mills operated by about 20 mid-Western makers under the Amalgamated Association's sliding scale, suspended and will not resume until a new contract is agreed upon.

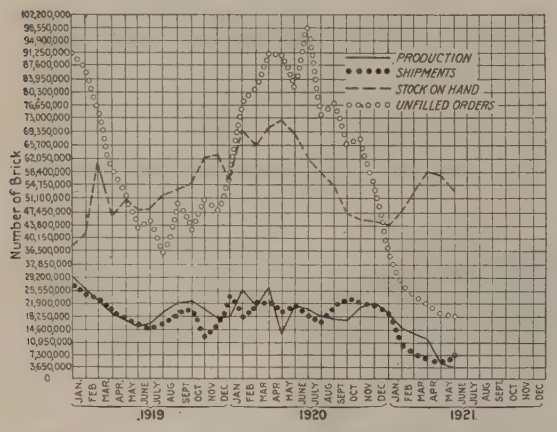
It is expected there will be little difficulty in arriving at an agreement on the sheet scale, as both sides have agreed to retention of the old base rates, but disagree upon the question of retaining an extra man on the crews, added during the war. In the tin mill scale, manufacturers are pressing a reduction in the rate of advance above the base of $3.50 per 100-lb. box of prime plates, from 1 1-8 per cent. for each 5c increase, to one per cent.

The business of the Isaac A. Sheppard Co., established in 1860 and long known as a maker of stoves, ranges and heating apparatus, is to be sold by the receivers, George W. Barr and William E. Wagner. The plant is located at Eastern Avenue and Chester Street, Baltimore, and the receivers, who will take bids by Aug 1, point out the location of the site for eastern and southern business.

REFRACTORY INDUSTRY

Valuable Information Made Public in Harmony With Secretary Hoover's Policy

The Refractories Manufacturers' Association, which embraces almost all of the manufacturers of fire clay brick and other refractories in the country, is among the first to adopt the suggestion recently made by Secretary of Commerce Hoover that trade associations should make public such production statistics as have hitherto been compiled exclusively for circulation among the memberships of such associations. The accompanying charts, giving the production, shipments, stock on hand and the unfilled orders of fire clay and silica brick from Jan. 1, 1919, to May 31, 1921, in-



Production, Shipments, Stocks and Unfilled Orders, Silica Brick

clusive, are the result. Although the charts were made up under the direction of the Refractories Manufacturers' Association, the figures are those for the entire industry and are not confined to the reports alone of the members of the association.

The charts provide a perfect picture of the industry over a period of almost two and one-half years and also reflect conditions within the iron and steel industry, since in excess of 90 per cent of the production of fire clay and silica brick goes to the latter industry. Like the iron and steel industry, the peak of unfilled orders in fire clay and silica brick was reached in the summer of 1920. At the end of May, 1920, the unfilled orders for fire clay brick were around 360,000,000, this representing a rise in this item from the previous low point in November, 1919, of about 240,000,000 brick. The curve of unfilled orders, starting with June, 1920, has been uninterruptedly downward, being almost perpendicular during the latter part of last year, when cancellations were heavy in keeping with the recession in business in iron and steel and the consequent curtailment in furnace repairs and relinings.

Stocks of fire clay brick reached low ebb last November and since have been on a gradually increasing scale, due to the continued downward trend of shipments and the fact that in spite of drastic curtailment of production, some surplus of production over shipments could not be avoided if the manufacturers were to maintain some semblance of working organizations. As of May 31, 1921, stocks on hand of fire clay brick were about 201,000,000, as compared with 212,000,000 on the same date in 1920 and about 230,000,000, the high point reached in September, 1919, when the industry still was feeling the impulse of the wartime demand. Unfilled orders at the end of May were about 45,000,000, as compared with 360,000,000 a year ago, a decline in a year of 315,000,000, or 700 per cent. The chart discloses that production since last December has run somewhat in excess of shipments, in contrast with the conditions of the previous six months, when the reverse was true.

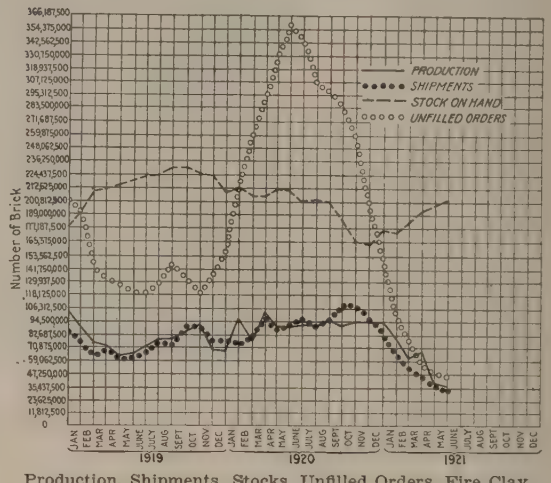
Conditions with regard to silica brick were similar to those in fire clay brick in a general way. It is noted however, that the peak of unfilled orders did not come until July of last year, as compared with May, when the industry had its largest order book in fire clay brick. Also, it will be observed the line of stocks on hand in silica brick was pointed downward at the end of May, while it was in the other direction in fire clay brick. And the last month of the period showed shipments of silica brick to be running ahead of production, or the opposite of the situation in fire clay brick.

Gas Mask for Carbon Monoxide

A public demonstration of a gas mask for protection against carbon monoxide, manufactured by the Mine Safety Appliances Co., Pittsburgh, and in which is utilized the special chemical mixture called Hopcalite, developed by the U. S. Bureau of Mines and Chemical Warfare Service, U. S. Army, was given recently in the special smoke room of the U. S. Bureau of Mines, Pittsburgh.

In the test two men entered the smoke room which contained one per cent of carbon monoxide gas in the air. The wearers of the mask remained in the atmosphere for 30 min., doing vigorous work part of the time, and experienced no ill effects whatever from the poisonous carbon monoxide gas. The gas masks are claimed to have given protection throughout the entire period of the test.

The carbon monoxide gas mask is of special interest to iron and steel industries, fire departments, in-



Production, Shipments, Stocks, Unfilled Orders, Fire Clay Brick

dustries using gas producers, illuminating gas plants, coal and metal mines and to all other persons who are apt to encounter carbon monoxide gas in their work.

Welding a steam line approximately one mile in length was successfully accomplished at the plant of the Dayton Lighting Co., Dayton, Ohio. The line is constructed of 10, 12 and 14-in. pipe and carried a pressure of about 200 lbs. During construction the line was frequently tested with cold water at a hydraulic pressure of from 400 to 500 lb., and when steam was turned into the line it was found light in every joint. The electric welding process was used, the work being done by the Ohio Wilson Welding & Repair Co., Dayton.

The open-hearth plant and rolling mills projected by the Automobiles M. Berliet at Venissieux, near Lyons, France, are to be abandoned by that company. Efforts are now being made to interest a Lorraine group of iron masters to take over the semi-completed plant. An account of the equipment, most, if not all, of which was bought in the United States, was given in THE IRON AGE of March 27, 1919.

PIG IRON COSTS

Producer Gives Figures as to Production and Freight Rates

Asked by an official of the Pennsylvania Railroad to give his ideas as to the extent the present freight rates were stifling the business of producing pig iron and consequently the other products manufactured from iron ore, a prominent western Pennsylvania pig iron producer made the following observations:

"The year 1913 was the last year in which the distribution of iron and steel products might be considered normal; that is, the distribution of them was unaffected in 1913 by any extraordinary causes and it seems proper to take the year 1913 as a point of comparison against present conditions. In the matter of freight rates charged in assembling of raw material necessary to make a ton of pig iron at Valley furnace, the following is illustrative:

Freight Rates

	1913	1920
Coke	$1.32	$2.77
Stone	.17	.42
Ore, upper rail	1.20	2.00
Ore, lake	1.10	2.48
Ore, lower rails	1.12	1.99
Supplies (estimated)	.25	.50
	$5.16	$10.16
Taxes		.31
		$10.47

"The above figures show that the freight rates in these assembling processes have increase $5.31 and while by a reduction of 30c. a ton in the carrying rate on the Great Lakes, the replacement cost of the ore from a freight standpoint has been reduced about 60c. a ton, Valley blast furnace managers will make pig iron this year, if any, from inventory material, which is loaded with the 1920 freight rates. Taking this view of it and following the iron ore through the blast furnace strictly along the lines of cost of production of other materials and disregarding their market prices, we have the following situation:

Cost of Producing Pig Iron Per Ton at Valley Furnace Now

Freights	$10.47
Ore at Minnesota mines	6.40
Coke at Connellsville ovens	3.30
Stone at quarry	.70
Costs above material	4.00
	$24.87

"In passing, let me say that the average market price of basic iron, Valley furnace, in 1913 was $14.63. The market price to-day is something less than $20, at the same point: (say $19.50).

"Since Jan. 1, this year, substantial reductions have been made in the cost of mining ore, coal and stone, none of which operations so far as the blast furnace industry is concerned is unionized in any substantial degree. It is within all the probabilities that the costs of producing these materials may be still further reduced, which probability extends to the 'costs above materials' excepting the item of taxes and as they are affected by your charges for switching.

"I hope I have made clear one of the fundamental things which is causing the present stagnation in the iron and steel business, thereby almost eliminating the commodities upon which many of your expectations of revenue are based and upon the free movement of which the prosperity of the iron and steel business generally depends.

"Allow me to say that it cannot be expected that labor in all other industries should be called upon to stand all of the burden of the reductions which are necessary and allow railroad labor to escape.

"It might be said too, that some of our friends in the pig iron manufacturing business will add an item to the figures we have given you, growing out of the very substantial increases made in the matter of wasting, to which we are not subject because we merchandise most of our former waste products, and also attention will be paid to the very substantial rates charged for docked ore; our figures dealing only with direct ore. Most of them too, will necessarily add something to the ore figures because ours are based on actual cost."

Ore Rates Declared Unreasonable

WASHINGTON, July 5.—Passing on the complaint of the St. Louis Coke & Chemical Co. vs. Alton & Southern, et al., the Interstate Commerce Commission has condemned as unreasonable rates on iron ore from Hurley, Florence and Baraboo, Wis., and Iron River, Iron Mountain and Ironwood, Mich., to Granite City, Ill., established on Aug. 26, 1920. New rates of $2.35 per ton from Baraboo and $3.25 from the other points of origin are to be established to Granite City not later than Sept. 1. These will be 15c. higher from Baraboo and 25c. higher than they were prior to the general advance on Aug. 26, last year. The rates held to be unreasonable are $2.836 from Baraboo and $4.05 from the other points mentioned.

The complaint contended that the rates on ore do not bear a proper relationship to the rates on coal northbound; that if properly related rates were made on the ore the southbound empty movement of cars would be greatly lessened. The commission said the testimony did not show any recognized relationship of rates on coal northbound and ore southbound. The complainant showed many rates on ore to other destinations made from 60 to 70 per cent of the rate on coal in the reverse direction.

Traffic officials from the Alton and the Wabash railroads admitted that the rates are relatively unreasonable because out of proportion with the rates to blast furnace and by-product coke plants served by rail-lake-and-rail hauls. They suggested that $3.25 would be a reasonable rate from the points of origin other than Baraboo and what they suggested, the commission prescribed.

The complaining plant, producing pig iron, coke and by-products, has been in operation since May, 1920, and up to the time of the hearing 110,000 tons of ore had been moved. The complainant said that if proper ore rates were made the movement of ore to Granite City would be approximately 2,400,000 tons as a counter-balance for 4,000,000 tons of coal moving in the other direction.

Cost of Living Slowly Falling

Figures prepared by the Bureau of Labor Statistics of the Department of Labor, Washington, show that about one-third of the maximum advance since 1913 in the budget of the average family has been annulled by the descending scale of prices. Wholesale prices have fallen much faster; it is the retail prices of clothing and furniture, and the recent advance in rents, which have retarded the fall in the family expenditures. In terms of a $1,500 living cost in 1913, and the same standards since then, the figures follow:

	1913	a1919	a1920	b1921
Food	$573	$1,054	$1,255	$829
Clothing	249	534	716	554
Housing	201	230	271	320
Fuel and light	80	116	138	145
Furniture and furnishings	77	174	225	191
Miscellaneous	320	554	644	668
Total	$1,500	$2,662	$3,249	$2,707

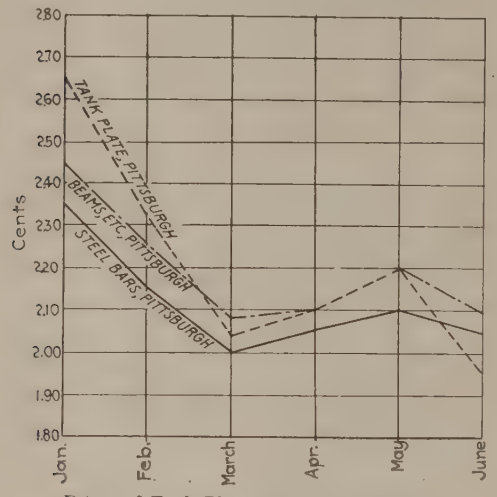
a—Based on figures for June. b—Based on figures for May.

For the past several years it has been the custom of the Youngstown Sheet & Tube Co., Youngstown, Ohio, to award to any of its employees by whose act a life is saved by reason of accident, or bodily injury averted, a solid gold safety fob. Such a fob was recently presented Joseph Kukura, a helper on No. 3 blast furnace, in the presence of officials of the company. In presenting the fob, Safety Director James M. Woltz complimented the blast furnace department for its success in holding accidents to a minimum. E. T. McCleary, assistant general superintendent, said that with the Sheet & Tube company it will continue in the future as in the past, Safety First, then quality and tonnage. Kukura, recipient of the fob, rescued a fellow employee who had fallen in a hot cinder bed.

TREND OF HALF YEAR

Readjustment of Prices of Pig Iron and Finished Materials in Past Six Months

Looking back over the course of prices on pig iron and steel products during the first six months of 1921, it may be noted that the downward trend has proceeded in orderly fashion. Aggregate price reductions during this period have varied according to products, the greatest drop being on galvanized steel sheets, the price of which at the end of June was $19 a ton below its Jan. 1 quotation. Plates have declined $15 a ton, structural shapes, $9 to $10, steel bars, $7 to $8 and wire products $5 to $7. In pig iron the reductions have been proportionate. Basic, Valley furnace, declined $9.50 during the six-month period, while foundry iron at Philadelphia has shown a decline of about $8, at Chicago $12, and at Birmingham $13.



Prices of Tank Plates, Beams and Bars—Jan. 1 to June 30, 1920

This rate of decline is the best answer to those self-appointed critics of the steel industry, who profess to see the whole economic readjustment being delayed by the alleged failure of the steel trade to assume its share of liquidation in commodity prices. Many market observers, including a considerable number of steel consumers, in comparing present steel prices with pre-war prices, take the low levels which existed in 1914 as a basis for a "normal" market. Steel prices in the latter part of 1914 were the lowest in a ten-year period, and hence are not truly representative of the general average of steel prices before the war. A ten-year pre-war average is undoubtedly a fairer measure of comparison, and if this is followed it will be noted that 1921 steel prices have already reached a point that is roughly, only $10 to $12 a ton above the pre-war average.

For example, the ten-year average for plates, 1905 to 1914, inclusive, was 1.47c., Pittsburgh, whereas plates in the last week of June were easily obtainable at 1.90c., Pittsburgh, a difference of only $8.60 per net ton. Structural shapes were obtainable at the end of June at 2c., Pittsburgh, the ten-year pre-war average being 1.48c., Pittsburgh, an advantage in the present price of only $10.40 per net ton. Steel bars are to be had at 1.95c. to 2c., Pittsburgh, which is $11 80 or $12.80 higher than the pre-war average.

In pig iron the price reductions of the first half of the year have, in a few instances, been drastic. Basic iron at Valley furnace has declined from $30 on Jan. 1 to $20.50, a drop of $9.50, or more than 30 per cent. No. 2 foundry iron at Chicago has declined during the six-month period from $31.50 to $20.50, a total of $11. Other grades have declined proportionately. The greatest drop is in Alabama iron, which declined from $35 to $22. The ten-year pre-war average for basic iron, Valley furnace, was $15.57, as compared with $20.50 the last of June, the difference representing approximately the increased cost of assembling the raw materials, ore, coke and limestone in freight rates and labor costs alone, not counting higher costs of these raw materials. The ten-year pre-war average for No. 2X iron, Philadelphia, was $17.46, as compared with $25.50, quoted the last week in June.

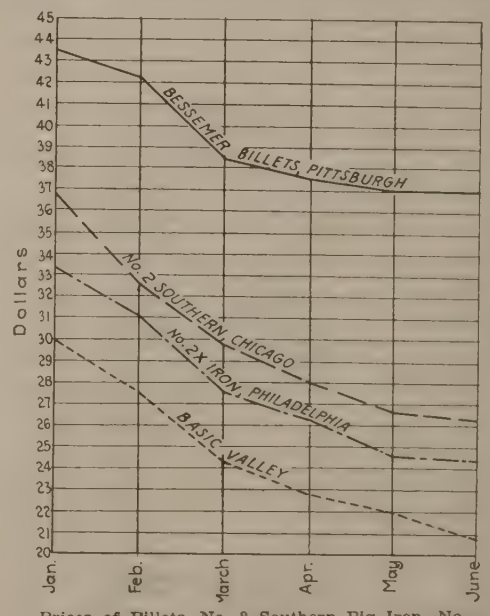
In semi-finished steel the decline has not been so great during the first half as in finished steel. Billets have dropped only $6.50 per gross ton.

The accompanying table shows the monthly averages for several grades of pig iron, semi-finished steel and finished steel for the first half of the year, as compiled from THE IRON AGE price tables.

During the first five months of the present year 806 men have been killed by accidents at coal mines, according to reports received by the United States Bureau of Mines, against 874 killed during the corresponding months of 1920, a decrease of 68 fatalities, or 7.8 per cent. The output of coal for the same months was 201,000,000 short tons in 1921 and 245,000,000 tons in 1920, a decrease during the present year of 44,000,000 tons, or 17.9 per cent. These figures represent a fatality rate of 4.01 per million tons mined in 1921, and 3.57 per million tons mined in 1920.

Prices of Leading Products for First Half of 1921

	Jan.	Feb.	March	April	May	June
No. 2X pig iron, Philadelphia	$33.34	$31.09	$27.59	$26.26	$25.71	$25.50
No. 2 Southern, Cincinnati	36.75	32.65	29.80	28.00	26.70	26.37
No. 2, Chicago	31.50	29.00	25.60	24.00	22.80	20.75
Basic, Valley furnace	30.00	27.50	24.25	22.88	22.00	20.75
Bessemer iron, Pittsburgh	33.96	31.46	28.16	26.96	25.96	24.71
Bessemer billets, Pittsburgh	43.50	42.25	38.40	37.50	37.00	37.00
Wire rods, Pittsburgh	57.00	54.50	52.00	49.00	48.00	48.00
Steel bars, Pittsburgh	2.35c.	2.15c.	2.00c.	2.05c.	2.10c.	2.05c.
Tank plates, Pittsburgh	2.65c.	2.33c.	2.04c.	2.10c.	2.20c.	1.95c.
Beams, etc., Pittsburgh	2.45c.	2.26c.	2.03c.	2.10c.	2.20c.	2.10c.
Wire nails, Pittsburgh (per 100 lb. keg)	$3.25	$3.21	$3.02	$3.13	$3.05	$3.00



Prices of Billets, No. 2 Southern Pig Iron, No. 2X and Basic—Jan. 1 to June 30, 1921

Canada's Trade with the United States

Value Was Largest on Record—Increase in Shipments of Rolling Mill Products an Outstanding Feature—Heavy Movement of Machinery

BY WILLIAM LEWIS EDMONDS

TORONTO, June 27.—Canada's import trade with the United States in iron and steel and products thereof during the fiscal year 1920-21 was marked by several outstanding features.

In value the trade was the largest on record, the total being $226,862,465, an increase over the previous high point of 1917-18 of $37,092,544, or more than 19 per cent. Compared with 1919-20, it is a gain of $48,200,859, or about 27 per cent, while it is in excess of five years ago by $140,196,705, or nearly 162 per cent.

The proportion the imports of iron and steel from the United States bore to the total from all countries was slightly less than in the previous year, being 92.36 per cent, as against 95.88 per cent. This is nearly altogether due to the fact that there was an increase of over 151 per cent during the year in the imports from the United Kingdom, the total from the latter country having a value of $16,698,085, compared with $6,637,065 for the fiscal year 1919-20.

Rolling Mill Products

The most outstanding increase in the imports from the United States was in rolling mill products, the total value of which was $70,750,358, against $41,717,551 in 1919-20 and $62,151,289 two years ago. The following table gives the principal imports from the United States under this classification during the past two years and the total from all countries for the fiscal year 1920-21:

	United States		All Countries
	1920-21	1919-20	1920-21
Rolled iron or steel and cast steel in bars, bands, etc.	$11,587,594	$4,563,307	$13,876,312
Rolled iron or steel hoop, band, etc., 14 g. and thinner	1,158,614	501,636	1,158,614
Rolled iron or steel, hoop, band, etc., gal. or coated	1,124,797	608,042	1,206,659
Rolled steel, not further mnfd. than cut to shape.	483,477	323,559	507,952
Hammered, drawn or cold rolled bars or shapes..	390,332	194,166	391,842
Steel rails	980,191	370,824	980,191
Shafting	445,845	157,171	448,361
Boiler plate	1,040,554	526,133	1,040,554
Canada plates, Russian iron, terne plates, etc...	1,153,659	901,722	1,243,108
Tin plate	8,605,139	6,556,216	8,902,463
Plates not less than 30 in. wide and not less than ¼ in. thick	2,603,421	1,168,601	2,603,921
Plates or sheets, sheared or unsheared	1,178,474	858,598	1,179,926
Sheets, 14 gage and thinner.	5,866,282	2,979,161	6,497,410
Galvanized sheets, flat ...	2,584,206	912,819	3,566,291
Skelp, sheared or rolled in grooves	5,963,149	4,294,019	5,963,149
Wire rods	1,630,836	1,135,348	1,630,836
Angles, beams, channels, etc.	8,833,877	3,959,625	8,850,134
Steel plate over 12 in. wide for structural work.	1,532,521	729,927	1,532,521
Boiler tubes	2,505,642	1,252,973	2,640,125
Wrought or seamless tubing	1,307,940	624,917	1,313,853

Smelted Products

In smelted products the imports from the United States more than doubled, having a value of $3,750,261 against $1,442,401 the previous year. The principal items were:

	United States		All Countries
	1920-21	1919-20	1920-21
Ferromanganese	$577,505	$7,257	$1,247,827
Pig iron	2,287,027	778,187	2,311,184
Billets, less 60 lb. lineal yd.	476,503	466,698	549,425
Ingots, blooms, puddled bars, etc.	253,245	6,187	253,245

New Record in Machinery Imports

Imports of machinery were the largest on record, and more than double in value those of 1916. The total for all kinds except agricultural machinery was $40,766,905, an increase over the previous year of $6,479,952. The most outstanding increases were in textile, pulp and paper mill and printing machinery. Principal items for the two years were:

	United States		All Countries
	1920-21	1919-20	1920-21
Steam and electric shovels	$569,722	$398,195	$569,722
Ore and rock crushers ..	729,420	408,118	788,820
Adding machines	953,253	923,512	955,373
Cash registers and parts.	322,007	225,944	322,007
Typewriting machines	998,481	1,042,345	1,001,587
Bookbinding and ruling machinery	777,007	519,975	791,029
Printing and lithographic presses	1,631,314	947,230	1,639,505
Typecasting and typesetting machines	1,244,256	899,904	1,244,504
Air compressing machines.	263,219	249,639	305,179
Cement making machines..	133,065	32,510	135,042
Coal handling machines..	166,818	102,777	168,577
Concrete mixing machines.	86,205	59,546	86,405
Cranes and derricks	848,157	1,005,199	876,717
Power lathes	542,246	741,330	565,337
Paper mill machines	1,296,543	939,302	1,988,945
Pulp mill machines	415,252	102,033	499,048
Rolling mill machines....	646,087	533,308	646,635
Saw mill machines	320,543	200,125	321,969
Textile machinery	4,932,506	2,056,400	6,199,562
Machinery, wholly or in part of steel	19,704,650	17,386,182	20,977,346

Striking Gains in Engines

There were some striking increases under the classification of "Boilers, engines, windmills and pumps." The aggregate value under this classification was $25,220,438, against $22,705,319 the previous year. There was a decline in the imports of automobile engines of nearly $3,000,000 and in gasoline and gas engines of nearly $800,000, but on the other hand there was an increase of $5,398,552 in traction engines for farms. The principal imports were:

	United States		All Countries
	1920-21	1919-20	1920-21
Steam boilers and parts..	$493,434	$374,183	$861,508
Automobile engines	5,387,416	8,402,351	5,388,444
Gas and gasoline engines.	2,175,077	2,960,728	2,257,870
Steam engines	443,968	454,403	505,182
Railway locomotives	542,643	523,732	542,643
Parts of traction engines.	1,871,647	1,404,969	1,871,647
Traction engines for farms	12,597,316	7,198,764	12,603,592
Power pumps	1,201,506	910,713	1,255,244
Hand pumps	293,451	247,478	298,901

Increase in Agricultural Implements

Imports of agricultural implements from the United States had a value of $11,431,444, an increase over the previous year of $4,639,199, and the largest by $1,787,000 ever experienced. Principal imports were:

	United States		All Countries
	1920-21	1919-20	1920-21
Cream separators and parts	$1,828,078	$1,373,923	$2,110,537
Harvesters, self-binding ..	1,106,426	641,210	1,118,133
Potato diggers	101,267	53,015	101,267
Cultivators	177,170	78,432	177,170
Harrows and parts	382,554	255,357	382,770
Plows and parts	2,526,472	1,795,438	2,526,503
Threshing machine separators	1,534,572	808,059	1,534,572
Parts threshing machine separators	1,056,794	442,505	1,056,929
Plow parts, mold boards, etc.	778,667	409,059	778,667

Cutlery and Hardware

Except in knives and forks of steel and scissors, cutlery imports from the United States experienced a decrease as a result of the increase in the imports from the United Kingdom. Taking cutlery and hardware as a whole, however, there was an increase of $420,389, the figures for the two years being $3,815,885 and $3,395,496 respectively. The figures covering imports from the United Kingdom were $1,938,585 and $819,430, an increase for the year of $1,119,155. The principal im-

ports from the United States under the classification of "cutlery and hardware" were:

	United States		All Countries
	1920-21	1919-20	1920-21
Knives and forks of steel.	$301,742	$266,424	$723,916
Pen - knives and pocket knives	104,297	192,882	704,225
Razors of all kinds	41,109	104,128	173,483
Scissors and shears	233,907	138,205	297,414
Cutlery n. o. p.	253,442	267,838	570,260
Builders' hardware	703,950	657,472	784,815
Locks of all kinds	676,418	560,380	702,142
Butts and hinges	164,078	116,300	165,642
Nails, wire	197,786	83,726	197,807
Nuts, rivets and bolts	389,355	316,518	395,632
Screws	180,369	141,062	182,538

Under the classification of tools and hand implements there was a substantial increase in the imports from the United States, the trade having a value of $2,315,480, against $1,942,036 the previous year. As the total imports from all countries had a value of $2,562,029, it will be seen that the lion's share of the trade fell to American manufacturers. Although there was a decline of about $10,000 in the imports of American stamped and enameled products, it was due to a smaller trade in the less important lines, agateware, ironware and tinware all showing increases. Total trade under this general classification had a value of $937,027, against $947,306 for the previous year.

Decline in Automobile Imports

Owing to the two-fold influence of special tax and trade depression, a decline in imports of automobiles was to be expected. In passenger cars, imports had a value of $8,339,704, against $11,196,327 the previous year; freight trucks, $3,476,163, against $3,811,139; automobile parts, $11,729,731, against $12,660,789 the previous year. Total imports of automobiles and parts from the United States had a value of $23,545,598, against $27,668,255 the year before, a decline of $4,122,657.

Electric and Gas Apparatus

Total imports of electric and gas apparatus from the United States had a value of $16,343,425, compared with $15,371,461 the previous year. The principal items were as follows:

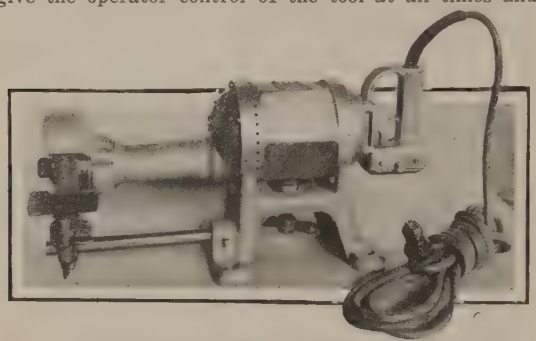
	United States		All Countries
	1920-21	1919-20	1920-21
Batteries, storage	1,363,986	$1,470,479	$1,364,456
Cooking and heating apparatus	127,627	111,148	129,575
Dynamos and generators (electric)	1,227,398	1,039,067	1,323,664
Meters	352,348	243,252	376,968
Electric motors	2,578,807	1,956,639	2,628,734
Sockets	300,935	138,312	304,160
Telephone instruments	889,553	649,994	922,357
Transformers	167,427	123,118	167,427
Electric apparatus n. o. p.	7,296,540	7,311,499	7,633,425
Electric light fixtures	650,548	698,879	668,475
Electric lamps	998,332	1,163,126	1,213,246
Gas and oil fixtures	132,321	140,066	136,758

With the enormous hydro-electric power developments and electric railway expansions which are under way in various parts of the Dominion, and particularly in the provinces of Ontario and Quebec, imports of electric apparatus will probably be extensive for some time to come.

Portable Electric Grinder

The Black & Decker Mfg. Co., Baltimore, is adding to its line of electric drills the portable electric grinder shown in the accompanying illustration.

The pistol grip and trigger switch are designed to give the operator control of the tool at all times and



Pistol Grip and Trigger Control Make It Unnecessary to Shift Either Hand to Start or Stop Machine

to make it unnecessary to shift either hand to start and stop it. Although essentially portable, the machine is supplied with a detachable base and adjustable tool rest, as shown, so that it can be used with equal facility as a bench grinder. The equipment also includes two 5 x 1 in., grinding wheels, one fine and one coarse; a wire brush wheel and a rag buffing wheel. The machine is designed for a wide range of usefulness in machine shop, foundry and garage work.

The mechanism is protected from dust and foreign matter, has grease lubrication throughout and forced air cooling. Gears and shafts are of chrome nickel steel and the housing of aluminum alloy. The grinder can be operated on either direct or alternating current. The motor is ½ hp., with a no load speed of 3200 r.p.m. The diameter of the wheel arbor is ¾ in., and the net weight, without base, 21 lb.

The Building Trades Council of Cincinnati has adopted resolutions calling for a grand jury investigation of the building industry in Cincinnati, following charges of collusion between employers and employees to keep costs of building up, made at a meeting to consider the building situation.

New Plant for Making Detinned Billets

The Metal & Thermit Corporation has constructed and will shortly place in operation in South San Francisco, Cal., a large new plant for the production of hydraulically compressed detinned billets, in addition to the detinning plants already operated by this company for several years at Chrome, N. J., and East Chicago, Ind.

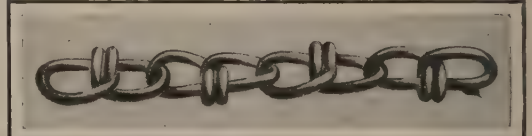
The new South San Francisco plant has also been equipped with a welding shop for repairing by the Thermit process. The new plant will be in charge of Em. Kardos, superintendent. The former offices of the company at 329-333 Folsom Street, San Francisco, have been moved to the South San Francisco plant.

Fiftieth Anniversary of Shipyard

Commemorating the fiftieth anniversary of the establishment of the Roach shipyard at Chester, Pa., now the property of the Merchant Shipbuilding Corporation, the latter organization has published an attractive issue of its employees' magazine, The Chester *Compass*, devoted almost exclusively to a history of the business from the time it was started by John Roach, sometimes called "the father of American iron and steel shipbuilding." J. H. Loughran is editor and business manager.

New Design of Weldless Machine Chain

A new design of weldless machine chain known as Noweld chain has been brought out by the Chain

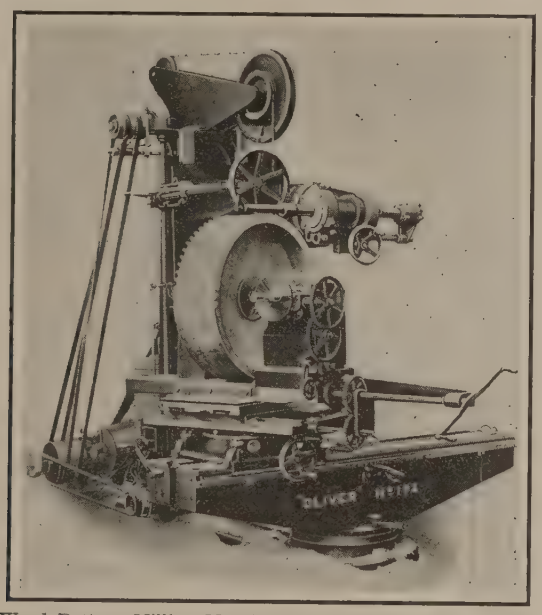


Products Co., Cleveland. It is a woven steel wire chain intended for manufacturing purposes where machine chain is required, and to take the place of electrically welded machine chain. The maker points out that in making the weldless type of chain, high carbon or even an alloy steel can be used, increasing the tensile strength or giving the exact physical characteristics wanted.

Gear Cutting Attachment for Pattern Milling Machine

A complete set of appliances for cutting spiral, spur, bevel and worm gears has been marketed by the Oliver Machinery Co., Grand Rapids, Mich., for use with its No. 102 wood pattern milling machine.

The outfit includes a 14 in. universal dividing head with tail stock, index plate, index chart, two face plates, a set of raising blocks, recessing change gears, quadrants, and a connecting mechanism installed between the table and the dividing head. The machine is so arranged that in turning spirals the gear pattern rotates according to the spiral as the cutting progresses from the back edge to the front edge. In cutting a bevel gear pattern 30 in. in diameter, 12 in. face, the makers state that very close proximations of the theoretically



Wood Pattern Milling Machine Equipped with Gear Cutting Attachment

perfect bevel gear patterns may be made in a few hours as against several days required in the ordinary methods. The attachment shown in the accompanying illustration is known as the No. 733.

Establish Open Shop

Ten of the 22 boiler and sheet iron manufacturers of St. Louis have established the open shop. They are: Ruemmeli-Dawley Mfg. Co.; Hummel Mfg. Co.; Missouri Boiler & Sheet Iron Works; Philip A. Rohan Boat, Boiler & Tank Co.; Alois Aufrichtig Cooper & Sheet Iron Mfg. Co.; John Nooter Boiler Works Co.; Heine Boiler Co.; John O'Brien Boiler Works Co.; William Koch Boiler & Sheet Iron Repair Works and Campbell & Dwyer Boiler & Sheet Iron Works. When the contract with the Boilermaker and Helpers' Union expired, the men demanded its continuation at the old rate of $1 an hour for layers out, 90 cents an hour for boilermakers and 70 cents an hour for helpers. The manufacturers' counter offer of 90c., 80c. and 50c. respectively was rejected. Eleven signed with the union, the others became open shops.

At a dinner last week at the Norton Boat Club, Lake Quinsigamond, 49 employees of the Norton Co., Worcester, Mass., grinding machinery and abrasives, were presented gold medals and framed engraved certificates signed by the directors, in recognition of 25 or more years service. A. C. Higgins, treasurer, made the presentations. The medal on one side shows a grinding wheel flanked by two mechanics, and on the reverse side bears the name of the recipient and the words "Presented by the Norton Co. in Recognition of 25 Years of Faithful Service."

Statistics of Commodity Consumption from Warehouses

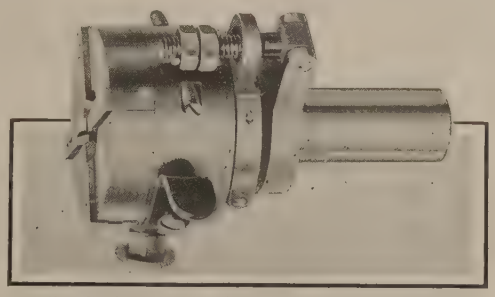
The necessity for statistics as to consumption of commodities from warehouses was stressed in the paper read by L. T. Crutcher, representing the domestic distribution department of the Chamber of Commerce of the United States, before the Central Warehousemen's Club, Chicago, July 1. He said: "Statistics are important in periods of depression to indicate when operations in any particular line may be enlarged safely; and in times of prosperity they furnish a light by which the prudent may be guided. Briefly, accurate statistics such as you warehousemen could prepare would act as a trade stabilizer." He stated further: "Since the value of money is based wholly upon its power in purchasing commodities; and since the warehousemen hold the commodities, it seems reasonable to believe that in due time they will be able to design negotiable paper which will be as carefully safeguarded, equally elastic and as widely accepted as is that of bankers." Mr. Crutcher also advocated pool-car shipments.

New Style DS Geometric Die Head

A new style DS Geometric self-opening and adjustable die head, primarily designed for Brown & Sharpe automatic screw machines but also adapted to other makes of automatics, has been placed on the market by the Geometric Tool Co., New Haven, Conn. The die head is simple and compact and does not depend on the turret feed but floats to suit the thread being cut, thereby eliminating stripping and shaving of threads, and making the usual close camming of the machine unnecessary. Where it is used there is no reversing of the spindle to back the die head off the threaded work.

A lever trip is provided which reduces the force of tripping the die head and accordingly lightens the reaction on the threads cut. Buffer springs allow the die head to yield slightly when chasers come in contact with the work, insuring a smooth thread throughout. Two check nuts at the side provide easy adjustment of the point of tripping, and push buttons are provided to eliminate trouble in inserting the chaser. No face plate is necessary, making it possible to use projecting chasers where required for cutting close to the shoulder.

Chasers are of sturdy construction, have long bear-



Buffer Springs Allow the Die Head to Yield When Chasers Come in Contact with the Work

ings in the die head skeleton and are supported by hardened keys, preventing tilting and consequent cutting of taper threads. There are four chasers in each die head.

A spring closing attachment is located in a convenient position to strike a stop on the machine, automatically closing the die head when the turret revolves. It is of especial value when closing the die head rapidly and eliminating shock and wear. The die heads have shanks to fit the particular size machine on which they are to be used, and micrometer adjustment is provided.

They are made in three sizes, 5/16, 9/16 and ¾ in., the shanks being ⅝ x 1 5/16, ¾ x 2 1/16 and 1 x 2⅜ in., respectively. They have a capacity of 1/16 to ¾ in. in diameter, 1¼ in. or shorter to 1¾ in. in length, and 18 or finer to 10 or finer pitch.

Many New Features of Tariff Bill

Administrative Provisions Mark Important Departure

Differences of Opinion as to Effect of American Valuation Plan—The President Given Large Powers to Negotiate for Reciprocity—Numerous Changes of Rates Already Made and Many More Will Probably Be Adopted—Sharp Opposition to Ferroalloys Tariff Expected

BY L. W. MOFFETT

Washington, July 5.
THE IRON AGE BUREAU,
816 Fifteenth Street.

THE metal schedule of the permanent tariff bill as finally drafted and accepted by Republican members of the House Committee on Ways and Means carries important changes in rates of duty on pig iron, scrap, spiegeleisen, ferrosilicon, ferromanganese and manganese ore from recommendations made by the subcommittee in charge of the schedule which had been tentatively adopted and in part published in THE IRON AGE of June 30. The revisions, determined upon shortly before the bill was given out for publication, lowered rates on pig iron, scrap, and spiegeleisen from $2.50 per ton and placed a duty of $1.25 on these products, as compared with the Payne-Aldrich duty of $2.50 on the former two and $1 on scrap. The reduction in pig iron and spiegeleisen under the act of 1909 therefore was 50 per cent, while on scrap there is an increase of 25 per cent. All three of these products are in the free list in the Underwood-Simmons act. Changes made in the final draft as to the ferroalloys mentioned and manganese ore cleared up conflicts that appeared in recommendations of the subcommittee. There is reason to believe, however, that these items had undergone previous changes at the hands of the subcommittee itself and that, as an instance, manganese ore had been placed on the free list and ferromanganese given the Payne-Aldrich duty of $2.50. Insistence upon protection on these products brought about the duties that have been printed in the bill, and apparently based on the claim that they come under the classification of infant industries. This is one of the outstanding features of the schedule.

Crucible Steel Industry

Another feature is the recognition given to the crucible steel industry, as had been urged at hearings, though recommendations made were not specifically followed. The attention given this part of the steel industry may be observed by the classification and rates of duties made with respect to such products as chrome metal, tungsten, vanadium, molybdenum, etc. The placing of ferromanganese in a ferroalloy paragraph instead of in the pig iron class is another interesting change, marking the first time this has been done in tariff history in this country. Request that this be done was made by domestic producers of that alloy. Chrome ore appears in the free list.

Follows Payne-Aldrich Law

The metal schedule as a whole on the heavier products follows rather closely the Payne-Aldrich schedule as to duties, but, with some exceptions, carries slightly lower duties and approximately seems to follow the principle that applies to the entire bill as explained by Chairman Fordney of the Ways and Means Committee. He estimated that the duties in the new bill will range between 18 and 20 per cent as compared with 18.55 per cent in the Payne-Aldrich act. The Underwood-Simmons average rate, he said, was 6 per cent and the Dingley average 26½ per cent. Like the Payne-Aldrich act, rates in the metal schedule of the new bill are stated in specific rather than ad valorem terms wherever practicable. There have been many transfers of products from the Underwood-Simmons free list to the dutiable list, but among those continued on the free list is iron ore, which carried a duty of 15c. a ton in the Payne-Aldrich act.

Duty on Magnesite

Sharing in interest with regard to disposition of products carried in the metal schedule were several which are consumed by the iron and steel trade, including magnesite, fluorspar, and pig tin. There was considerable discussion over magnesite, with prominent makers of refractories who import material from Austria where they have money invested in mines asking that it be made free, while domestic producers, especially in Washington and California, asked for a duty. The latter have been victorious so far as the present bill is concerned, calcined magnesite, including dead burned and grain, being given a duty of ¾c. per pound, while crude or ground magnesite was made dutiable at ½c. a pound. Fluorspar, for which some interests had asked a duty of $6 a ton, was given a duty of $5, with the provision that after the expiration of one year beginning on the day following the passage of the tariff act, the duty shall be $4 a ton. Tin in bars, blocks or pigs, and grain or granulated tin, were made dutiable at 2c. a pound. There is a provision in the free list, however, which deals with tin ore and pig tin, blocks, and bars, which requires clearing up. It calls for a duty of 4c. a pound on tin ore and 6c. a pound on pig tin, etc., "when it is made to appear to the satisfaction of the President of the United States that the 'mines' of the United States are producing 1500 tons of cassiterite and bar, block, and pig tin per year," the President to make the fact known by proclamation, after which the duties would become operative. This paragraph, except for placing a duty of 6c. on pig tin, etc., is similar to the one in the present act, which would apply a rate of 4c. to the pig tin as well as to the ore. So far as it applies to ore it perhaps is not important because no tin ore is mined in the United States, but as the paragraph reads, it relates to the "mining" of pig tin, bars, etc., and if these commodities were manufactured to the extent of 1500 tons it might be questionable whether the 6c. rate could technically be applied. Zinc and lead-bearing ores are given the same duties as those carried in the Payne-Aldrich act, the former ranging from ¼c. to 1c. per pound on the zinc content for 10 to more than 25 per cent material, and free when under 10 per cent. The Underwood-Simmons act carries a flat ad valorem duty of 10 per cent. Restoration of the Payne-Aldrich duty of 1½c. per pound on the lead content doubles the present duty of

¾c. Crude aluminum and aluminum scrap are given a duty of 5c., as compared with 7c. in the Payne-Aldrich act and 2c. in the Underwood-Simmons act, while aluminum plates, sheets, etc., are given a duty of 9c. as compared with 9c. and 3½c., respectively.

Important Departures

Administrative features in the bill mark some wide departures in tariff making. Undoubtedly one of them, a provision that has been the source of sharp differences of opinion, not only as between Democrats and Republicans, but also between the Senate Committee on Finance and the House Committee on Ways and Means, regardless of party, is that fixing duties on an American valuation basis. The Senate committee refused to approve this provision in the emergency bill as the latter passed the House and it now is under attack by House Democrats, one of whom, Representative Garner of Texas, ranking member of the Committee on Ways and Means, states that the rates in the new tariff bill, when considered in the light of American valuations, are much higher than in any tariff passed by Congress since the Civil War. This claim is vigorously denied by Representative Fordney and is one of many evidences that the bill is going to be subjected to much controversy. The American valuation provision is apparently not clearly understood, and has caused many members of Congress to hesitate about comparing rates of duty in the new bill and the Payne-Aldrich act. Under the present and past laws, the assessment of customs has been based upon foreign value. It is stated that the operation of the section may be made difficult because it calls for assessment of customs upon the value in the American market of a comparable and competitive product, while it is estimated that 50 to 60 per cent of all imports have no standard value. In the case of steel, however, comparison would be simple, and it is assumed the American value would be placed on the Pittsburgh basis. But most steel duties are specific and would not involve valuations. In denying that the American valuation would mean a great increase in rates, the Republican members of the Ways and Means Committee said that because of the higher values in the American market the rates of duty may be decreased 30 per cent without lowering the protection which the rates will afford or the amount of revenue they will produce. Or, according to Mr. Fordney, a duty of 70 per cent, if based on the American valuation, will produce the same revenue and afford the same protection as a duty of 100 per cent if assessed on the present foreign valuation system.

Bargaining Made Possible

Request made by the Consolidated Steel Corporation, and other interests for a bargaining tariff has been complied with in the new bill, which goes into this interesting feature at considerable length. This provision, in brief, authorizes the President to enter into reciprocal arrangements with foreign countries by treaty, to be ratified by the Senate. One clause also gives the President the right to impose higher duties on articles from countries which discriminate against the United States, while still another provides that within three years the President may conclude reciprocal arrangements with foreign countries by which for five years their articles may be imported into the United States at not more than 20 per cent reduction of the regular rates in the tariff. Provision also is carried repealing the Canadian reciprocity agreement, effective since 1910. The measure authorizes customs officers to obtain verified statements of production costs where it is considered they are necessary and changes to some degree approximately one-half of the customs laws with regard to passage of commodities through customs houses, methods of assessing duties and other definitions to guide customs officials.

The bill is so bulky, contains so much new material, and is the object of such a great variance of opinion, over and above the expected political differences, that there can be no question that it will be the object of sharp debate in both branches of Congress and predictions are made that it will be considerably changed before it passes the Senate, though it is traditionally true that this happens to all tariffs. The bill, however, was the source of many differences among Republican members of the Ways and Means Committee. This is shown by the changes made from recommendations of subcommittees of the various schedules, as to a number of schedules even after the first print of the bill was given out, calling for a revised print, and the issuance of a supplementary change in mimeographed form. Changes in the metal schedules referred to were among those made at a late hour. It is proposed that other changes by way of amendments from Republican members of the Ways and Means Committee will be made on the floor of the House. While this is commonly done, it is claimed that in this instance they may be very important in some instances and not be confined to the more ordinary changes as to phraseology. Whether the metal schedule will be affected by these revisions remains to be seen. It is stated that the House Republican caucus held last Thursday evening developed considerable difference of opinion, and that it then was found amendments would have to be made in order to insure strong Republican support of the bill, which will be fought by Democrats who urged preparation of another bill and a minority report. Under the parliamentary procedure in the House, debate can be limited by special rule, and because of this, Republicans propose to hold amendments down to the minimum and admit only those acceptable to them. It has been proposed to put the bill through the House in two weeks, the intention being to take it up for consideration to-morrow by the full Committee on Ways and Means.

Hearings in the Senate

Hearings on the tariff before the Senate Committee on Finance, according to Chairman Penrose, will occupy "one or two months" and probably will begin as soon as the bill passes the House. Those who do not look for the House to make changes they desire are waiting to present protests before the Committee on Finance.

This is said to be true with regard to some independent steel interests, and their position denotes that duties on manganese ore and ferroalloys, particularly on ferromanganese, will be the storm center of the metal schedule, which, by reason of additional classifications, is unusually large, consisting of 94 paragraphs as compared with 66 in the Underwood-Simmons act.

They have protested that manganese ore should be placed on the free list and ferromanganese either free listed or given a duty of not more than $10 a ton. Contention is made by them that a duty of 1c. per lb. on manganese ore would mean an added cost of only 7c. per ton to the steel maker who manufactures his own ferromanganese, calculating that the average imports will run about 48 per cent in manganese and that it requires 15 lb. of ferromanganese (taking 2.2 tons of ore per ton of ferromanganese) to make a ton of soft steel. As against this, it is asserted that a duty of 2 1/5c., based on the quantity of ore in a ton of the alloy, on ferromanganese in excess of 1 per cent of carbon—the average tonnage is said to run between 4 and 7.50 per cent in carbon—would be equivalent to $38.43 a ton based on 78 per cent ferromanganese, or approximately 26c. a ton additional in the cost of making steel. On this basis, it is claimed, the annual cost to independent steel makers as the result of the 2 1/5c. ferromanganese duty

would be approximately $5,200,000, estimating their normal finished steel output at 20,000,000 tons. Protests also have been made against any duty on either fluorspar or magnesite, while those urging duties are said to be prepared to support strongly the proposed levies or to ask for higher ones. In the case of fluorspar, consumers have stated that the pre-war price ranged from $4.75 to $7.25 per net ton, f.o.b. mines, and that the duty now is higher than the former market price, while the pre-war price on grain magnesite was $16 per ton, Atlantic seaboard, as compared with a proposed duty of $15 per net ton.

Chairman Tilson Explains the Metal Schedule

Chairman Tilson of the sub-committee on the metal schedule made the following report in part:

"Whatever may be the facts in regard to other schedules, the rates of duty as carried in the metal schedule of the act of 1897 were revised downward in the act of 1909. A careful comparison of the two acts will show a general and substantial reduction. The revision was well and carefully done, so that comparatively few mistakes were discovered in the administration of this portion of the act in the four years during which the law was in effect. In fact, during all the bitterness of partisan conflict which raged about this law during its four years of life very little adverse criticism, except the most general kind, was ever made against the metal schedule.

"The highest tribute, however, was paid to the 1909 revisers of Schedule C by those who revised the same schedule in 1913. The revision of this schedule in 1913 could not by any stretch of the imagination be called a scientific revision. A few paragraphs were transferred to the free list. In a much larger number of cases, the carefully prepared specific rates were stricken out and either a blanket ad valorem rate or a series of more or less haphazard ad valorem rates substituted, while in the cases where ad valorem rates were applied in the act of 1909, the rates were quite generally reduced, many of them disastrously so, as subsequent events fully proved. Although ruthlessly hacked and distorted in many of its features shorn of its symmetry and rendered impotent in most respects to perform the useful functions for which it was originally designed and fitted, nevertheless the frame work and in general the classifications of the old schedule were carried over to the new in the 1913 revision.

Same General Structure

"Although conditions have materially changed in many of the metal industries since 1909 and 1913, nevertheless the same general structure of the schedule as carried in the two preceding acts is here used. Many of the classifications remain substantially the same, while in many other cases classifications have been prepared to meet the new conditions.

"In the four normal years from 1909 to 1913 the rates of duty carried in the act of 1909 proved on the whole to be reasonably protective without being excessive or prohibitive and the metal industries thrived. As soon as general business conditions return to approximately the pre-war normal many of these rates will doubtless again measure with reasonable accuracy the proper rate level. Acting upon the belief that this will be true, a number of rates which had proved satisfactory in pre-war normal times have been restored to this bill. In other cases, time and war have so changed conditions that different and sometimes higher rates have been rendered necessary.

"Difficulties have been encountered at every step in the committee's efforts to secure satisfactory information as to industrial conditions throughout the world and even at home. Government statistics mean less and have been less valuable than ever before. Statistics for the period of the war and immediately following are practically of no value whatever. Statistics showing the exports and imports during the operation of the act of 1913 are most unsatisfactory because the groupings are made either by fiscal or calendar years and that act was not in effect through either a fiscal or a calendar year before the war produced abnormal conditions. There remain the statistics of the normal years before 1914 and those now accumulating of the last year, which cannot be reckoned as normal, but which serve to indicate tendencies and the direction in which industrial affairs are moving. Some of the most valuable information received as to conditions in foreign countries came from persons who have been abroad recently on business trips. Letters containing offers from foreign manufacturers have been submitted with price lists and advertising matter. Also original invoices of foreign made goods. From all the information received, it appears clearly and beyond question that as far as manufactures of metals are concerned the spread or differential between the labor cost of articles made here and abroad is much greater than before the war. This is so to a very marked degree in Germany and only less so in the other countries which compete with us in the metal industries. It is well known that before the war Germany had already become our most effective competitor in the manufacture of metals. With uninjured, and in many cases greatly improved, facilities for manufacturing, with abundant skilled labor at wages less than one-fourth, in many cases less than one-eighth, measured in gold, that of the corresponding American labor, the German faces his American competitor, now paying the highest wages ever paid in any country at any time, except in this country for a portion of last year. The answer to the problem outlined by such a condition furnishes abundant reasons for such increases in rates of duty as are proposed in this Title.

Divided Into Three Classes

"For the purposes of determining proper rates of duty the articles contained in this Title may be roughly divided into three classes.

"The first class includes articles produced in large part by machinery, where the element of labor, though important, is relatively small as compared with the quantity and value of the product. This class includes iron and steel in the earlier stages of manufacture embracing the many forms of what are sometimes called the heavy or rolled product. Even for this class of products the increase of labor cost alone might justify an increase in rates of duty beyond what was ever before required, but rates have not been increased upon these articles. In many cases they have been substantially reduced below the rates in the Act of 1909 and in some cases below the Act of 1913.

"Formerly many articles of a higher stage of manufacture fell within this class because of the fact that in this country labor saving machines and appliances were used to a degree unknown in any other country. America was the land of 'jig made' goods. With proper machinery and an adequate equipment of tools, jigs, dies, gages and fixtures, one American workman could turn out several times the output of his brother workman abroad. Such advantages on our side in a large measure have ceased to exist and in many of the older industries have entirely ceased. With this change, such industries pass into the next class.

"The second class comprises articles produced in industries long established and thoroughly developed, wherein advantages by way of labor saving devices have ceased to exist, where the element of labor is relatively most important and where the difference in labor cost is the controlling factor in competition. The list of this class of industries is growing as the machines, the equipment and the methods of this country become the common property of all industrial countries.

"The third class consists of those articles the production of which was begun or largely developed during the war period and which have not yet reached the stage of competition upon even terms with those longer engaged in the industries in foreign countries. A number of these may be truly called 'infant industries.'

"*Surgical and Scientific Instruments.*—Among the new industries may be mentioned surgical, dental, philosophical and scientific instruments. Prior to the war we had been accustomed to import these articles largely from abroad. The making of them had not been satisfactorily developed in this country, which, when the war came to us, became a matter of genuine and serious regret, not to mention inconvenience and danger. Before the war ended we had made considerable progress in making these articles and it is proposed in this bill that so far as protective duties can properly assist, to insure the continuance of these industries here.

"*Scissors.*—Long before the war the making of steel laid shears had become an important industry in the United States, but the making of solid steel scissors had been almost entirely neglected, so that the war found us without a scissors industry. This was developed and built up during the war and it is believed that a fair rate of duty will enable it to continue.

"*Ferroalloys.*—The making of new kinds of steel by means of various metal alloys was greatly developed during the war as new and different uses were discovered. Some of these alloys had been used for a long time, but the use of all of them was greatly stimulated. The most important alloy metals used in making different kinds of steel are chrome, tungsten, vanadium, molybdenum and titanium. Other ferroalloys for the most part still in the experimental stage are ferrouranium, ferroboron, ferroaluminum, ferrozirconium and ferrocerium.

"Chrome and tungsten are used extensively in making high speed tool steel. Vanadium toughens the steel and renders it more resistant to shock and stress. Molybdenum gives it greater toughness and tensile strength. In fact, by the use of these alloys the making of steel has become a business much like that of the pharmacist who stands ready to compound his drugs according to the prescription. There are unlimited possibilities ahead of the ferroalloy industry.

"The addition of alloys in general makes the steel harder, tougher, or in some respect more difficult to work, requiring an increasing number of operations and additional labor, so that somewhat increased rates of duty are required for these products and articles made thereform.

Mining Industries

"During the war not only such old mining industries as lead, zinc and quicksilver underwent unusual development, but a considerable number of new industries were undertaken and to a considerable extent developed. Under Government stimulus, mining was encouraged to a very marked degree. Rare metals used as alloys for steel, such as chrome, tungsten, molybdenum and others were eagerly sought for. The mining of manganese ore was especially encouraged and reached a production of more than 40 per cent of the total domestic consumption in 1918. Many of these newer enterprises have suffered seriously since the close of the war. In some cases, such as tungsten, molybdenum and manganese, it is here attempted by protective duties to preserve the industries. Others, like chrome, also encouraged by the Government and now destined to lose what has been invested, unless recovered by the Government, the committee has deemed it unwise to attempt to save because the results of the war developments do not seem to warrant the belief that an economical industry can be built up in this country and if not, then the duty imposed would prove a useless burden upon the entire steel industry.

"In the metal title, as throughout the bill, specific rather than ad valorem duties have been imposed wherever practicable, first, because they are readily determined and also because they furnish greatest protection on a falling market when protection is most needed. In comparing the rate in the bill with that contained in any previous act, it should be borne in mind that by reason of the war, production costs have been generally increased, but nowhere so much as in the United States, which means that a specific rate now furnishes a less degree of protection than was furnished by the same specific rate when the value of the article was less. In view of the well grounded belief that it will be a long time before production costs in this country again approach normal, it has been found necessary in fixing rates to take the changed conditions into account."

Metal Schedule of the New Tariff Bill

Items Now on the Free List Restored to the Dutiable List—Manganese Ore and Ferromanganese Duties Are Noteworthy

IN THE IRON AGE of June 30 were printed some paragraphs of the Metal Schedule of the new tariff bill as originally printed for presentation to the full Ways and Means Committee. Changes were made in some of these sections before the bill in its final form was given to the press. These changes were notably in pig iron and in the ferroalloy section.

Below is given the Metal Schedule in full, and inserted are the corresponding provisions of the present Underwood tariff and of the previous tariff, commonly known as the Payne-Aldrich tariff. The Underwood duties are given in parentheses ( ), while the Payne-Aldrich duties are given in brackets [ ]. It is to be expected that amendments will be made to the bill, both in the House and in the subsequent consideration of the measure by the Senate.

Schedule 3.—Metals and Manufactures of

301. Iron in pigs, iron kentledge, spiegeleisen (all on free list) [all $2.50 per ton], wrought and cast scrap iron, and scrap steel, including scrap tin plate (all scrap on free list) [scrap, $1 per ton], *$1.25 per ton:* Provided, That nothing shall be deemed scrap iron or scrap steel except second-hand or waste or refuse iron or steel fit only to be remanufactured.

302. Manganese ore or concentrates containing in excess of 30 per cent of metallic manganese (free list), *1c. per lb.* on the metallic manganese contained therein; molybdenum ore or concentrates, *75c. per lb.* on the metallic molybdenum contained therein; tungsten ore or concentrates, *45c. per lb.* on the metallic tungsten contained therein; ferromanganese containing in excess of 1 per cent of carbon (free list) [$2.50 per ton], *2½c. per lb.* on the metallic manganese contained therein; manganese metal, manganese-silicon, manganese-boron, and ferromanganese containing less than 1 per cent of carbon (free list) [$2.50 per ton], *2½c. per lb.* on the manganese contained therein and *28 per cent* ad valorem; ferromolybdenum, metallic molybdenum, molybdenum pow-

der, calcium molybdate, and all other compounds and alloys of molybdenum, *$1.25 per lb.* on the molybdenum contained therein and *17 per cent* ad valorem; ferrotungsten, metallic tungsten, tungsten powder, tungstic acid, and all other compounds of tungsten, *72c. per lb.* on the tungsten contained therein and *15 per cent* ad valorem; ferrochromium tungsten, chromium tungsten, chromium cobalt tungsten, tungsten nickel, and all other alloys of tungsten not specially provided for, *72c. per lb.* on the tungsten contained therein and *17 per cent* ad valorem; ferrosilicon, containing 8 per cent or more of silicon and less than 30 per cent, *2½c. per lb.* on the silicon contained therein; containing 30 per cent or more of silicon and less than 60 per cent, *2¾c. per lb.* on the silicon contained therein; containing 60 per cent or more of silicon and less than 80 per cent, *3½c. per lb.* on the silicon contained therein; containing 80 per cent or more of silicon and less than 90 per cent, *4c. per lb.* on the silicon contained therein; containing 90 per cent or more of silicon, and silicon metal, *8c. per lb.* on the silicon contained therein; ferrochrome or ferrochromium containing 3 per cent or more of carbon, *3½c. per lb.* on the chromium contained therein; ferrochrome or ferrochromium containing less than 3 per cent of carbon, and chrome or chromium metal, *30 per cent* ad valorem; ferrophosphorus, ferrotitanium, ferrovanadium, ferrouranium, ferrocerium, zirconium ferrosilicon, ferroboron, titanium, zirconium, tantalum, chromium nickel, vanadium nickel, zirconium nickel, chromium vanadium, chromium silicon, zirconium silicon, calcium silicide, and all alloys used in the manufacture of steel not specially provided for, *30 per cent* ad valorem (ferroalloy paragraph carried 15 per cent) [ferroalloys, 20 to 25 per cent].

303. Muck bars and bar iron, square iron, rolled or hammered, comprising flats not less than one inch wide nor less than ⅜ in. thick, round iron not less than 7/16 in. in diameter, *¼c. per lb.*; round iron, in coils or rods, less than 7/16 in. in diameter, and bars and shapes of rolled or hammered iron, not specially provided for (5 per cent) [6/10c. per lb.], *5/10c. per lb.;* iron in slabs, blooms, loops, or other forms less finished than iron in bars, and more advanced than pig iron, except castings (5 per cent) [4/10c. per lb.], *2/10c. per lb.:* Provided, That all iron bars, blooms, billets, slabs or loops in the manufacture of which charcoal is used as fuel shall be subject to a duty of *3/10c. per lb.* (5 per cent) [3/10c. per lb.].

304. Steel ingots, cogged ingots, blooms and slabs, by whatever process made; die blocks or blanks; billets and bars and tapered or beveled bars; mill shafting; pressed, sheared, or stamped shapes, not advanced in value or condition by any process or operation subsequent to the process of stamping; hammer molds or swaged steel; gun-barrel molds not in bars; alloys used as substitutes for steel in the manufacture of tools; all descriptions and shapes of dry sand, loam, or iron molded steel castings; sheets and plates and steel not specially provided for; all of the foregoing valued at not over 1c. per lb., *2/10c. per lb.* [7/40c. per lb. on value of ¾c. per lb. or less and ranging up to 4.6c. per lb. on value of 16c. to 24c.]; valued above 1c. and not above 1½c. per lb., *3/10c. per lb.;* valued above 1½c. and not above 2½c. per lb., *5/10c. per lb.;* valued above 2½c. and not above 3½c. per lb., *8/10c. per lb.;* valued above 3½c. and not above 5c. per lb., *1c. per lb.;* valued above 5c. and not above 8c. per lb., *1½c. per lb.;* valued above 8c. and not above 12c. per lb., *2c. per lb.;* valued above 12c. and not above 16c. per lb., *2½c. per lb.;* valued above 16c. and not above 20c. per lb., *3½c. per lb.;* valued above 20c. and not above 24c. per lb., *4c. per lb.;* valued above 24c. and not above 32c. per lb., *5c. per lb.* [6c. per lb.]; valued above 32c. and not above 40c. per lb., *6c. per lb.* [7c. per lb.]; valued above 40c. per lb., *20 per cent* [20 per cent] ad valorem: Provided, That on steel circular saw plates there shall be levied an additional duty of *¼c. per lb.* (Ingots, billets, etc., by Bessemer or open-hearth process, free list; electric, crucible and alloy ingots, &c., 15 per cent.)

305. In addition to the rates of duty provided for in this title on steel in all forms and shapes, by whatever process made, and by whatever name designated, whether cast, hot or cold rolled, forged, stamped, or drawn, containing more than 6/10 of 1 per cent of nickel, cobalt, vanadium, chromium, tungsten, molybdenum, or any other metallic element used in alloying steel, there shall be levied and collected *15 per cent* ad valorem: Provided, That manganese and silicon shall not be considered as alloying material unless present in the steel in excess of 1 per cent: Provided further, That an additional cumulative duty of *$1.25 per lb.* on the molybdenum content in excess of 1 per cent, and *72c. per lb.* on the tungsten content in excess of 1 per cent shall be levied and paid on any of the above-named articles.

306. All metal produced from iron or its ores, which is cast and malleable, of whatever description or form, without regard to the percentage of carbon contained therein, whether produced by cementation, or converted, cast, or made from iron or its ores, by the crucible, electric, Bessemer, Clapp-Griffith, pneumatic, Thomas-Gilchrist, basic, Siemens-Martin, or open-hearth process, or by the equivalent of either, or by a combination of two or more of the processes, or their equivalents, or by any fusion or other process which produces from iron or its ores a metal either granular or fibrous in structure, which is cast and malleable, excepting what is known as malleable-iron castings, shall be classed and denominated as steel.

307. Boiler or other plate iron or steel, except crucible plate steel and saw plate steel, not thinner than 140/1000 in., cut or sheared to shape or otherwise, or unsheared, and skelp iron or steel sheared or rolled in grooves, valued at 1c. per lb. or less, *7/20c. per lb.* [from 3/10c. on 8/10c. value to 6/10c. on 3c. value]; valued above 1c. per lb. and not above 3c. per lb., *5/10c. per lb.;* valued at over 3c. per lb., *20 per cent* ad valorem [20 per cent]: Provided, That all sheets or plates of iron or steel thinner than 140/1000 in. [No. 10 wire gage] shall pay duty as iron or steel sheets (all plates 12 per cent).

308. Sheets of iron or steel, common or black, of whatever dimensions, and skelp iron or steel, valued at 3c. per lb. or less, thinner than 140/1000 and not thinner than 38/1000 in., *45/100c. per lb.;* thinner than 38/1000 and not thinner than 22/1000 in., *55/100c. per lb.;* thinner than 22/1000 and not thinner than 10/1000 in., *75/100c. per lb.;* thinner than 10/1000 in., *85/100c. per lb.;* corrugated or crimped, *75/100c. per lb.;* all the foregoing when valued at more than 3c. per lb., *20 per cent* ad valorem: Provided, That all sheets or plates of common or black iron or steel not thinner than 140/1000 in. shall pay duty as plate iron or plate steel (all black sheets, 12 per cent) [5/10c. on 3c. value, and less, and thinner than No. 10 wire gage, ranging up to 9/10c. on thinner than No. 32 gage; over 3c. value, 30 per cent].

309. All iron or steel sheets, plates, bars, and rods, and all hoop, band, or scroll iron or steel, excepting what are known commercially as tin plates, terne plates, and taggers tin, when galvanized or coated with zinc, spelter, or other metals, or any alloy of those metals, shall pay *2/10c. per lb.* more duty [same] than if the same was not so galvanized or coated; sheets or plates composed of iron, steel, copper, nickel, or other metal with layers of other metal or metals imposed thereon by forging, hammering, rolling, or welding, *28 per cent* ad valorem [40 per cent]; sheets and plates of iron or steel, polished, planished, or glanced, by whatever name designated, *1¼c. per lb.* [1½c]: Provided, That plates or sheets of iron or steel, by whatever name designated, other than polished, planished, or glanced, herein provided for, which have been pickled or cleaned by acid, or by any other material or process, or which are cold-rolled, smoothed only, not polished, shall pay *2/10c. per lb.* [same] more duty than the rates provided on corresponding thicknesses of common or black sheet iron or steel. (For all the above, 15 per cent ad valorem.)

310. Sheets or plates of iron or steel, or taggers iron or steel, coated with tin or lead, or with a mixture of which these metals, or either of them, is a component part, by the dipping or any other process, and commercially known as tin plates, terne plates, and taggers tin, *1.1c. per lb.* [1.2c. per lb.].

311. No article not specially provided for which is wholly or partly manufactured from tin plate, terne plate, or the sheet, plate, hoop, band, or scroll iron or steel, or of which such tin plate, terne plate, sheet, plate, hoop, band, or scroll iron or steel shall be the material of chief value, shall pay a lower rate of duty than that imposed on the tin plate, terne plate, or sheet, plate, hoop, band, or scroll iron or steel from which it is made, or of which it shall be the component thereof of chief value.

312. Beams, girders, joists, angles, channels, car-truck channels, tees, columns and posts, or parts or sections of columns and posts, deck and bulb beams, and building forms, together with all other structural shapes of iron or steel, not assembled, manufactured, or advanced beyond hammering, rolling, or casting, *7/20c. per lb.* (10 per cent) [3/10c. to 4/10c. per lb.]; any of the foregoing if machined, drilled, punched, assembled, fitted, fabricated for use, or otherwise advanced beyond hammering, rolling, or casting, 25 *per cent* ad valorem (10 per cent) [45 per cent].

313. Hoop, band, and scroll iron or steel, not specially provided for, valued at 3c. per lb. or less, 8 in. or less in width, and thinner than ⅜ in. and not thinner than 140/1000 in., *25/100c. per lb.* (10 per cent) [3/10c. per lb.]; thinner than 140/1000, and not thinner than 38/1000 in., *35/100c. per* lb. (10 per cent) [4/10c. per lb.]; thinner than 38/1000 in., *55/100c. per lb.* (10 per cent) [6/10c. per lb.]: Provided, That barrel hoops of iron or steel, and hoop or band iron, or hoop or band steel, flared, splayed, or punched, with or without buckles or fastenings, shall pay no more duty than that imposed on the hoop or band iron or steel from which they are made, bands and strips of iron or steel, whether in long or short lengths, not specially provided for, *20 per cent* ad valorem (10 per cent) [35 per cent].

314. Hoop or band iron, and hoop or band steel, cut to

lengths, or wholly or partly manufactured into hoops or ties, coated or not coated with paint or any other preparation, with or without buckles or fastenings, for baling cotton or any other commodity, *¼c. per lb.* (free list) [3-10c. per lb.].

315. Wire rods: Rivet, screw, fence, and other iron or steel wire rods, whether round, oval, or square, or in any other shape, nail rods and flat rods up to 6 in. in width ready to be drawn or rolled into wire or strips, all the foregoing in coils or otherwise, valued at not over 4c. per lb., *3/10c. per lb.* (10 per cent) [3/10c. per lb.]; valued over 4c. per lb., *6/10c. per lb.* (10 per cent) [3/10c. per lb.]: Provided, That all round iron or steel rods smaller than 20/100 in. in diameter shall be classed and dutiable as wire: Provided further, That all iron or steel wire rods which have been tempered or treated in any manner or partly manufactured shall pay an additional duty of *¼c. per lb.* (10 per cent) [½c. per lb.]: Provided further, That on all iron or steel bars and rods of whatever shape or section which are cold rolled, cold drawn, cold hammered, or polished in any way in addition to the ordinary process of hot rolling or hammering, there shall be paid *⅛c. per lb.* [same] in addition to the rates provided on bars or rods of whatever section or shape which are hot rolled; and on all strips, plates, or sheets of iron or steel of whatever shape, other than polished, planished, or glanced sheet iron or sheet steel, which are cold hammered, blued, brightened, tempered, or polished by any process to such perfected surface finish or polish better than the grade of cold rolled, smoothed only, there shall be paid *2/10c. per lb.* (10 per cent) [4/10c. per lb.] in addition to the rates provided on plates, strips, or sheets of iron or steel of common or black finish of corresponding thickness or value.

316. Round iron or steel wire, not smaller than 95/1000 in. in diameter, *¾c. per lb;* smaller than 95/1000 and not smaller than 65/1000 of one inch in diameter, *1¼c. per lb.* (15 per cent) [1¼c. per lb.]; smaller than 65/1000 in. in diameter, *1½c. per lb.* (15 per cent) [1¾c. per lb.]: Provided, That all of the foregoing valued above 6c. per lb. shall pay a duty of *20 per cent* ad valorem; all wire composed of iron, steel, or other metal, not specially provided for, except gold, silver, or platinum; all flat wires and all steel in strips not thicker than ¼ in. and not exceeding 16 in. in width, whether in long or short lengths, in coils or otherwise, and whether rolled or drawn through dies or rolls, or otherwise produced, and all other wire not specially provided for, 20 *per cent* ad valorem (15 per cent) [35 per cent]: *Provided,* That all iron or steel wire coated by dipping, galvanizing, sherardizing, electrolytic or any other process with zinc, tin, or other metal, shall pay a duty of *2-10c. per lb.* in addition to the rate imposed on the wire of which it is made [same]; telegraph, telephone, and other wires and cables composed of iron, steel, or other metal except gold, silver, or platinum, covered with or composed in part of cotton, jute, silk, enamel, lacquer, rubber, paper, compound, or other material, with or without metal covering, 30 *per cent* ad valorem (15 per cent) [40 per cent]; wire rope and wire strand, 30 *per cent* ad valorem (30 per cent) [maximum wire duty and 1c. per lb.]; spinning and twisting ring travelers, 30 *per cent* ad valorem; wire heddles and healds, *25c. per thousand* and 30 *per cent* ad valorem. ,(30 per cent) [25c. and 40 per cent].

317. All galvanized wire not specially provided for, except gold, silver, or platinum, not larger than 20-100 and not smaller than 8-100 in. in diameter, of the kind commonly used for fencing purposes (free) [wire duty plus 2-10c. per lb.], galvanized wire fencing composed of wires not larger than 20-100 and not smaller than 8-100 in. in diameter; and all wire commonly used for baling hay or other commodities, *½c. per lb.* (free) [not less than 40 per cent].

318. Woven-wire cloth: Gauze, fabric, or screen, made of wire composed of steel, brass, copper, bronze, or any other metal or alloy, not specially provided for, with meshes not finer than thirty wires to the lineal inch in warp or filling, 20 *per cent* ad valorem; with meshes finer than 30 and not finer than 90 wires to the lineal inch in warp or filling, 30 *per cent* ad valorem; with meshes finer than ninety wires to the lineal inch in warp or filling, 40 *per cent* ad valorem. (15 per cent) [maximum wire duty plus 1 c. per lb.].

319. Iron or steel anchors and parts thereof [1c. per lb]; forgings of iron or steel, or of combined iron and steel, not machined, tooled, or otherwise advanced in condition by any process or operation subsequent to the forging process, not specially provided for, 25 *per cent* ad valorem (12 per cent) [30 per cent].

320. Electric storage batteries and parts thereof, storage battery plates and storage battery plate material, wholly or partly manufactured, all the foregoing not specially provided for, 30 *per cent* ad valorem. (20 per cent) [45 per cent].

321. Antifriction balls and rollers, metal balls and rollers commonly used in ball or roller bearings, metal ball or roller bearings, and parts thereof, whether finished or unfinished, for whatever use intended, *10c. per lb.* and 35 *per cent* ad valorem. (35 per cent) [45 per cent].

322. Railway fishplates or splice bars, made of iron or steel, *¼c. per lb.* (10 per cent) [3-10c. per lb.]; all other railway bars made of iron or steel, and railway bars made in part of steel, T rails, and punched iron or steel flat rails, *7-40c. per lb.* (free) [7-40c. per lb.].

323. Axles and parts thereof, axle bars, axle blanks, and forgings for axles, of iron or steel, without reference to the stage or state of manufacture, not specially provided for (10 per cent), valued at not more than 6c. per lb., *6-10c. per lb.* [3-4c. per lb]: *Provided,* That when iron or steel axles are imported fitted in wheels, or parts of wheels, of iron or steel, they shall be dutiable at the same rate as the wheels in which they are fitted. (same) [same].

324. Wheels for railway purposes, and parts thereof, of iron or steel, and steel-tired wheels for railway purposes, wholly or partly finished, and iron or steel locomotive, car, or other railway tires and parts thereof, wholly or partly manufactured, *1c. per lb.* (20 per cent) [1¼c. per lb.]: *Provided,* That when wheels for railway purposes, or parts thereof, of iron or steel, are imported with iron or steel axles fitted in them, the wheels and axles together shall be dutiable at the same rate as is provided for the wheels when imported separately.

325. Anvils of iron or steel, or of iron and steel combined, by whatever process made, or in whatever stage of manufacture, *1 5-8c. per lb.* (15 per cent) [1 5-8c. per lb.].

326. Blacksmiths' hammers, tongs, and sledges, track tools, wedges, and crowbars, of iron or steel, *1⅜c. per lb.* (10 per cent) [1⅜c. per lb.].

327. Cast-iron pipe of every description [¼c. per lb.], cast-iron andirons, plates, stove plates, sadirons, tailors' irons, hatters' irons, but not including electric irons, and castings and vessels wholly of cast iron [8-10c. per lb.], including all castings of iron or cast-iron plates which have been chiseled, drilled, machined, or otherwise advanced in condition by processes or operations subsequent to the casting process but not made up into articles, or parts thereof, or finished machine parts [2-10c. per lb. extra]; castings of malleable iron not specially provided for [7-10c. per lb.]; cast hollow ware, coated, glazed, or tinned [1½c. per lb.], but not including enameled ware or hollow ware containing electrical elements, 10 *per cent* ad valorem. (All the above, 10 per cent).

328. Lap-welded, butt-welded, seamed, or jointed iron or steel tubes, pipes, flues, and stays, not thinner than 65-1000 in., if not less than ⅜ in. in diameter, *¾c. per lb.;* if less than ⅜ and not less than ¼ in. in diameter, *1¼c. per lb;* if less than ¼ of an inch in diameter, *1¾c. per lb.* (all 20 per cent) [1c. to 2c.]; *Provided,* That no tubes, pipes, flues, or stays made of charcoal iron shall pay a less rate of duty than *1¼c. per lb.* [1½c.]; cylindrical and tubular tanks or vessels, for holding gas, liquids, or other material, whether full or empty; welded cylindrical furnaces, tubes and flues made from plate metal, whether corrugated, ribbed, or otherwise reinforced against collapsing pressure, and all other finished or unfinished iron or steel tubes not specially provided for, 20 *per cent* ad valorem [30 per cent]; flexible metal tubing or hose, whether covered with wire or other material, including any appliances or attachments affixed thereto, not specially provided for [30 per cent], and rigid iron or steel tubes or pipes prepared and lined or coated in any manner suitable for use as conduits for electrical conductors, 25 *per cent* ad valorem. (All 20 per cent).

329. Chain and chains of all kinds, made of iron or steel, not less than ¾ in. in diameter, *1c. per lb.;* less than ¾ and not less than ⅜ in. in diameter, *1¼c. per lb.;* less than ⅜ and not less than 5-16 in. in diameter, *2⅛c. per lb;* less than 5-16. in. in diameter, *4c. per lb;* chain and chains of all kinds, of iron or steel, not specially provided for, 25 *per cent* ad valorem; sprocket and machine chains, of iron or steel, and parts thereof, 30 *per cent* ad valorem (25 per cent); anchor or stud link chain, two inches or more in diameter, *1½c. per lb.;* less than two inches in diameter, *2c. per lb.* (all except sprocket and machine, 20 per cent) [chains, ⅞ to 3c. per lb., but not less than 45 per cent]: *Provided,* That all articles manufactured wholly or in chief value of chain shall not pay a lower rate of duty than that imposed upon the chain of which it is made, or of which chain is the component material of chief value.

330. Nuts, nut blanks, and washers, of wrought iron or steel, *6-10c. per lb.* (5 per cent); bolts, with or without threads or nuts, and bolt blanks, of iron or steel, *1c. per lb.* (10 per cent); spiral nut locks, and lock washers, of iron or steel, 30 *per cent* ad valorem. (30 per cent) [All 1½c. per lb.].

331. Cut nails and cut spikes, of iron or steel [*4-10c. per lb.*], exceeding 2 in. in length, *4-10c. per lb.;* cut tacks and brads, hobnails and cut nails, of iron or steel, not exceeding 2 in. in length, 20 *per cent* ad valorem; horseshoe nails, and other iron or steel nails, not specially provided for, *2c. per lb.*

[1½c. per lb.]; nails, spikes, tacks, brads, and staples, made of iron or steel wire, not less than 1 in. in length nor smaller than 65-1000 in. in diameter, 4-10*c. per lb.*; less than 1 in. in length and smaller than 65-1000 in. in diameter, ¾*c. per lb.* [⅝c. per 1000 to ¾c. per lb.]; spikes, tacks, brads, and staples, not specially provided for, 6-10*c. per lb.* (All on free list).

332. Rivets, studs, and steel points, lathed, machined, or brightened, and rivets or studs for nonskidding automobile tires, 25 *per cent* ad valorem (20 per cent) [45 per cent]; rivets of iron or steel, not specially provided for, 1*c. per lb.* (20 per cent) [1¼c. per lb.].

333. Horse, mule, or ox shoes of wrought iron or steel, 6-10*c. per lb.* (free) [¾c. per lb.].

334. Steel wool, 10*c. per lb.* (20 per cent) [40 per cent]; steel shavings, 5*c. per lb.* (20 per cent) [40 per cent]; and in addition thereto, on all of the foregoing, 30 *per cent* ad valorem: *Provided,* That in computing the duty the weight and value of the package shall be included and the net weight of the contents shall be plainly marked upon each package.

335. Grit, shot, and sand of iron or steel, in any form, 1*c. per lb.* (30 per cent) [1c. per lb.].

336. Corset clasps, corset steels, and dress steels, whether plain or covered with cotton, silk, or other material, 25 *per cent* ad valorem. (15 per cent) [35 per cent].

337. Card clothing not actually and permanently fitted to and attached to carding machines or to parts thereof at the time of importation, when manufactured with tempered or untempered round iron or steel wire, or with plated wire or other than round iron or steel wire, or with felt face, wool face, or rubber-face cloth containing wool, 35 *per cent* ad valorem. (10 to 35 per cent) [20 to 55c. per sq. ft.].

338. Screws, commonly called wood screws, of iron or steel, more than 2 in. in length, 10*c. per gross;* over 1 in. and not over 2 in. in length, 8*c. per gross;* over ½ in. and not over 1 in. in length, 5*c. per gross;* ½ in. and less in length, 3*c. per gross* (25 per cent) [3 to 10c. per lb.]; *Provided,* That each package or carton shall have conspicuously marked thereon the number of screws contained therein and the duty shall not be assessed upon a less number than so marked.

339. Table, household, kitchen, and hospital utensils, and similar hollow or flat ware, not specially provided for; composed of iron or steel and enameled or glazed with vitreous glasses, 5*c. per lb.* and 30 *per cent* ad valorem [40 per cent]; composed wholly or in chief value of aluminum, 28 *per cent* ad valorem (all above, 25 per cent); and in addition thereto, upon any of the foregoing articles containing electrical heating elements as constituent parts thereof, 10 *per cent* ad valorem.

340. Crosscut saws, mill saws, pit and drag saws, circular saws, steel band saws, finished or further advanced than tempered and polished, hand, back, and all other saws, not specially provided for, 15 *per cent* ad valorem (12 per cent) [5c. per ft. to 5c. per lb. and 20 per cent extra]; jewelers' or piercing saws, 40*c. per gross.* [25 per cent].

341. Steel plates, stereotype plates, electrotype plates, halftone plates, photogravure plates, photoengraved plates, and plates of other materials, engraved for printing, [20 per cent], and plates of iron or steel engraved or fashioned for use in the production of designs, patterns, or impressions on glass in the process of manufacturing plate or other glass, 15 *per cent* ad valorem (15 per cent) [25 per cent]; lithographic plates of stone or other material engraved, drawn, or prepared, 20 *per cent* ad valorem. (25 per cent) [50 per cent].

342. Umbrella and parasol ribs and stretchers, composed wholly or in chief value of iron, steel, or other metal, in frames or otherwise, and tubes for umbrellas, wholly or partly finished, 35 *per cent* ad valorem. (Same) [50 per cent].

343. Spring-beard needles, and other needles for knitting, sewing, shoe, or embroidery machines of every description, not specially provided for, and crochet needles, $1.15 *per* 1000 and 25 *per cent* ad valorem; latch needles, $2 *per* 1000 *and* 35 *per cent* ad valorem [above, $1 to $1.15 per 1000 and 25 to 35 per cent extra]; tape knitting, and all other needles, not specially provided for, bodkins of metal, and needle cases or needle books furnished with assortments of needles or combinations of needles and other articles [25 per cent], 30 *per cent* ad valorem. (All 20 per cent).

344. Fishhooks, fishing rods and reels, artificial flies, artificial baits, snelled hooks, leaders or casts, and all other fishing tackle and parts thereof, fly hooks, fly boxes, baskets or creels, finished or unfinished, not specially provided for, except fishing lines, fishing nets, and seines, 35 *per cent* ad valorem (30 per cent): *Provided,* That any prohibition of the importation of feathers in this act shall not be construed as applying to artificial flies used for fishing, or to feathers used for the manufacture of such flies.

345. Saddlery and harness hardware: Buckles, rings, snaps, bits, swivels, and all other articles of iron, steel, brass, composition, or other metal, commonly or commercially known as saddlery or harness hardware, 35 *per cent* ad valorem. (15 per cent).

346. Belt buckles, trouser buckles, and waistcoat buckles, shoe or slipper buckles, and parts thereof, made wholly or partly of iron or steel, valued at not more than 20c. per 100, 5*c. per* 100; valued at more than 20 and not more than 50c. per 100, 10*c. per* 100; valued at more than 50c. per 100, 15*c. per* 100; and in addition thereto, on all of the foregoing, 20 *per cent* ad valorem. (15 per cent).

347. Hooks and eyes, wholly or in chief value of metal, whether loose, carded, or otherwise, including weight of cards, cartons, and immediate wrappings and labels, 4½*c. per lb. and* 15 *per cent* ad valorem. (15 per cent).

348. Snap fasteners and clasps, and parts thereof, by whatever name known, or of whatever material composed, not plated with gold, silver, or platinum, and not mounted on tape, 40 *per cent* ad valorem; mounted on tape, 45 *per cent* ad valorem. (15 per cent).

349. Metal trouser buttons, except steel and nickel bar buttons, 1-12*c. per line per gross;* steel trouser buttons, ¼*c. per line per gross;* buttons of metal, not specially provided for, ¾*c. per line per gross;* and in addition thereto, on all of the foregoing, 10 *per cent* ad valorem; metal buttons embossed with a design, device, pattern, or lettering, 35 *per cent* ad valorem: *Provided,* That the term "line" as used in this paragraph shall mean the line button measure of 1-40 in.

350. Pins with solid heads, without ornamentation, including hair, safety, hat, bonnet, and shawl pins, and pins with heads of glass, paste, or fusible enamel, composed of brass, copper, iron, steel, or other base metal, not plated with gold or silver, and not commonly known as jewelry, 28 *per cent* ad valorem. (20 per cent) [35 per cent].

351. Pens, metallic, not specially provided for, 12*c. per gross* (8c.) [12c.]; with nib and barrel in one piece, 15*c. per gross.* (12c.) [15c.].

352. Penholder tips, penholders and parts thereof [5c. per gross and 25 per cent], gold pens [25 per cent], combination penholders comprising penholders, pencil, rubber eraser, automatic stamp, or other attachments, 25*c. per gross and* 20 *per cent* ad valorem [45 per cent]; mechanical pencils made of base metal and plated with gold, silver, or platinum, 45*c. per gross and* 20 *per cent* ad valorem (all 25 per cent): *Provided,* That pens and penholders shall be assessed for duty separately.

353. Fountain pens, fountain-pen holders, stylographic pens, and parts thereof (25 per cent) [30 per cent], valued at not more than $2 per dozen, 72*c. per dozen;* valued at more than $2 and not more than $6 per dozen, $1.50 *per dozen;* and in addition thereto, on all of the foregoing, 25 *per cent* ad valorem: *Provided,* That the value of cartons and fillers shall be included in the dutiable value.

354. Penknives, pocketknives, clasp knives, pruning knives, budding knives, erasers, manicure knives, and all knives by whatever name known, including such as are denominatively mentioned in this act, which have folding or other than fixed blades or attachments, valued at not more than 40c. per dozen, 40 *per cent* ad valorem; valued at more than 40c. and not more than 50c. per dozen, 1*c. each and* 30 *per cent* ad valorem; valued at more than 50c. and not more than $1.25 per dozen, 5*c. each and* 30 *per cent* ad valorem; valued at more than $1.25 and not more than $3 per dozen, 10*c. each and* 30 *per cent* ad valorem; valued at more than $3 and not more than $8 per dozen, 20*c. each and* 30 *per cent* ad valorem; valued at more than $8 per dozen, 30*c.* each and 30 *per cent* ad valorem; cuticle knives, corn knives, nail files, tweezers, hand forceps, and parts thereof, finished or unfinished, by whatever name known, 40 *per cent* ad valorem (35 to 55 per cent) [40 per cent and up to 20c. each, with 40 per cent extra]: *Provided,* That any of the foregoing, if imported in the condition of assembled, but not fully finished, shall be dutiable at not less than the rate of duty herein imposed upon fully finished articles of the same material and quality, but not less in any case than 15*c. each and* 35 *per cent* ad valorem: *Provided further,* That all the articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk conspicuously and indelibly on the shank or tang of at least one or, if practicable, each and every blade thereof.

355. Table, butchers', carving, cooks', hunting, kitchen, bread, cake, pie, slicing, cigar, butter, vegetable, fruit, cheese, canning, fish, carpenters' bench, curriers', drawing, farriers', fleshing, hay, sugar-beet, beet-topping, tanners', plumbers', painters', palette, artists', shoe and similar knives, forks, and steels, and cleavers, all the foregoing, finished or unfinished, not specially provided for, with or without handles of mother-of-pearl, shell, ivory, deer, or other animal horn, silver, nickel silver, or other metal than iron or steel, 16*c. each;* with handles of hard rubber, solid bone, celluloid, or any pyroxylin, casein, or similar material, 8*c. each;* with handles

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Soft Times and Other Times

It is desirable at intervals to review at long range our position and prospects, and in particular to note the verification or failure of predictions previously made. We may well ask at this time what has become of the prophecy made during the war that there would follow a period of from three to five years of activity and prosperity. Certainly there was a substantial foundation for such predictions. Six months or so ago the thought was in many minds that there was merely a short interruption, while certain readjustments would be made, whereupon the activity of 1920 would be resumed. That view is no longer held.

The war-time viewpoint, from which the predictions were made, was that men would be able and willing to work hard. That was taken practically as a matter of course. Hard work ought to be welcome as a change from making war. The prediction rested chiefly on the belief that the opportunity for hard work and advancement would be presented, and that part of the argument was sound.

What occurred after the war, however, was that nearly everyone, manufacturers, dealers and workmen, concluded that soft times had come, and they proceeded to take advantage of the soft times. There was indulgence rather than progress, a superficial activity rather than real prosperity.

It was a psychological phenomenon rather than a business or financial development. By reason of the mental attitude taken, that soft times had come, the period of activity was shortened. The cycle that with a normal mental attitude might have required from three to five years was run through its course in a shorter period. There is not an interruption to the period. It has simply come to its natural close.

Those who predicted a period of three, four or five years of activity also predicted that afterward there would be a period of recovery from the effects of the war. That is the period upon which we have entered and we shall delay the recovery if we do not recognize the fact. Such a period is sometimes called one of "hard times," but that viewpoint should be avoided, since the term suggests times that are abnormal, and no one can do his best work if he feels he is laboring under abnormal or unnatural conditions. It is a time for hard work and man is destined by nature for hard work. There is no acceptable system of religion or philosophy that teaches otherwise, none that shows that man is entitled to live in "soft times."

The Proposed Metal Schedule

The new tariff bill as it has just left the hands of the Ways and Means Committee represents, in general, as was expected, a return to the protective character of the Payne-Aldrich act, the predecessor of the existing Underwood-Simmons act. In the comment made in these columns last week it was pointed out that in general iron and steel manufacturers had given little advice to the framers of the bill. The metal schedule as published in full on other pages indicates that the committee wrote most of its paragraphs with the definite idea of re-establishing the general lines of the Payne-Aldrich metal tariff of 1909. In some cases the actual rates in that act are restored and for the most part the departures from it are not marked. As was expected, the unscientific and loosely made ad valorem duties of the present metal schedule are supplanted by specific duties, and every iron and steel product the Underwood tariff put on the free list, save only barbed wire, is restored to the dutiable list. The committee, having decided to make an end of the farmer's free cotton ties, wire nails and wire for baling, left that one remnant of the Underwood committee's largess to the agricultural community.

The pig iron duty of $1.25 is neither protective nor a revenue maker. Apparently the low tariff members of the committee suggested halving the $2.50 duty of the Payne-Aldrich act which had a place in the bill as originally drafted. Similarly scrap might as well have been retained on the free list.

The ferroalloy section promises to be the storm center of the new bill. The duties on manganese ore and ferromanganese in particular will be points of attack. It might be assumed, in view of the fact that normally nearly all the ores used in the making of ferromanganese in this country

are imported, that the imposition of a duty of 1c. per pound of metallic manganese in such ores was designed as a revenue tariff. But the subcommittee on the metal schedule, in its explanatory statement, says that the manganese ore duty, like that on tungsten and molybdenum ores, represents an attempt, by means of protective duties, to preserve domestic industries.

It need not be said that a radical departure is involved in imposing on a product long on the free list a duty equal to 100 per cent of the price at which that product sold—under exceptional conditions it is true—for a considerable time in 1914. At 2 1/5 cents per pound of manganese content, as proposed, the duty on a ton of 80 per cent ferromanganese would amount to $39.42, and it will be recalled that both the British producers and the United States Steel Corporation sold large lots in 1914 at $37 and $38, seaboard. So far as most independent steel manufacturers are concerned, the effect of the proposed duty will be to impose a tax of close to 27 cents per ton on their output, figuring 16 pounds of ferromanganese to the ton of steel. The Steel Corporation, in common with other producers of ferromanganese, would pay $11.20 duty per ton of 50 per cent manganese ore, but it has the advantage of the operation of its own Brazilian mines.

The issues involved in the proposed manganese duties promise to take precedence, so far as the steel industry is concerned, over all other features of the new metal schedule. The ability of British producers of ferromanganese, who have long supplied a considerable part of the ferromanganese consumed in the United States, to continue to do business here is one factor. The advisability of keeping in reserve for future emergency the limited supply of manganese ore in this country, instead of attempting its present development by the maintenance of a permanently high level price for ferromanganese, is another. The consumers of ferromanganese, it is already apparent, will exert themselves to secure radical reductions in the duties now carried in the bill.

Exports and Domestic Consumption

The subject of refunding approximately ten billion dollars owed by foreign governments to the United States Government has just been placed squarely before Congress, which is asked to give the Secretary of the Treasury practically unrestricted power to act. Another important matter before Congress is the tariff.

We have heard a great deal of talk lately about "economics," though there may not have been much illumination, and the superficially bright observation has been made that while this subject originally was "political economy" and referred principally to the policies of nations as such, it has now become more "practical" and has become "a matter of vital interest to the individual."

Right here we are in danger of making a grievous blunder. Never before did the United States Government have greater need for a definite and intelligent system of political economy. This ten billion dollars admitted to be owing to us, and the question of the tariff, as well as some other pending matters, make the economic issue of the most vital importance.

Why do we export goods? Before the war we exported, as an annual average, merchandise worth about half a billion dollars more than the merchandise we imported. That was our "trade balance" and it was needed and used to cover freights paid to foreign vessel owners on our imports, interest and dividends on our securities held abroad, the expenses of American tourists, gifts of residents of this country to residents of foreign countries, and some other and smaller items.

Now, as everyone knows, most of these conditions are reversed. About 40 per cent of our water-borne commerce is now in American vessels, and as our exports, valued at the home port, exceed our imports, valued at the foreign port, it would look as though we were in line to receive as much in ocean freights as we pay out. We are in line to receive more interest and dividends than we pay. We practically "broke even," in the broad sense, before the war with half a billion more merchandise exports than imports, while in future we might break even with some excess of imports over exports.

If we have a balance to be settled in gold, securities or other evidence of value, not merchandise or service that we can use, will it be profitable to us as a nation? There is a law of trade that if such a matter is left to itself prices of commodities will so change that a country with an excess of merchandise exports not otherwise taken care of will have rising prices, tending to discourage exports and encourage imports. It would be foolish to leave the matter to adjustment according to that law, since if we want to export we want to continue to export indefinitely.

The argument that we cannot consume all we produce needs more analysis. It is a good thing to be able to produce a great deal, but it is not a good thing to be too poor to consume. Of course it might not be well for us to consume more wheat than we do or more canned milk or hops or musical instruments, in all of which we have had a considerable export trade; but it might possibly be well for us to use the labor involved in producing these surpluses in building houses or good roads or other things that involve actual advancement and increase our comfort.

What is here suggested would involve a redistribution of man power. There is a difficulty with respect to factory power. We may have typewriter factories in which much capital is tied up and which can supply us with all the typewriters we need and still have a large surplus. It would not be good practice to destroy that capital. But if a man can do as good work building roads as in raising wheat and we can use the good roads to advantage, but do not need the money that would be paid for the wheat, it is better for us to have the good roads than the money.

We should have, then, a national policy, a system of political economy, aimed directly at giving us what we really need and will be good for us. A policy of endeavoring to keep merchandise from coming into the country, to force merchandise out of the country, and to accumulate gold and securi-

ties, could be advantageous only by the slimmest kind of a chance.

The Proportion of Union Workers

Statements have been made lately that between 80 and 90 per cent, or between 85 and 90 per cent, of the workers in the United States do not belong to labor unions. Friends of the labor union movement have sometimes claimed proportions of unionism up to 50 or 75 per cent. Here are wide discrepancies. Sometimes a discrepancy is produced by the friends of labor unions juggling the figures. For instance, some time ago a presentation was made, claiming to use "the latest figures," but these figures were on the one hand the 1910 census for the total number of persons "engaged in gainful occupations" and on the other hand the latest claim of the labor unions as to the number in their ranks. The population had increased since 1910 and the proportion of the population at work had increased.

A large part of the discrepancy arises from differences in classification as to who are "workers." The labor union advocates have a way of counting out those who work but who do not seem susceptible to unionization, though if any such workers should later be found susceptible they would be added to the union total. Those classed as "public servants" are excluded from the total with which the strength of unionism is compared, but this did not prevent the Boston policemen from being organized and going on strike.

The 1920 census has not yet reported on the number of persons engaged in gainful occupations. The figure as to total population is 105,708,771. The 1910 census was as follows:

Total	91,972,266
Ten years and older	71,580,270
Ditto, engaged in gainful occupations	38,167,336

Punctiliously counting up all classes that it might be considered proper to exclude, when considering the proportion of unionism, one cannot find more, at the outside, than about 12,600,000. The deductions include farmers, 5,865,003, farm laborers working at home, 3,310,534, persons in public service, 459,291, clergymen, 118,018, other professional men, newsboys and a great many others.

Allowing for the 15 per cent increase in population from 1910 to 1920, but not allowing for the proportion of workers having increased, the figures for 1920 would be 44,000,000 for all persons ten years and older engaged in gainful occupations and 29,300,000 for the number of workers left after the very free deductions referred to above.

As to the strength of unionism, the outside claim ever made was under 7,000,000, while even at that the strength of unionism has since declined. At the Denver convention the American Federation of Labor reported 3,906,528, against 4,078,740 in 1920. The figures are said to exclude men locked out, on strike or out of employment, since these do not pay dues. Even with these allowances there is reason to believe the figure is too high. Outside the American Federation of Labor are the four railroad brotherhoods, quite a number of miners in the West, and some small unions. The total number of union workers can hardly be taken at over 5,000,000 at the present time, and that is probably a liberal statement.

At 5,000,000 for unionism there is a proportion of 11 per cent for unionism of all those who work instead of depending upon investments or upon some one else for their keep. It is a proportion of 17 per cent of workers, excluding all who by any species of argument can be claimed as properly deductible. Thus a statement that between 80 and 90 per cent of the workers are nonunion provides a leeway that covers all points that could be brought into controversy.

CORRESPONDENCE

Efficient Journal Bearings

To the Editor: In your issue of June 16, you quote "from a monograph" on the above subject. The early part of the article improperly makes comparisons between babbitt bearings and ball and roller bearings. I use the word "improperly" advisedly, as the statements are made without qualification, from which it may be inferred that, in all cases, babbitt bearings are the inferior of ball or roller bearings.

Every engineer knows that there are many places where ball or roller bearings cannot be used; that in most of the world's machinery, babbitt is indispensable, and in fact, that some of the bearings in the machinery used to manufacture the very ball or roller bearings are babbitt-lined—we know this because we furnish babbitt for such machinery.

I do not wish to enter here upon a discussion as to the respective merits of babbitt bearings and ball or roller bearings. Each has its place where it is better adapted than the others. But so general a statement as "the annoyance of shut-downs to reline, adjust or replace plain bearings . . . more than compensates for any increase in first cost of application of the antifriction bearings," should not go unchallenged, for the plain reason that it is only fractionally true. It would be just as fractionally true for one to say that the use of a genuine babbitt "more than compensates for any increase in the cost of the application of bearings made from No. 4 Babbitt." Anybody familiar with bearings knows that there are many places where the ultimate cost of babbitted bearings is considerably less than that of ball or roller bearings.

More frequently than otherwise, the bearings in the connecting rod of an automobile outwears the car itself. Take the big bearings in a marine engine, brass as well as babbitt; the right babbitt will operate under heavy duty for years before relining of the bearings is found necessary.

Another assertion open to question is that "workmen will not give proper attention to the correct lubrication of plain bearings." Long experience has convinced us that bearing troubles caused by inattention to their lubrication are so rare, compared to the great number of babbitt bearings in use, as to be negligible. Few machines are in charge of an ordinary "workman." The lubrication of most machines is looked after by engineers and master-mechanics, who as a rule are men of intelligence, mechanically skilled and fully cognizant of the importance of keeping their bearings properly lubricated. But if, by chance, a bearing does burn out "at just the time when the mill is busy," how much time will it take to reline it, as compared to the replacing and installation of a roller-bearing that has broken, an accident by no means rare? And bear in mind, that while the mill always has babbitt on hand, it does not often have extra rollers on hand, but

Features of the Metal Schedule of the Proposed Tariff Bill, with Comparisons

	NEW BILL	PRESENT TARIFF	PAYNE-ALDRICH TARIFF
Iron ore	Free	Free	15c. per ton
Pig iron	$1.25	Free	$2.50
Spiegeleisen	$1.25	Free	$2.50
Scrap	$1.25	Free	$1.00
*Manganese ore	1c. per lb. Mn. content	Free	Free
†Ferromanganese	2 1/5c. per lb. Mn. content.	Free	$2.50 per ton
Steel billets	2-10c. to 6c. per lb.	Bess. and O.H. free.	7-40c. to 7c. per lb.
Bar iron	¼c. to ½c. per lb.	5 per cent.	3-10c. per lb.
Beams, etc., plain	7-20c. per lb.	10 per cent.	3-10 to 4-10c. per lb.
Plates	7-20c. to 5-10c. per lb.	12 per cent.	7-20 to 5-10c. per lb.
Wire rods	3-10c. per lb.	10 per cent.	3-10c. per lb.
Galv. wire for fencing	½c. per lb.	Free	Wire duty plus 2-10c. per lb.
Axles	6-10c. per lb.	10 per cent.	3-4c. per lb.
Rails	7-40c. per lb.	Free	7-40c. per lb.
Cast-iron pipe	10 per cent.	10 per cent.	1-4c. per lb.
Cut nails and spikes	4-10c. per lb.	Free	4-10c. per lb.
Barbed wire	Free	Free	3-4c. per lb.
Machine tools	35 per cent.	15 per cent.	30 per cent.
Chain	1c. to 4c. per lb.	20 per cent.	7-8c. to 3c. per lb.
Aluminum ingots	5c. per lb.	2c. per lb.	7c. per lb.
Tin, pig	2c. per lb.	Free	Free
Nickel, ingots	5c. per lb.	10 per cent.	6c. per lb.
Fluorspar	$5 per ton.	$1.50 per ton.	Free
Magnesite	½c. to ¾c. per lb.		

*Above 30 per cent Mn.
†Above 1 per cent carbon.

must lose days before their arrival from the makers.

The most absurd assertion of the article is that "a properly designed ball or roller bearing . . . will operate 50 times longer than a plain bronze or babbitt bearing under the same conditions." It would be just as logical to recommend a genuine babbitt that costs 40c. per lb. for a car axle bearing, instead of a lead-based babbitt that costs 15c. per lb., because the genuine babbitt will operate "at least fifty times longer." We have records of babbitted bearings in engines, lumber gangs, centrifugals and many other machines where the bearings operated under severe conditions and did not require relining for 3 years. Who in the world would want to pay so much more for the initial cost in order that the bearings in his engine-lumber-gangs, centrifugals or other machines, may still be in service for his great-great-grandchildren 150 years hence?

There is no question that ball and roller bearings have done wonderful work in advancing the progress of machinery. But they have not as yet reached that point where they can displace babbitt bearings except in comparatively few places. We have the highest regard for ball bearings and roller bearings and use them in certain of our machinery, just as some of our friends in the ball and roller bearing industries use babbitt in certain of their machinery.

A. HOYT LEVY,
Secretary United American Metals Corporation.
Brooklyn, N. Y., June 20.

The Proposed Metal Schedule

To the Editor: The tariff bill just proposed by the Ways and Means Committee is the most unreasonable accumulation of greed ever submitted to any American Congress. Surely it does not represent an attempt to reduce the cost of living or to stabilize industry, and therefore deserves and will receive a storm of condemnation that will not need an amplifier to be heard in Washington.

The metal rates with few exceptions are absolutely prohibitive, and this Chinese wall would be a joke as a revenue producer, but it will not be a joke to the American consumer who is waiting for a reduction in his expense account.

Wake up, consumer, before it is too late, and send your protest to Washington.

C. W. LEAVITT & CO.
New York, June 30, 1921.

Danish Competition as Well as German

To the Editor.—I was interested in reading the reprint of J. R. Bates' letter in the June 23 issue of your journal with regard to competition encountered in the crane business from German manufacturers, but as you are undoubtedly aware it is not from Germany alone that very excellent machinery can be obtained cheaper than at prevailing prices here.

For instance we can land Diesel engines, made in Denmark by probably the best known builder in the world, on cars at New York after paying for ocean boxing, freight, insurance and 20 per cent duty at figures below those quoted for American-built engines of equivalent powers and speeds.

The margin for duty alone is a handsome profit on heavy machinery of this class, hence it is easy to understand the difficulties United States manufacturers face in attempting to compete abroad under present conditions of labor and other costs here and the exchange situation.

H. L. DEAN,
President Dean Machinery Corporation.
New York, June 28.

The Iron Age and Its Readers

Perhaps no department of THE IRON AGE is read with more interest than the personal section. It is a department, not only for its readers, but by its readers. In the last four weeks 78 personal paragraphs were published; 23 of these —or nearly one-third—were contributed by readers themselves. These tangible evidences of reader interest seldom bear any marks of desire for self advertisement but instead are expressions of an impulse to serve fellow readers as the individuals have been served by others.

NEW LOW IN IRON OUTPUT

June Production 3900 Tons Per Day Less Than in May

Net Loss of 14 Furnaces—Ferromanganese Output Lowest on Record

After standing practically stationary during April and May the blast furnace output of the country again registered a rapid decline in June and made a new low record for the year and for several years. It is necessary to go back to January, 1908, to find a month's output which parallels that of June, this year. In January, 1908, the country's total output was 1,045,250 gross tons or 33,918 tons per day as compared with 1,064,833 tons or 35,494 tons per day last month. This is a decline from May of 156,388 tons or 3900 tons per day. The net loss in furnaces blown out or banked in June is 14 as compared with six in both April and May respectively. The net loss in the last nine months is 243 furnaces.

The production of coke and anthracite furnaces in June, a 30-day month, amounted to 1,064,833 gross tons, or 35,494 tons per day as compared with 1,221,221 tons, or 39,394 tons per day in May, a 31-day month, and with 1,193,041 tons or an av rage of 39,768 tons per day in April, a 30-day month. In June, 1920, the total output was 3,043,540 tons or 101,451 tons per day. The total furnaces in blast on July 1 was 76 compared with 90 on June 1, with 96 on May 1, with 102 on April 1 and with 201 on January 1. The 76 furnaces in blast July 1 had a capacity of 32,195 tons per day as compared with 38,080 tons per day for the 90 in blast on June 1 last. There were 16 furnaces blown out or banked and only two blown in during June.

A feature of the June output was the further sharp decline in the production of manganese-iron alloys. In June no spiegeleisen was produced and the output of ferromanganese was only 4536 tons. This compares with 6853 tons of ferromanganese in May besides an output of 2379 tons of spiegeleisen in that month. The decline is emphasized when it is remembered that in April 9566 tons of ferromanganese and 14,744 tons of spiegeleisen were produced. The lowest month previous to this was in January, 1904, when the combined output of manganese-iron alloys was 6673 tons.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from June, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
June	73,659	27,792	101,451
July	71,954	26,983	98,937
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	.....
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	.....
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,587	92,997	110,762	84,944	87,222	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
Half yr.	19,069,892	18,002,572	16,033,808	18,138,986	9,428,166
July	3,342,438	3,420,988	2,428,541	3,067,043	.....
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	.....
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28,038	29,013
Mar.	2,277,507	2,480,668	1,323,443	26,644	35,275	41,294
Apr.	1,838,677	1,968,542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1,024,678	14,604	33,407	9,232
June	1,655,944	2,209,770	883,312	14,254	34,751	4,536
July	1,906,604	2,230,567	.....	14,805	36,789	.....
Aug.	2,108,566	2,254,943	.....	17,419	36,985	.....
Sept.	1,828,613	2,247,250	.....	20,631	39,546	.....
Oct.	1,295,690	2,393,644	.....	20,238	34,786	.....
Nov.	1,727,656	2,150,075	.....	19,964	26,944	.....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	.....

Capacities in Blast July 1

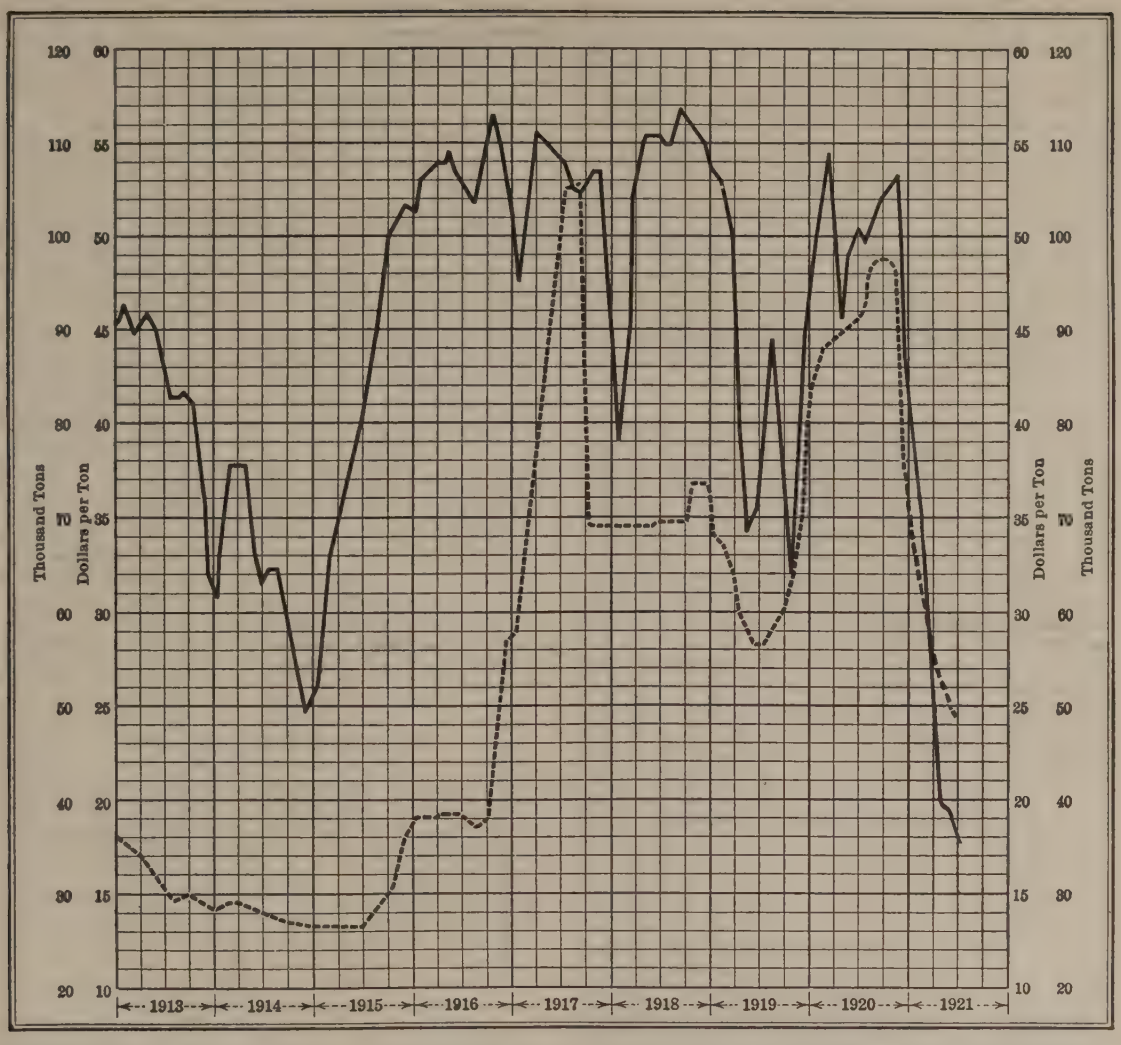
The following table shows the number of furnaces in blast July 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast June 1:

Coke and Anthracite Furnaces in Blast

Location of Furnaces	Total Stacks	July 1—In Blast	July 1—Capacity per Day	June 1—In Blast	June 1—Capacity per Day
New York:					
Buffalo	22	3	1,140	3	1,200
Other New York	4	0	...	0	...
New Jersey	4	1	175	2	330
Pennsylvania:					
Lehigh Valley	18	2	900	3	1,125
Spiegel	2	0	...	0	...
Schuylkill Valley	15	2	705	2	785
Lower Susquehanna	10	1	380	2	790
Ferro	0	0	...	0	...
Lebanon Valley	8	1	135	0	...
Ferro	2	0	...	1	65
Pittsburgh District	55	16	7,550	18	8,700
Ferro and spiegel	4	1	110	1	110
Shenango Valley	19	0	...	2	900
Western Penn.	26	6	2,100	6	2,000
Ferro and spiegel	0	0	...	0	...
Maryland	6	1	335	1	450
Wheeling District	15	1	600	1	580
Ohio:					
Mahoning Valley	27	6	3,000	5	2,400
Central and Northern	26	6	3,220	8	4,140
Southern	16	2	200	4	1,010
Illinois and Indiana	42	13	7,000	15	8,100
Mich., Wis. and Minn.	11	2	850	3	1,335
Colorado and Missouri	6	2	740	2	760
The South:					
Virginia	18	2	175	2	175
Kentucky	7	0	...	0	...
Alabama	41	8	2,880	9	3,125
Tenn., Ga. and Texas	16	0	...	0	...
Total	418	76	32,195	90	38,080

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for June, and the three months preceding:



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Pig Iron Production by Districts, Gross Tons

	June (30 days)	May (31 days)	April (30 days)	March (31 days)
New York	34,241	37,202	41,223	82,559
New Jersey	6,051	10,291	9,875	9,307
Lehigh Valley	29,929	42,289	45,329	48,256
Schuylkill Valley	21,172	24,471	21,279	28,631
Lower Susquehanna and Lebanon Valleys	25,809	26,491	24,799	24,521
Pittsburgh district	243,025	281,391	304,308	387,966
Shenango Valley	12,077	27,981	30,763	52,516
Western Penna.	63,802	73,661	70,930	83,350
Maryland, Virginia and Kentucky	15,289	20,781	17,575	22,069
Wheeling district	18,207	17,981	1,991	54,573
Mahoning Valley	88,515	87,090	102,826	132,482
Central and Northern Ohio	116,003	133,801	107,747	137,925
Southern Ohio	25,798	29,103	11,843	4,547
Illinois and Indiana	214,834	249,671	239,585	344,675
Mich., Minn., Mo., Wis., Colo. and Wash.	56,857	65,004	68,058	80,539
Alabama	93,224	94,013	94,910	101,484
Tennessee	none	none	none	122
Total	1,064,833	1,221,221	1,193,041	1,595,522

Only two furnaces were blown in during June, and they were as follows:

A furnace of the Bethlehem Steel Co. in the Lebanon Valley and Grace furnace of the Brier Hill Steel Co. in the Mahoning Valley.

Among the furnaces blown out or banked during June were the following:

The Musconetcong furnace in New Jersey; B furnace of the Bethlehem Steel Co. in the Lehigh Valley; B furnace of the Bethlehem Steel Co. in the Lower Susquehanna Valley and B furnace of the same company in the Lebanon Valley, making ferromanganese; G furnace of the Carnegie Steel Co. and the second Monongahela furnace of the National Tube Co. in the Pittsburgh district; Nos. 2 and 4 New Castle furnaces of the Carnegie Steel Co. in the Shenango Valley; Dover furnace and the second River furnace in the Central and Northern Ohio district; the Belfont and Portsmount furnaces in southern Ohio; the second Federal furnace and one Joliet furnace of the Illinois Steel Co. in the Chicago district; the second furnace of the Minnesota Steel Co. in Minnesota and the second North Birmingham furnace of the Sloss-Sheffield Steel & Iron Co. in Alabama.

Canadian Imports for Twelve Months

During the twelve months ended May 31, Canada reports imports from the United States goods amounting to $812,531,821 and exports to the United States goods amounting to $525,164,405. Materials of iron and steel and of nonferrous metals moved as follows:

	Iron and Steel	Non-ferrous
From Canada to United States	$16,577,593	$27,359,422
From United States to Canada	16,297,882	6,055,776

Former employees of the Mullins Body Corporation at Salem, Ohio, have voted to return to work at reduced wages following a strike which lasted 16 weeks.

MANY IDLE PLANTS

Greatly Reduced Production in Manufacturing Centers

PITTSBURGH, July 4.—The mid-summer shutdown of iron and steel plants for repairs and other necessary work on equipment this year is much more general and promises to be for a much longer period than before in several years. Demands are so few and small that nearly all steel manufacturers will be able to meet them from stocks which have been built up over the past few weeks. The plant suspensions, therefore, instead of being for a definite period, are likely to continue until either there are sufficient orders on the books to warrant a resumption or mill stocks are reduced to a point where it is considered wise to replenish them. The outlook is that iron and steel producing capacity will be more poorly engaged during the first half of July than it has been for many years.

July starts off with only 19 of the 139 blast furnaces in the territory bounded by Johnstown, Wheeling, Pittsburgh and the Mahoning and Shenango Valleys, making iron. Seven of the furnaces of the Carnegie Steel Co. were banked on June 30, for over the holiday, while the Pittsburgh Steel Co. also banked the one furnace it had making iron on the same date. The standing of the leading steel companies in the matter of active furnaces is 7 of 57 for the Carnegie Steel Co.; 2 of 12 for the Jones & Laughlin Steel Co.; 2 of 11 for the Cambria Steel Co.; 1 of 8 for the Republic Iron & Steel Co. in the Youngstown district; 2 of 6 for the Youngstown Sheet & Tube Co., and 2 of 6 furnaces located within the territory referred to for the National Tube Co. All four of the Pittsburgh district furnaces of the American Steel & Wire Co. are down, and have been for some time. All six of the furnaces embraced in the Wheeling Steel Corporation now are idle, the stack of the Whitaker-Glessner Co., at Portsmouth, Ohio, having gone down on June 25. Only one merchant furnace is making iron in the territory mentioned, this being one of the two stacks of the American Manganese Mfg. Co., Dunbar, Pa., which is running on foundry iron.

Among the various classes of finishing mills those turning out tubular goods are making the best showing, and even these mills are not as well engaged this week as they were recently, due to the fact that jobbers are doing a good deal of trading between themselves and thus keeping back orders from the mills. Besides, the demand for oil country pipe is extremely light because so many of the big producers are reclaiming and repairing old pipe. Although the Steel Corporation has been getting some bar business from some of the automobile companies, and a few demands for plates and small shapes are developing as a result of the railroad repair orders recently placed, it cannot be said that operations of bar, plate and shape mills reflect these developments. Operations of the sheet and tin plate mills have rarely been so low as at present. Union mills generally have suspended because of the failure of an agreement on a wage scale, also because demands are so low that the manufacturers are satisfied that they can meet such demands as develop in the immediate future from stocks. Leading independent makers here of wire have shut down their plants.

Plant Operations

The steel works of the National Enameling & Stamping Co. at Granite City, Ill., closed down on July 1, with the exception of the finishing department which will run until July 15. Hayward Niedringhaus, plant manager, said that the company had a fairly large stock on hand. The plant likely will remain closed for several months. The stamping works at Granite City also is virtually closed down.

The entire plant of the Minnesota Steel Co., Duluth, Minn., is idle with the exception of 38 coke ovens, the remaining active blast furnaces and open hearths having been put out last week.

Reports from 476 members of the National Metal Trades Association for the months of March, April and May, indicated that 227, or almost 50 per cent of those reporting, were operating 50 hours or more a week. The majority of these, however, are working with greatly reduced forces as compared with six months ago. Operations of less than 50 hours were reported by 249; 116 reported 40 hours, or less; 36, 30 hours or less; five were completely shut down, while five, on the other hand, are operating two shifts.

For 45 Milwaukee metal working shops reporting, 12,404 men were employed in May, as compared with 13,061 in April. The average number of hours worked per man per week was 41.1 in April and 40.6 in May. Comparison with conditions a year ago is much less favorable. In May, 1920, the total employees in 36 shops amounted to 19,169, while in May, 1921, the same 36 shops had only 11,954 men on their pay rolls. The average number of hours worked per man per week was 52.5 in May, 1920, and 40.6 in May, 1921.

The plant at St. Johns, Mich., of the Hayes Wheel Co. of Jackson, Mich., reopened Tuesday, July 5. The plant had been closed for inventory and repairs.

The machine shop of the Union Iron Works, Springfield, Mo., is operating on two-thirds time and the foundry two or three days a week.

The Erie Railroad shops at Meadville, Pa., resumed July 1, after being closed down since May 3. About 600 men are affected by the order.

The Pennsylvania Railroad Co., Philadelphia, is arranging for the closing of its repair shops at Chambersburg, Pa., transferring the work now being handled at this point on its Cumberland Valley Division to the shops at Altoona and other outlying repair plants. The local shops have been giving employment to about 350 men.

Massachusetts Plants Close

Indications are a number of New England plants will be closed two or three weeks or longer this month. The Goodell-Pratt and various Greenfield Tap & Die Corporation, Greenfield, Mass., plants, as well as the Millers Falls Co., Millers Falls, Mass., plant closed July 1 until Aug. 1. The first and last named companies manufacture small tools. Other producers of small tools are feeling the business depression, especially those located in Rhode Island, and will operate on a reduced schedule this month.

Army and Navy Award Contracts

WASHINGTON, July 5.—Awards were made last week by the War Department for supplying material for and fabricating 76 airplant hangars, of which 60 are small ones. The contract for the latter went to the Fort Bridge Works, Pittsburgh, at $204,000, f.o.b. Pittsburgh, while that for 16 hangars of the larger size went to the Belmont Iron Works, Philadelphia, at $271,000, f.o.b. New York. The latter company also was awarded a contract for hangar spare parts at $103,343, f.o.b. manufacturer's plant. In all, the steel involves approximately 3500 tons.

The Bureau of Supplies and Accounts, Navy Department, has awarded a contract to the Duquesne Steel Foundry Co., Pittsburgh, for 276 net tons of steel castings for the Philadelphia Navy Yard, at $28,-704, delivered.

The following bids have been received by the Bureau: 60 net tons of nickel steel, for the Naval Ordnance plant, South Charleston, W. Va.; Carnegie Steel Co., Pittsburgh, 0.0426c. per lb.; Crucible Steel Co. of America, Pittsburgh, 0.044c. per lb., and Cambria Steel Co., Johnstown, Pa., 0.045c. per lb., all on a delivered basis; 70 net tons of rivet stock for the Mare Island, Cal., Navy Yard, $3.082 f.o.b. producers' plants, submitted by all bidders, including the Jones & Laughlin Steel Co., the Carnegie Steel Co., the Crucible Steel Co. of America, Pittsburgh; Cambria Steel Co., Johnstown, and the Bethlehem Steel Co., Bethlehem, Pa.

The Rogers Haggerty Co. was the low bidder for the hill to hill bridge to be constructed in Bethlehem, Pa., by the Pennsylvania State Highway Commission. Its bid was $2,568,000. In addition to the structural steel a large tonnage of reinforcing bars will be required for this project.

GERMAN MARKET STIFFENS

Finished Material Stiff But Semi-Finished Material and Sheets Slightly Weak

(Special Correspondence)

BERLIN, GERMANY, June 20.—Buying activity has been stimulated to a certain extent during the past week by the favorable view taken in industrial circles of the recent conference between the French and German ministers of reconstruction. The conditions still obtaining in Upper Silesia are increasingly influencing the Western market. Added to this is the foreign exchange situation that has once more demonstrated its importance as a determining factor in the German iron and steel market. Though the general tendency is still downward, signs are nevertheless multiplying that the bottom of the price curve has been reached and that a hardening of prices may be looked for soon, as an advance in coal prices is predicted and a further depreciation of the mark considered a certainty. The market in general was rather erratic during the past week, especially in sheets, but recent quotations in finished materials are from 5 to 10 per cent higher than the low prices quoted some weeks ago and mills are showing less inclination to make concessions.

Price Reductions in Pig Iron

Foundry business is largely of a "pick-up" character, being affected by the pig iron market. Blast furnaces are piling up stock and several stacks have lately been blown out. There being a glut of ore offers, the Siegerland Ironstone Syndicate has had to reduce prices by 30 m. per ton. Present quotations for German pig iron are unchanged, but the Pig Iron Syndicate is contemplating a price reduction. Some isolated deals in Lorraine and Luxemburg iron were closed at 1020 to 1030 m. per ton ($13.77 to $13.90), base Brebach. For economic reasons blast furnaces are increasing the use of scrap wherever practicable, owing to the high cost of certain foreign ores. The market is flooded with ferroalloy offers, English ferromanganese being quoted at £16 and less per ton f.o.b., Antwerp or Hamburg. Keen competition in the ferrosilicon market has prompted German mills to reduce prices for blast furnace ferrosilicon, 10 to 12 per cent Si., by 120 m. as from June 1, so that the official quotation is now 1980 m. ($26.73) per ton, base Oberhausen. Ferrosilicon, 45 per cent Si., which is subject to import permit, is offered by the Stinnes company at Knapsack at 3200 m. ($43.20) per ton, f.o.b. cosumers' point. For 75 per cent Si. stock, 5000 to 5100 m. ($67.50 to $68.85) are charged.

Semi-Finished Prices Decline

The tone of the semi-finished material market has been decidedly weak, with prices suffering a further decline. We quote billets, basic, at 1330 m. ($17.95), sheet bars at 1400 m. ($18.90), and cogged blooms, open hearth, at 1300 m. ($17.55) per ton.

For rolled material the following prices generally prevail:

	Marks per Metric Ton	
Angles	1800	$24.30
Bar iron	1800	24.30
Rounds, flats, squares, basic	1820	24.57
Structural shapes	1780	24.03
Beams	1750	23.63
Rivet stock	1750	23.63
Bolt and nut stock	2200	29.70
Rails, heavy	2250	30.38
Fish plates	2350	31.72
Double-angle splice bars	2750	37.12
Rails for mines, inc. fish plates	1850	24.98

Contrary to general assumption, the wire convention has been continued for another four weeks for tactical reasons. Official prices in force since April 26 are 2300 m. ($31.05) for drawn commercial wire, 2700 m. ($36.45) for bolt and rivet wire, 2950 m. ($39.82) for galvanized wire, 2700 m. ($36.45) for nails, and 3400 m. ($45.90) for barbed wire. Wire rods in the open market are quoted at 1650 ($22.27).

Sheet and Plate Market Dull

Inquiries for sheets and plates have been light and prices, especially for thin plates, soft. We quote as follows: Heavy sheets, 1800 m. ($24.30); medium sheets, 1850 m. ($24.98); light plates, 1850 to 1900 m. ($24.98 to $25.65). The Association of German Iron Merchants, at their last meeting held at Düsseldorf in the middle of June, revised prices as follows:

	Marks per 100 Kg.	
Bar iron	230	$3.10
Hoop iron	280	3.78
Heavy sheets, according to gage	240–251	3.24 to $3.39
Medium sheets	250	3.37
Light plates, according to gage	262–289	3.54 to 3.90
Chequered plates	268	3.62

These prices are intended to serve as a guidance for closing deals and though there is a penalty for firms underselling, it remains to be seen whether the Association is strong enough to prevent members from going their own way.

American Engineers Honored by British

Information by cable brings the announcement that a number of American engineers who are now in Europe as members of the delegation to present the John Fritz medals, awarded to Sir Robert A. Hadfield and to Dr. Eugene Schneider, have had conferred on them honorary membership in a number of British engineering societies.

Charles F. Rand, who has been notably active in mining engineering circles, a trustee for years of the United Engineering Society, which is the institution in charge of the Engineering Societies Building in New York, and who is, among other things, head of the Engineering Foundation, has been made an honorary member of the Iron and Steel Institute. According to the latest list of members of that British society, there are only four other honorary members, the Prince of Wales, the King of the Belgians and two elected from Sweden.

Ambrose Swasey, chiefly prominent in the American Society of Mechanical Engineers, of which he was at one time president, and the man whose generous donation was the means of establishing the Engineering Foundation, was made an honorary member of the Institution of Mechanical Engineers. Both Messrs. Swasey and Rand were elected honorary members of the Institute of Mining and Metallurgy, and they together with Arthur S. Dwight and William Kelly, of the Institute of Mining and Metallurgical Engineers, were made honorary members of the Institution of Mining Engineers.

How High Freight Rates Operate

YOUNGSTOWN, OHIO, July 5.—Leading independent steel executives in the Mahoning Valley point to the prevailing high railroad freight charges and high rail wages as the chief contributing cause in the present period of economic depression.

"The farmer to-day has not the purchasing power to buy the things he needs and in turn the steel plants and factories of the country are adversely affected," states the president of a large interest. "The increase in freight in a certain type of gang plow, for instance, which costs $125, is $28.50, which the farmer is obliged to pay. This increase is made up by the excess freight on the wheat which the farmer is obliged to sell to purchase the implement; by the higher freight charges paid in assembling at the factory the materials to manufacture the plow, and the higher freight on the plow from the factory to the farmer. In 1915, this gang plow sold at $75. The condition illustrated by the gang plow is, I believe, at the root of the present trouble in this country."

The American Steel & Wire Co., Waukegan, Ill., has established a grocery store to reduce the cost of living for its employees in that city. For the present the store will sell only staple articles, such as smoked meats, flour, soap, etc. In addition to selling groceries to employees, the company plans to sell hard coal at cost.

Iron and Steel Markets

PRICES SETTLE FURTHER

Readjustments Still in Progress, Wages Keeping Pace

Pig Iron Production Lowest Since January, 1908 —Railroad and Automobile Buying

The reductions in prices of various steel products formally made on July 5 by the Bethlehem Steel Co., amounting to $4 per ton for bars, plates, shapes, billets, skelp, sheet bars and blue annealed sheets, $5 for black and galvanized sheets and $10 for tin plate, have been met by such of the other producers as were not already selling at the new Bethlehem levels. The fact is that as to some products the announcement merely recorded what the market already had done.

That the Steel Corporation will meet the market is inferred from recent evidence that the schedule of April 13 was not rigidly observed by some of its subsidiaries. Formalities of publication, as followed by the Bethlehem company, tend to make the adjustment of the industry to lower prices gradual and somewhat orderly.

A reduction of 15 per cent in mill wages and of 10 per cent in salaries is a part of the Bethlehem readjustment, and fresh wage reductions at various western Pennsylvania and Youngstown, Ohio, plants are expected about July 15. What action the Steel Corporation will take as to a new wage basis is not indicated as yet.

Only 18 blast furnaces out of 139 in Johnstown, Pittsburgh, Wheeling and Mahoning and Shenango Valley districts were operating over July 4, various stacks being banked. Thus in operations and in sales the first week in July has been making a low record.

Pig iron production in June was smaller than in any month since January, 1908, when the low point was touched due to the 1907 panic. But capacity then was only about half of to-day's.

At 1,064,833 tons, output last month averaged 35,494 tons per day, against 1,221,221 tons in May, or 39,394 tons per day. The month brought a net loss of 14 furnaces, the 76 which were active July 1 having a daily capacity of 32,195 tons, whereas the 90 furnaces in blast June 1 had a daily capacity of 38,080 tons.

For the six months ending June 30 the country's pig iron output, exclusive of charcoal iron, was 9,428,000 tons, against 18,139,000 tons in the first half of 1920.

While railroad buying is restricted to the last degree, there are signs that more business will be released by Aug. 1. The condition of rolling stock and in some case of track is such as to compel action. The Illinois Central's locomotive inquiry is for 100 to 130, representing over 3000 tons of steel. The Southern Pacific is inquiring for 4800 kegs of spikes and 3300 kegs of track bolts.

In the Chicago district a large share of current orders is for Federal, State, municipal and county work. Automobile plants are more of a factor in the Central West. The Ford company has bought 1000 tons of light plates and is about to place a month's requirements in other forms.

Whereas 2c., Pittsburgh, is the new Bethlehem price for plates, some western car repair work recently let brought out plates at 2c., Chicago.

Negotiations are practically completed by which the American Locomotive Co. will supply 45 locomotives to Mexico.

Fabricated steel business has shown some improvement. In the East 10,000 tons of work was contracted for, with 3000 tons practically settled and 2500 tons involved in new projects.

Opposition in the steel trade to the metal schedule of the new tariff bill centers on the manganese ore and ferromanganese duties, which steel manufacturers consider far too high. There is also the anomaly that 20 units of manganese in spiegeleisen pay $1.25 duty, whereas 80 units in ferromanganese pay $39.42, or at nearly an eight-fold rate. The general provision for American valuations would be of little help in keeping out European steel, since nearly all steel duties are specific and hence do not involve valuations.

Over and above the duty on the foreign ores they use, domestic merchant producers of ferromanganese have close to $15 per ton protection against the British product. This margin would encourage more steel companies to make their own alloy.

The monotonous record of recessions in pig iron prices continues. In the South the prevailing price is down 50c. and production is to be further curtailed. Other centers report reductions of from 50c. to $1 and there is no evidence that bottom has yet been struck. Sales are mostly in carload lots, the largest of the week being 2000 tons of basic at Pittsburgh.

Pittsburgh

PITTSBURGH, July 5.

The new schedule of prices announced by the Bethlehem Steel Corp. is received here with mixed emotions. The reductions have been generally adopted by other independent companies and while official announcement is yet to be made, it is believed that the new prices will be adopted by the Steel Corporation. As a stimulus to business, nobody expects that the new schedule will be any more beneficial than the old one, for the reason that the prices named had been fairly generally quoted against attractive inquiries previously. The claim is made in some quarters that some business which was near the closing stage has been deferred as a result of the announced reduction. Publication of a new price schedule on the minor products still is to be made, but it is expected that the revision will be completed by the end of the week and that then the Steel Corporation will adopt all of the new schedule.

Business over the past week has been smaller than at any time since the contraction started last fall. This condition finds reflection in plant operations, which are unusually small, even for the first week of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 5, 1921	June 28, 1921	June 7, 1921	July 6, 1920
No. 2X, Philadelphia‡	$25.50	$25.50	$25.50	$47.15
No. 2, Valley furnace†	21.00	21.00	22.50	45.00
No. 2, Southern, Cin'ti†	*25.50*	26.00	26.50	45.60
No. 2, Birmingham, Ala.†	*21.00*	21.50	22.00	42.00
No. 2, foundry, Chicago*	20.00	20.00	21.50	45.00
Basic, del'd, eastern Pa.	23.50	23.50	25.00	43.00
Basic, Valley furnace	*20.00*	20.50	21.00	45.00
Bessemer, Pittsburgh	*23.46*	24.46	24.96	46.40
Malleable, Chicago*	20.00	20.00	21.50	43.50
Malleable, Valley	*21.50*	22.50	23.00	45.00
Gray forge, Pittsburgh	21.96	21.96	23.46	44.40
L. S. charcoal, Chicago	37.50	37.50	37.50	57.50
Ferromanganese, del'd.	70.00	70.00	75.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill.	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill.	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	*33.00*	37.00	37.00	60.00
O.-h. billets, Pittsburgh	*33.00*	37.00	37.00	65.00
O.-h. sheet bars, P'gh.	*35.00*	39.00	39.00	75.00
Forging billets, base, P'gh.	*38.00*	42.00	42.00	85.00
O.-h. billets, Phila.	*38.74*	42.74	42.74	69.10
Wire rods, Pittsburgh	*45.00*	48.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	2.00	2.00	2.20	2.75
Skelp, sh. steel, P'gh., lb.	2.00	2.00	2.20	3.00
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.25	2.25	2.25	4.75
Iron bars, Chicago	*2.10*	2.15	2.25	3.75
Steel bars, Pittsburgh	*1.90*	2.00	2.10	3.50
Steel bars, New York	*2.28*	2.38	2.48	4.02
Tank plates, Pittsburgh	1.90	1.90	2.00	3.50
Tank plates, New York	2.28	2.28	2.38	3.77
Beams, etc., Pittsburgh	2.00	2.00	2.20	3.10
Beams, etc., New York	2.38	2.38	2.58	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.75	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 5, 1921 Cents	June 28, 1921 Cents	June 7, 1921 Cents	July 6, 1920 Cents
Sheets, black, No. 28, P'gh.	*3.50*	3.75	3.85	5.50
Sheets, galv., No. 28, P'gh.	*4.50*	4.75	5.00	7.00
Sheets, blue an'l'd, 9 & 10.	*2.65*	2.85	2.90	4.50
Wire nails, Pittsburgh	3.00	3.00	3.00	4.00
Plain wire, P'gh	2.75	2.75	2.75	3.50
Barbed wire, galv., P'gh.	3.65	3.65	3.85	4.45
Tin plate, 100-lb. box, P'gh.	*$5.75*	$6.25	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.25	$13.25	$13.50	$35.50
Carwheels, Philadelphia	18.00	18.00	18.00	38.00
Heavy steel scrap, P'gh.	12.00	12.00	13.00	25.50
Heavy steel scrap, Phila.	11.00	11.00	11.50	22.50
Heavy steel scrap, Ch'go.	*10.00*	10.25	11.50	23.50
No. 1 cast, Pittsburgh	16.00	16.00	17.00	40.00
No. 1 cast, Philadelphia	*16.00*	17.00	17.50	37.00
No. 1 cast, Ch'go (net ton)	12.50	12.50	13.00	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	15.00	33.00
No. 1 RR. wrot, Ch'go (net)	9.50	9.50	10.00	25.00
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.00	$3.00	$17.00
Furnace coke, future	3.25	3.25	3.25	11.50
Foundry coke, prompt	4.25	4.25	4.50	17.00
Foundry coke, future	4.75	4.75	5.00	14.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.75	12.75	13.00	19.00
Electrolytic copper, N. Y.	12.62½	12.62½	13.00	19.00
Spelter, St. Louis	*4.35*	4.25	4.55	7.85
Spelter, New York	*4.85*	4.75	5.05	8.20
Lead, St. Louis	*4.25*	4.15	4.50	8.00
Lead, New York	4.40	4.40	4.75	8.25
Tin, New York	*29.87½*	29.00	29.00	48.00
Antimony (Asiatic), N. Y.	*4.75*	4.87½	5.20	7.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Finished Steel, 2.557c. per Lb.

Based on steel bars, beams, tank plates, open-hearth rails, plain wire, black pipe and No. 28 gage black sheets	June 28, 1921,	2.607c.
	June 7, 1921,	2.679c.
	July 6, 1920,	3.724c.
	10-year pre-war average,	1.684c.

July, which is usually chosen for plant repairs. All producers are carefully watching overhead and where less loss would be sustained by keeping in operation than in shutting down the former course is pursued. The fact that only 18 furnaces out of the 139 in Johnstown, Wheeling, Pittsburgh and The Valley districts were making iron over July 4 is evidence of the small order books of the steel companies and also of the desire to avoid the piling up of cold iron at current costs. Seven furnaces of the 14 Carnegie Steel Co. which were in blast in the last week of June were banked over the holiday and resumed production to-day, while the blast also was turned on this morning at the stack of the Weirton Steel Co., which was banked over Saturday, Sunday and Monday. This brings the number of active furnaces to 26 out of 139, or slightly less than 19 per cent.

Although the railroads tributary to Pittsburgh are not ordering forward rails placed early in the year, they are expected to do so by August 1, and expectations of increased railroad buying are stronger than they have been recently. The railroads in this part of the country are showing a balance on the right side of the ledger, and in order that this development may not be used against them as an argument in favor of lower freight rates, the common tendency lately has been to increase the maintenance of way payrolls and to start up idle shops as a means of getting rid of some of the enlarged earnings. Because of this disposition on the part of the railroad management, orders for steel are expected to be more numerous than they have been. Few, however, expect the railroads to be heavy buyers.

There is considerable opposition among the steel companies to the proposed tariff on ferromanganese and manganese ore and suggestion is heard that some companies will go into the manufacture of ferromanganese because of the proposed duty.

Pig Iron.—The only important transaction recently noted is one involving 2000 tons of basic iron recently sold by a Valley steel maker to another steel producer at $20, furnace. This is a drop of 50c. per ton from the former quotation, but the market does not yet give evidence of having touched bottom, as other offerings have been made at $20, furnace, and there are reports from Cleveland that as low as $19 has been done. If business has been done that low, it is probably from the stock of a Cleveland middle interest which has been carrying a big tonnage for some time, bought at well above to-day's market. Little or nothing has been done recently in Bessemer iron, which nominally is quoted at $2 a ton above basic, or offered at $21.50, without takers, and this quotation must be given consideration. Producers of foundry iron claim to have lost prospective orders because of the price reduction just announced by independent companies. W. P. Snyder & Co. report the average price of Bessemer iron from Valley furnaces in June at $23, and the average price on basic the same month at $20.70. These prices show declines of $1.25 in Bessemer from the May average and of $1.175 in basic from the average of May.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$20.00
Bessemer	$21.50 to 22.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	21.50 to 22.00

Structural Material.—Since there has been no appreciable increase either in the number or the size of structural awards to fabricating shops in this district, the demand for plain material is extremely limited. The announcement of the cut by the Bethlehem Steel Co. to 2c. base, Pittsburgh, for structural beams has been followed by other independent companies and probably also will be followed by the Steel Corporation. Since this price could have been done previously, it is doubtful whether much new business will develop, and the opinion is expressed in some quarters that an inquiry involving a really sizable tonnage could be placed with a little shopping, at well below 2c. Prices are given on page 49.

Ferroalloys.—Business probably never before was so completely at a standstill as at present. With independent steel works operations not much over 20 per cent of capacity, and these companies, unlike the Steel Corporation, dependent on outside sources for supplies of ferromanganese and spiegeleisen, the lack of demand is readily explained. There are occasional inquiries, but when quoted against they usually prove to be nothing more than "feelers." Prices are purely nominal and the undertone of the market is weak, based on bid and asked quotations. It is reported that a price as low as $65 furnace, freight allowed, recently was made on 50 per cent ferrosilicon. Bessemer ferrosilicon and silvery iron at current quotations are much out of line with pig iron and the appearance of a sizable inquiry undoubtedly would develop sharply lower prices.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $69 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The lower prices announced by Bethlehem Steel Corporation of $33 for 4-in. billets, $35 for sheet bars and $34 for slabs have been generally adopted by other independents and while there has been no official announcement, it is assumed that the Steel Corporation will name these prices at an early date. Almost no business has been done lately and the new prices are not expected to stimulate the demand because it has been possible to obtain tonnages at these prices for at least the past two weeks. Steel works operations are at the lowest notch since the depression set in, and, including the corporation subsidiaries, it is doubtful whether operations reach 20 per cent of capacity.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $33; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $34; forging billets, ordinary carbons, $38, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Thus far there has been no announcement relative to change from the old base of $48 for No. 5 common soft rods. There is almost no demand, however, and it is currently stated that a bid of $45 would get consideration. Maintenance of the present differential between 4-in. billets and wire rods, of $11, would suggest a new base of the latter of $44. Prices are given on page 49.

Steel Skelp.—Reduction by independent companies in the base price to 2c. is looked upon merely as a public announcement of a price which it is known could have been done for at least the past fortnight. The corporation is expected to meet this cut, but it is doubtful whether it will produce much new business in view of the tapering demand in both pipe and boiler tubes.

Wire Products.—Evidence of the light demand is found in the fact that at least two large independent producers have shut down their plants, and while this action is explained in part by the fact that there usually is a suspension in the first week in July for necessary plant repairs, neither of these companies has a definite date for resumption. Manufacturers have fair-sized stocks and the fact that jobbers are doing much trading between themselves is keeping down demands upon the former to a minimum. Prices have not yet been revised in keeping with the reduction announced in other finished lines, but a new schedule is probable, notwithstanding the recent reduction of $5 per ton in nails and plain wire and the cutting of the differential in galvanized products.

We quote wire nails at $3 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.75 base per 100 lb. Pittsburgh.

Nuts, Bolts and Rivets.—The recent downward revision in prices has been without effect either upon the demand or specifications against unfilled orders. Plant operations here are almost nil, but one company that had been down resumed on part time this week. Prices and discounts are given on page 49. Some makers of track bolts recently have gone as low as $4 per 100 lb. in an effort to stir up orders.

Spikes.—The market now is quotable at $3.25 base, Pittsburgh, on all sizes and does not show much real strength even at that figure, as makers are more anxious to sell than buyers are to buy. There are rumors of quotations as low as $3 by some makers on both standard and small spikes. Prices are given on page 49.

Iron and Steel Bars.—It is generally expected that the corporation will meet the new independent price of 1.90c., base, Pittsburgh, on soft steel bars, although no official announcement of this sort has been put out. The new base is not expected to appreciably stimulate business for the reason that it is common knowledge that such a price could have been done right along against orders of sufficiently attractive proportions. Reinforcing bars from steel also have been cut to 1.90c., base, but even this price seems high with such bars rolled from old rails or shell steel available at 1.75c. There has been a cut of $5 per ton in iron bars, which now are quoted by makers here at 2.50c., base, for refined iron.

We quote steel bars rolled from billets at 1.95c. to 2.10c.; reinforcing bars, rolled from billets, 1.95c. to 2.10c. base; reinforcing bars rolled from old rails, 1.75c. to 1.85c.; refined iron bars, 2.65c. to 2.75c., in carloads, f.o.b. mill, Pittsburgh.

Cold-Finished Steel Bars.—Business is so nearly at a standstill that quotations have little or no value. The general quotation is 3c., base, Pittsburgh. How much lower an order might be placed is purely conjectural in the absence of real inquiries. As low as 2.75c., base, has been quoted and now that soft steel bars definitely are quotable at 1.90c., there are suggestions of 2.65c., and even of 2.50c., as a base for the cold-finished bars.

Iron and Steel Pipe.—In comparison with other finished steel products, the demand for pipe is fairly good. One of the Valley producers last week was able to maintain 50 per cent operation and to ship its entire production, and this week's schedule calls for the operation alone of its tube works. Generally, most of the current production is for stock. Shipments are on a tapering scale, due to the fact that oil production continues to be curtailed and the fact that most of the producers have ample supplies and some have a surplus of which they are disposing at low prices. Business in standard pipe is purely of a piecing out character and such business does not bulk large because so many jobbers are matching up stocks among themselves. No announcement yet has been made as to the reduction which seems likely in view of the cut in skelp and other semi-finished and finished products. Discounts are given on page 49.

Hoops and Bands.—With merchant steel bars definitely at 1.90c. base, the market for hoops and bands has settled to 2.50c. base and even that quotation, which has been fairly common in the past fortnight, does not mean much because makers have so few chances to quote.

Hot-Rolled and Cold-Rolled Strips.—A revision in prices is yet to be made in keeping with the reduction just made in billet prices. A cut seems probable, although it is likely to be a moderate one, in view of the fact that prices of strips have been discounting lower steel prices for several weeks. The market is

quotable from 2.50c. to 2.60c. on hot-rolled strips and from 4.75c. to 5c. on cold-rolled strips. Business still is slack although some demands are coming from the Ford Motor Co. and Dodge Brothers Co. The latter has decided upon an increased production schedule, which will carry its daily output to 525 pleasure cars, which compares with full production of 600 cars daily.

Plates.—The reduction by the Bethlehem Steel Co. to 2c., Pittsburgh, has been followed by other independent companies, which hitherto have been nominally quoting 2.20c. Outside of the fact that the reduction brings buyers' and sellers' price ideas a little closer together, it has no importance because some makers for several weeks past have been willing to go as low as 1.90c. to secure business, and an even lower price recently was made by a Chicago district manufacturer. The corporation has not yet made an official announcement as to prices, but undoubtedly will meet the revised independent quotations. We therefore quote sheared plates, ¼ in. and heavier, of tank quality, at 1.90c. to 2c.

Steel Rails.—Railroads, despite the lower wage rates which became effective July 1, are not specifying against rail orders placed earlier in the year, but some increase is expected by Aug. 1, when it is believed, the railroads will have used up such supplies as already have been delivered them. The market on light rails, rolled from new steel, still is nominally quoted at 2.20c., Pittsburgh, for 25 to 45-lb. sections, but in view of the reductions recently announced in the finished lines, and also that for some time past there has been considerable shading of that price, it is expected that a new price soon will be named and a base of 2c. is forecast. Demand for light rails still is slack.

We quote 25 to 45-lb. sections, rolled from new steel 2.10c. to 2.20c.; rolled from old rails, 1.80c. to 2c.; standard rails, $45 mill for Bessemer, and $47 for open-hearth sections.

Sheets.—Increased production schedules of Dodge Brothers are finding some reflection in the demand for automobile sheets, but outside of this class of material, the market still is exceedingly quiet. The new schedules of the Bethlehem Steel Co. of 2.65c. base for blue annealed, 3.50c. base for black and 4.50c. base for galvanized, have been adopted by most of the other independent makers, and it is assumed that they will be followed by American Sheet & Tin Plate Co. The latter has put into operation its sheet plant at Scottdale, Pa., and is running heavier at some of its other plants running on automobile sheets. So many of the independent mills are down, however that the operations of the industry as a whole do not exceed 20 per cent capacity. No word yet has been received relative to the wage scale conference which convened to-day in Columbus, Ohio, between representatives of the Amalgamated Association of Iron, Steel and Tin workers and manufacturers who have been working under an agreement with this organization. Prices are given on page 49.

Tin Plate.—The new base of $5.75, Pittsburgh, for tin plate, announced by the Bethlehem Steel Co., has been adopted by other independents generally, and probably will be adopted by the American Sheet & Tin Plate Co. A good many of the independent plants working under an agreement with the Amalgamated Association are idle this week, but the loss has been somewhat offset by increased operations by the American Sheet & Tin Plate Co. and some of the independents working under an open shop policy. One independent company which has been running eight of its 32 mills for several weeks past has 14 under power this week.

Coke and Coal.—The coke market is extremely inactive but fairly steady at $3 per net ton oven, for spot furnace grade and at $4.25 for selected 72-hr. coke, for spot delivery. Oven operators have been willing to keep production where losses have not exceeded those that would have been sustained by complete suspension. Demand, however, has become so limited that there no longer is any opportunity to save money by keeping in operation, and the result has been a suspension of several plants. The contract market is purely nominal in the absence of any important business. The coal market still is weak because there is so little demand. Lake requirements have been disappointing and there is no compensating demand from other quarters. Mine run steam coal is quotable from $1.50 to $2.25 per net ton, mine, by-product from $1.60 to $2, and gas coal from $2.25 to $2.50.

Boiler Tubes.—Business is dull to the point of stagnation. Jobbers are getting very little business because it is possible for consumers to buy less than a carload at about the carload prices from manufacturers. Discounts are given on page 49.

Steel Skelp.—A tapering demand in pipe and boiler tubes is fully reflected in the call for the raw material. The April 13 base was 2.20c. Pittsburgh for sheared, universal and grooved skelp, but this price has been shaded $2 to $4 a ton against recent inquiries. With plates at 2c. or less and the demand far below normal, users of skelp would not have much trouble in obtaining supplies at 2c.

Old Material.—Trading is practically at a standstill. The foundries in this district are running at a very low rate, and are practically out of the market for old material, while interest on the part of steel companies is passive on account of the suspensions for lack of orders and to make the annual plant repairs, for which the first week in July usually is chosen. Offerings of scrap are not heavy, but they cannot be cut off entirely and dealers in their efforts to find an outlet for material which cannot be applied against old contracts, are obliged to put the knife to prices. Machine shop turnings have been rather freely offered lately at $7.50 a gross ton, delivered, which would mean in some instances, where the freight rate from shipping point to Pittsburgh is high, that the railroads would obtain about twice as much as the producer. Figuring a freight rate of $5 a ton from Detroit to Pittsburgh, would mean that the producer or shipper would receive only $2.50 a ton on the shipment. Prices generally are merely an appraisal of what might be obtained and mean little in the absence of business. The Baltimore and Ohio Railroad will receive bids until noon, July 11, for 15 cars and 15.875 gross tons of scrap; also for 3000 lbs. of high speed steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to 16.50
Railroad malleable	12.00 to 13.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	14.50 to 15.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	12.00 to 12.50
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	14.00 to 14.50
Stove plate	12.00 to 12.50
Cast iron borings	8.00 to 8.50
No. 1 railroad wrought	12.00 to 12.50

Directors of the Truscon Steel Co., Youngstown, Ohio, have declared a quarterly dividend on common stock of 1¾ per cent, payable July 15 to holders of record July 5. Previous to the recent payment of a common stock dividend of 50 per cent, the company maintained a quarterly dividend rate of 4 per cent on the junior issue. Directors met at the home office in Youngstown, instead of in Detroit as usual, and inspected the main properties.

The Reedy Foundry Co., one of the oldest Chicago jobbing foundries, has been sold to the Oil & Chemical Co., Chicago, which will transfer the plant into a refinery. W. H. Reedy, head of the Reedy Foundry Co., is interested in the oil concern. All of the foundry equipment will be sold.

Cleveland

CLEVELAND, July 5.

Iron Ore.—The market is inactive. A few sales have been made in lots of around 5000 tons of certain ores for mixtures, but only one inquiry is reported involving any large tonnage requirements. Ore shipments during June were 3,600,000 gross tons, or only about 40 per cent of the movement during the corresponding month last year, when the lake shipments amounted to 9,233,566 tons. Shipments during May were 2,594,027 tons. Lake shipments up to July 1 were 6,371,227 tons as compared with 16,440,515 for the same month last year. The total amount of iron ore in furnace yards and on Lake Erie docks June 1 was 27,840,000 tons, or an increase of 240,000 tons over May 1. This compares with 18,975,000 on June 1, 1920. The consumption of Lake Superior ore during May was approximately 1,725,000 tons, or an increase of 48,000 tons over April.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The buying of pig iron continues in light volume and orders are almost wholly for car lots. The market still shows a downward tendency. While open quotations range from $21 to $21.50, Valley furnace, for No. 2 foundry iron, the $21 price has been shaded in some cases, although some car lot sales have been made at $21.50. The only inquiry of any size is from a Johnstown, Pa., radiator interest for 250 tons. June shipments as a whole fell off as compared with May, and with very few shipping orders at present, producers do not look for an improvement in consumption for this month.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$21.96
Northern No. 2 fdy., sil. 1.75 to 2.25	22.50
Southern fdy., sil. 2.25 to 2.75	29.42
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	$37.00 to 38.00

Finished Iron and Steel.—The price reduction by the Bethlehem Steel Co. had little effect on the market, as buyers had expected reductions July 1, and quotations as low as, and in some cases lower, than the newly named prices, have become common in steel bars, plates and structural material. Some of the independent mills promptly accepted the new prices and others will probably do so, although the attitude of the Steel Corporation has not yet been made known. Consumers see no indication that prices will be stabilized at the new levels, but look for further price irregularities. While the market continues very quiet, some of the mills report a little improvement in inquiries both in number and tonnage involved. The Ford Motor Co. is understood to have placed 1000 tons of light plates for frames, dividing this steel among four mills. The Illinois Central Railroad is inquiring for 100 Mikado type locomotives requiring 3000 tons of steel. The Brown Hoisting Machinery Co. has taken the coal handling plant for the Superior Coal & Dock Co., requiring 800 tons of structural material. The Akron, Canton & Youngstown Railroad is inquiring for 600 tons of rails. The Ohio State University stadium and other steel building work previously noted have not yet been placed. With the reduction in mill prices, Cleveland warehouse prices will be reduced within a day or two.

Cleveland warehouses quote steel bars at 2.99c.; plates, 3.09c.; structural shapes, 3.09c.; No. 9 galvanized wire, 3.75c.; No. 9 annealed wire, 3.50c.; No. 28 black sheets, 4.50c.; No. 28 galvanized sheets, 5.50c.; No. 10 blue annealed sheets, 3.60c. to 3.75c.; hoops and bands, 3.69c.; shafting, 4.25c.

Bolts and Nuts.—Bolts and nuts still show a tendency toward lower levels. Further reductions amounting to 5 per cent have been made on large machine and carriage bolts by some makers. Prices on semi-finished nuts are also weaker. Local makers are meeting on desirable orders a 10 per cent cut in prices that had appeared in the East. The demand for bolts and nuts has improved somewhat owing to buying by the railroads. Some orders up to carloads have come from this source.

Sheets.—Some of the independent mills have adopted the price reductions made by the Bethlehem Steel Co., but others have as yet taken no action on price changes, and still others without formally reducing prices will meet the new prices, which seem to be generally recognized as the going market quotations.

Hot-Rolled and Cold-Rolled Strip Steel.—There is some demand for strip steel from the Detroit territory. Hot-rolled strips are quoted at 2.55c. to 2.60c. and cold-rolled strip steel at 4.75c. to 5c.

Rivets.—The demand for rivets is only for small lots and prices are weak. Quotations of 2.75c. for structural and 2.85c. for boiler rivets have appeared. Small lot sales are being made at $3 a ton higher prices.

Coke.—A few car lot sales of the better grades of Connellsville foundry coke are quoted at $5 per ton. Some makes are quoted as low as $4.

Old Material.—Only one mill in this territory is taking shipments of scrap and that in very small quantities. There is virtually no activity in the market, sales being limited to a few car lot transactions between dealers. Dealers are offering $10 per ton for heavy melting steel scrap. Prices are unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.00 to 7.50
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	6.50 to 7.00
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 casting	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in	5.50 to 6.00
Drop forge flashings, under 10 in	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Birmingham

BIRMINGHAM, ALA., July 5.

Pig Iron.—With the coming in of July the Birmingham iron market had reached a level of $21, some carloads still going at $21.50, but the former was admitted to be the new base. Among other recent purchasers was the American Radiator Co., which is credited with having taken 1000 tons and is known to have placed one order for 500 tons at $21. Numbers of consumers made offers during the week of $20, but none of these offers is believed to have been taken. It is known that one maker turned down an offer of 2000 tons at $20 base and that a like amount of iron brought $21.50 shortly before close of the month. A fairly good tonnage was sold during the week, one concern admitting the booking of 6500 tons recently. However, furnace interests feel that the limit has been reached and will not continue production on the present price tendency. The Sloss-Sheffield Steel & Iron Co. closed down its one active stack the first of the month and the Alabama Co. will bank or blow out at Gadsden about July 15. The action of the latter company appears significant in the light of its reputation for ability to dispose of a one-stack production. With the Alabama Co. out of the merchant iron production, the Woodward Iron Co. will have the only producing stack. The Sloss-Sheffield company has large stocks of yard iron. Its operations will be confined for the time being to as much of by-product works as will furnish the city of Birmingham with gas. Southern iron interests want some freight rate relief and that is believed to be part cause of the general furnace suspension. It is not a producers' strike in name, but is beginning to resemble one.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$21.00
Basic	20.00
Charcoal	35.00

Cast Iron Pipe.—The National Cast Iron Pipe Co. continues to book orders for the Middle Western cities,

but no large order has been taken in Birmingham since that of 5000 tons for Phoenix, Ariz. Recent bidding has shown that sizes from 24 in. and up go under $40, although $45 remains base for smaller sizes. Santitary shops have booked Eastern business. The $40 base seems fairly firm.

Old Material.—With the slowing down of operations at the Gulf States Steel Co. mills, heavy melting steel is not in much demand. Cast scrap is going fairly well to pipe works and stove and radiator works. Freight rates prevent scrap getting beyond the district at this time.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	16.00 to 17.00
Car wheels	16.00 to 17.00
Tramcar wheels	15.00 to 16.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, July 5, 1921.

Pig Iron.—Iron offered by a steel mill is the best-moving furnace product in this district. Sales of 2,500 tons last week are reported as going to various points east of Buffalo. The producer insists that the lowest price on this iron has been $21.50 base, f.o.b. Buffalo despite reports from other points that this iron was offered through brokers for $20 and $20.75. Two furnaces have been offered considerable tonnage if they would consider $18.50 base and both producers rejected the offer. Inquiry of 3000 tons is in hand and sales for a week total about 600 tons. Carload lots of malleable are sold at $23, and the same price is quoted on carload lots of 2.75 to 3.25 silicon. Rumors that the largest buyer in this market has lately made a purchase of a large tonnage at $18 lack verification. An agency having a number of branch sales offices reports total orders for the week amount to 500 tons sold at $22 base. In one instance, a small carload of No. 2 plain was sold at $24.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$22.75 to $23.50
No. 2X foundry, 2.25 to 2.75 sil.	21.75 to 22.50
No. 2 plain, 1.75 to 2.25 sil.	20.75 to 21.50
Basic (nominal)	21.00 to 22.00
Malleable (nominal)	23.00 to 24.00
Lake Superior charcoal	37.00

Finished Iron and Steel.—Mills and sales offices unite in saying business could not be worse. Opinion is general that actual wants have been disregarded for several weeks, while buyers watched for the new price schedules. The fact that this revision did not come, made no change in the policy of the buyers, which it is hoped will now be changed as price reductions are being announced. A situation with reference to Canadian business—always interesting in this vicinity—has arisen and threatens to bring a complete withdrawal of shipments of American-made steel products into the Dominion. The Canadian customs has promulgated a ruling which requires every invoice of steel going into Canada to bear a footnote showing that the shipment is billed at cost plus a reasonable profit. Coming at a time when sales are either at cost or even less, shippers here say the ruling is offensive and that it will result in an advance in prices on Canadian shipments or withdrawal from that market. Sales of two or three tons of bars daily, comprise the sole activity of one of the largest interests. The rail department of the largest mill will operate at 25 per cent capacity for July, but has no schedule beyond that date. A fair amount of plate and reinforcing bar inquiry has reached this mill. The Buffalo Structural Steel Co. will fabricate 400 tons of shapes for the new Cataract theatre at Niagara Falls, N. Y.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.25c.; plates, 3.25c.; plates, No. 8 gage, 4.10c.; soft steel bars and shapes, 3.15c.; hoops, 3.85c.; blue annealed sheets, No. 10 gage, 3.90c.; galvanized steel sheets, No. 28 gage, 6.05c.; black sheets, No. 28 gage 5.05c.; No. 9 gage annealed wire, 4.35c.; cold rolled strip steel, 8.15c.

Old Material.—One dealer has sold 500 tons of heavy melting steel to a wire manufacturer and it is understood the same buyer has made other purchases of the same material. A dealer has not bought or sold a ton of material in a week. All yards are well stocked, many of them holding material bought when prices were almost double present quotations. A few tonnages of bundled sheet stampings have been moved.

We quote dealers' asking prices per gross ton, f.o.b. Buffalo, as follows:

Heavy melting steel	$12.00 to $12.50
Hydraulic compressed	9.00 to 9.50
Low phos., 0.04 and under	17.00 to 18.00
No. 1 railroad wrought	13.00 to 14.00
Car wheels	14.50 to 15.00
Railroad malleable	10.50 to 11.50
Machine shop turnings	6.00 to 7.00
Heavy axle turnings	9.00 to 10.00
Clean cast borings	6.00 to 7.00
Locomotive grate bars	10.50 to 11.50
Wrought pipe	8.00 to 9.00
No. 1 busheling	9.50 to 10.50
Stove plate	14.00 to 15.00
Bundled sheet stampings	7.00 to 8.00
No. 1 machinery cast	17.50 to 18.00

Boston

BOSTON, July 5.

Pig Iron.—The outstanding features the past week are the shrinkage in sales and a stiffening of prices, especially on Buffalo iron. Buffalo irons, silicon 1.75 to 2.50, offered a week ago at $20.75 furnace, and silicon 2.50 to 3 at $20.90, are now quoted at $21.25 and $21.40, respectively. Less than half a dozen cars were sold to foundries at the lower quotations, and comparatively little other Buffalo furnace iron is available at the moment at less than $23 furnace base. The market on eastern Pennsylvania also has a firmer undertone, nothing having sold since last reports for less than $21 furnace base. Certain brokers are credited with going short of the market and the firming up of Buffalo and eastern Pennsylvania prices possibly has something to do with such selling. Sales for the week include 200 tons, silicon 1.75 to 2.25, Buffalo to a Massachusetts melter at $21, furnace, 100 tons eastern Pennsylvania, silicon 2.25 to 2.75, to a Massachusetts foundry at $22 furnace, 100 tons, silicon 2.75 to 3.25, to an eastern Connecticut plant at $22.50 furnace, 100 tons, silicon 1.75 to 2.25, and 100 tons, silicon 2.75 to 3.25, to another Connecticut foundry at $22. These, with car-lot sales, largely No. 1X iron, bring the aggregate sales for the week up to something better than 1000 tons. Inquiries, including one of 600 tons No. 2X iron from a Massachusetts consumer, approximate 2200 tons. Delivered prices follow:

East. Penn. silicon 2.25 to 2.75	$27.21 to $29.96
East. Penn. silicon 1.75 to 2.25	26.71 to 29.46
Buffalo, silicon 2.25 to 2.75	25.96 to 29.46
Buffalo, silicon 1.75 to 2.25	25.46 to 28.46
Virginia, silicon 2.25 to 2.75	33.58 to 34.58
Virginia, silicon 1.75 to 2.25	32.58 to 33.58
Alabama, silicon 2.25 to 2.75	33.16 to 33.66
Alabama, silicon 1.75 to 2.25	32.66 to 33.16

Warehouse Business.—Although individual orders continue small, the consumption of iron and steel appears on the mend. Warehouse business, however, is in no instance more than 50 per cent of that for the corresponding time last year and in a majority of cases less. In at least one case, employees are working on half time. Stocks are complete although not excessive. Those of nails, especially wire, are small and jobbers will be obliged to buy within the near future. The recent downward revision in prices on bolts has failed to stimulate business. The demand for machine screws is improving and covers a wide range of sizes.

Jobbers now quote: Soft steel bars, $3.18 per 100 lb. base; flats, $4.18 to $4.28; concrete bars, $3.18 to $3.45¼; tire steel, $4.25 to $4.75; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.83 to $4.48; steel hoops, $4.38; toe calk steel, $5.25; cold rolled steel, $4.65 to $5.15; structural, $3.18 to $3.28; plates, $3.28 to $3.50; No. 10 blue annealed sheets, $4.03; No. 28 black sheets, $5.50; No. 28 galvanized sheets, $6.50; refined iron, $3.18 to $5; best refined, $5; Wayne iron, $7.50; Norway iron, round, ¼-in. to 2½-in., 7.25c. per lb. net; other sizes, 8c. base.

Tool Steel.—High speed steel generally is quoted at $1, as compared with $1.10 to $1.25 a month or so ago, but quotations on other tool steels remain practically unchanged. Going business is of a hand-to-mouth character, notwithstanding the fact stocks in consumers hands in many cases are badly broken. Offers

of German and English steel at concessions apparently fail to interest the trade.

Finished Material.—Structural prospects continue in light supply and some lots already bid on by fabricators remain unlet, including 400 tons for a Boston municipal building. Bids are in on 650 tons for bridge connecting Lynn and Point of Pines, Mass. Plans for a street railway underground loop at East Boston are in the preliminary stages. The estimated structural needed is 1000 tons. Plates are quoted at 2c. to 2.20c., Pittsburgh, with going business not exceeding car lots. The Bath Iron Works, Bath, Me., will soon ask bids on a round tonnage of sheared and boiler plates for five Government lightships. Buying of bars has been held up pending an expected new mill price schedule July 1. Mill representatives look for a flurry of business within the next fortnight. As low as 1.85c., Pittsburgh, has been done on soft bars by Rhode Island bolt and nut makers.

Coke.—New England coke producers are unanimous in the opinion, based on shipping instructions, that July will mark an improvement in the movement of foundry grade. Buyers in many instances are considering the wisdom of accumulating coke during the third quarter, and a considerable number already have covered possible requirements, as is attested by contracts signed up since last reports. No change in prices is noted.

Old Material.—The market was inactive the past week, and aside from a slight hardening in quotations on cast iron borings, without special features. Foundries show practically no interest in the usual run of machinery cast, but scattered small tonnages of textile machinery cast and one 100 ton lot have been taken by Massachusetts consumers at $17.50 delivered. Comparatively little heavy melting steel is going to Pennsylvania mills and usually for stocking purposes. A dealer paid $2 for a car of machine shop turnings this week, but others are willing to pay $2.50 to $3. The firmer undertone to cast iron borings quotations is due to inquiries from chemical interests, amounting to several cars. A local dealer sold a small tonnage of boiler clippings to a Dorchester foundry at $15 delivered.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $17.50
No. 2 machinery cast	15.50 to 16.00
Stove plate	15.00 to 16.00
Railroad malleable	14.00 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

St. Louis

ST. LOUIS, July 2.

Pig Iron.—Sales are few and are confined largely to carload lots, the principal exceptions being 800 tons of Northern foundry bought by a Western consumer and 100 tons of low phosphorous purchased in the local industrial district. Few open-hearth furnaces are in operation in this section and the melt of malleable and gray iron foundries is less than 30 per cent of normal. Many melters still have liberal stocks, and even those who have cleaned up their yards are buying from hand to mouth. The lowest quotation on Southern foundry reported in this district is $21.50 base Birmingham, but the addition of $5.74 freight makes the delivered price too high to permit competition with Northern iron. The local market on Northern material is largely determined by Chicago furnace prices, which are now $20, Chicago, or $22.80 delivered St. Louis, for foundry, basic and malleable. The Granite City furnace is still in blast, and is meeting Chicago competition, while the Mississippi Valley stack still has stocks which it is offering on the market. There is very little activity in the ferroalloys, the only inquiry reported being for 50 tons of 50 per cent ferrosilicon.

We quote delivered consumers' yards St. Louis:

Northern No. 2 foundry, sil. 1.75 to 2.25	$22.80 to $23.30
Northern malleable	22.80 to 23.30
Basic	22.80 to 23.30
Southern Foundry, sil. 1.75 to 2.25	27.24 to 27.74

Coke.—Because of their light operations melters are buying sparingly, with the result that sales are small and scattered. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis. The Granite City by-product ovens are actively competing for business, and are meeting beehive prices. Local by-product foundry is quoted at $11.50 ovens, or $11.70 delivered anywhere in the industrial district.

Old Material.—The only bright spot in the old material market is the relaying rail situation. Inquiries have been received here for 26 miles from one Texas industrial concern, another inquiry for 20 miles from a Missouri industrial and there is an inquiry for 400 tons from Michigan. Some actual sales are being reported, and the relaying market is looking up. Coal mines also are inquiring for light weight rails. Users of scrap either are closed down or running on rather short time, and there is no immediate outlet for this material. Despite the low level of the market, railroads are offering material, the lists closing this and next week covering 3000 tons for the southwestern region of the Pennsylvania System, 1500 tons for the Santa Fe, and the Big Four has an open list.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

Per Gross Ton

Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Relaying rails, standard section, subject to inspection	27.00 to 29.00
Cast-iron car wheels	12.00 to 12.50
No. 1 railroad heavy melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundled sheet	4.00 to 4.50

Per Net Ton

Heavy axle and tire turnings	5.00 to 5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	10.00 to 10.50
Iron car axles	18.00 to 18.50
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 9.00
No. 1 dealers' forge	6.50 to 7.00
Cast iron borings	6.00 to 6.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	7.00 to 7.50
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.50 to 7.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.00 to 10.50
Railroad brake shoes	7.50 to 8.00

Finished Iron and Steel.—Buying is so limited that the market is largely untested in this district. Some few sales at the full April 15 prices are reported, and on the other hand some concessions have been made, notably on bars, sheets and track fastenings. Soft steel bars have been sold at from 1.90c. to 2c., Pittsburgh, blue annealed sheets at as low as 2.65c., base Pittsburgh, while there are unverified rumors of sales of galvanized and black at 4.50 and 3.50c., base Pittsburgh, respectively. Quotations of 3.25 and 4.20c., Pittsburgh, on track spikes and bolts are not uncommon and as low as 3.10 and 4.10c. have been named. The Mobile & Ohio is in the market for 550 kegs of spikes and 165 kegs of bolts. The principal item of interest in the structural field is a machine shop for the Motor Transport division of the Army at Fort Leavenworth, Kan., the general contract for which has been let to the Murch Brothers Construction Co., St. Louis. The fabrication of the steel, amounting to 1100 tons, has not yet been let. The Unit Construction Co.,

St. Louis, has the general contract for a depot at Memphis for the Illinois Central, which will involve 300 tons of reinforcing material, which has not yet been let. Warehouse prices on bolts, nuts, and sheets have been reduced.

For stock out of warehouse, we quote: Soft steel bars, 3.22½c. per lb.; iron bars, 3.22½c.; structural shapes, 3.32½c.; tank plates, 3.32½c.; No. 10 blue annealed sheets, 3.97½c.; No. 28 black sheets, cold rolled, one pass, 5.25c.; No. 28 galvanized sheets, 6.25c.; cold drawn rounds, shafting and screw stock, 4.72½c.; structural rivets, $4.62½ per 100 lb.; boiler rivets, $4.72½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and, tapped, $3.00 off list.

New York

NEW YORK, July 5.

Pig Iron.—Reports from other centers of less weakness in Buffalo iron are not confirmed in New York and this iron is still to be had on a basis of $21, furnace, for No. 2 plain. Eastern Pennsylvania iron is weak and sales are reported as low as $21, furnace. Sales are limited to carload lots and no inquiries of importance are pending, although some interest is being shown in last quarter business. Furnaces are not disposed to quote for delivery later than August or possibly September.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$27.52 to $28.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	26.52 to 27.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	25.52 to 26.52
Buffalo, sil. 1.75 to 2.25	25.46 to 26.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—The bids on 100 net tons of ferromanganese for the Government, referred to a week ago, are not yet reported as having been accepted and the market is featureless with quotations nominal. It is reported, however, that a carload lot was sold at an equivalent of $72.50, delivered. The spiegeleisen market is quiet with inquiries of two 100-ton lots, but no sales. There is no demand for manganese ore on which the quotations continue nominal. The prevailing topic is the question of the proposed duties on manganese ore and ferromanganese, concerning which opinions decidedly differ, depending upon the interests concerned. It is recognized, however, that it will be some time before the matter is settled and it is evident a stiff fight will be put up by the various interests before this part of the bill is approved. Sales of ferrosilicon, 50 per cent, are confined to a carload or two here and there, which can be obtained at a range of $67.50 to $70 per ton, delivered, depending on conditions. Quotations are as follows:

Ferromanganese, domestic, delivered, per ton	$80.00
Ferromanganese, British, seaboard, per ton	$75.00
Spiegeleisen, 20 per cent, furnace, per ton	$30.00
Ferrosilicon, 50 per cent, delivered, per ton	$67.50 to $70.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$5.00
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00
Manganese ore, foreign, per unit, seaboard	22.50c.

Finished Iron and Steel.—No particular interest is shown in the announcement of a downward revision in finished steel prices by the Bethlehem Steel Co., as they are regarded largely as the official recognition of prices already the basis of transactions. As to sheets the decided cut is taken as an illustration, so far as the Eastern market is concerned, of the basis on which the automobile trade has lately been purchasing. The announced price of 2c. for plates is not taken seriously for the reason that in the last few days, for example, the Steel Corporation is reported to have sold to a leading railroad line on a basis of less than 2c., Chicago basis. Fabricated steel business is the one division of the market which is looking upward. Quite a number of relatively small projects are under active negotiations with every indication that they are definitely to be put through, and the situation appears to be an outcome in part of a decided betterment in the efficiency of the building trades. Among the awards of the week may be mentioned the following: 2100 tons for a department store, 230 West 125th Street, 800 tons for a 16-story office building at 66 West Fortieth Street, and 500 tons for a 12-story office building at Madison Avenue and Forty-fourth Street, all to the Hay Foundry & Iron Works; 700 tons for a mercantile building, East Twenty-fifth Street, to the Hinkle Iron Co.; 500 tons for transfer tables, New York terminal, Lehigh Valley Railroad, to the Bethlehem Steel Bridge Corporation; 2700 tons for 14 oil storage tanks for the Government to the Pittsburgh & Des Moines Bridge Co.; 1500 tons for the Chesapeake & Ohio over the Licking River to the Mt. Vernon Bridge Co.; 225 tons for dormitories for the Sisters of Mercy, East 199th Street, to the Bethlehem Steel Fabricators. New work includes 700 tons for a marine terminal at Wilmington, 250 tons for two bridges for the Boston & Maine and 200 tons for the Grand Trunk at New Stratford, N. H. It is expected that the Fort Pitt Bridge Co. will be awarded 1400 tons for the airship hangars for the War Department and the Belmont Iron Co. 500 tons for similar work. Terry & Tench Co., Inc., is low in the bidding for a 650-ton bascule span for the Hudson River bridge between Troy and Cohoes; Rodgers & Hagerty are the low bidders on the hill-to-hill bridge at Bethlehem, Pa., and bids have been received on the barge canal freight terminal at Rochester, N. Y., taking 400 tons. The power house project of the Edison Electric Illuminating Co., Boston, has been postponed. In car repair work an inquiry has been received from the New York Central lines and possibly may mean considerable more work than now indicated.

Prices unchanged. We quote for mill shipments, New York, as follows: Soft steel bars, 2.28c. to 2.48c.; plates, 2.28c. to 2.58c.; structural shapes, 2.38c. to 2.58c.; bar iron, 2.28c.

Warehouse Business.—The market continues quiet since last week's change in prices by most warehouses, the reduction thus far not having stirred up any new business. Some dealers are looking forward to the curtailment of mill production this month as the possibility of greater buying from warehouses. The few contracts in the pipe market are still pending. There is no change in the brass and copper situation. We quote prices on page 62.

High Speed Steel.—There are no signs of improvement, sales still being confined to a few small orders to complete stocks. Producers continue to quote 90c. to $1 per lb. with resales and special concessions sometimes made at 85c. per lb.

Old Material.—The chief activity is in heavy melting steel and stove plate, though there are but few transactions in either. One broker is paying $11, delivered to Conshohocken, for heavy melting steel, though $1 less than this is being paid for other plants in the same district. The volume of business is very small, the holidays having added to the dullness.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$6.50 to $7.50
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10 50 to 11.00
Iron car axles	17.00 to 18.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3 50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	9.00 to 9.50
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	8.00 to 8.50
Old car wheels	12.50 to 13.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Cast-Iron Pipe.—No new municipal business has developed, but orders from private companies are keeping the pipe foundries busy, most of them operating at over 50 per cent. Prices for carload lots have been lowered about $1 a ton and should a tonnage of desirable size, totaling 300 tons or more, be asked for, concessions would be made undoubtedly. Quotations for carload lots, f.o.b. New York, follow: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Cincinnati

CINCINNATI, July 5.

Pig Iron.—The past week was perhaps the quietest experienced in the market this year. Two sales of malleable, each of 200 tons, were reported, but the carload business was even scarcer than usual. A local agency reports the sale of 600 tons of Virginia iron to an Eastern melter. There are no inquiries of consequence before the trade, though the American Car & Foundry Co. has not yet closed on 700 tons for its Huntington, W. Va., plant. Prices of southern Ohio irons are off $1, sales having been made during the latter part of the week at $22 Ironton furnace. Chicago iron is now quoted in this territory at $20.50 to $21 for carloads, while Lake furnaces are reported to be making the same price. Southern irons are unchanged, $22 being the general quotation on carload business, but lower prices have been made on tonnages in the Southern territory. An inquiry for 500 tons of foundry coke from a melter in this territory has been received. This is the only evidence of any activity.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$26.00
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	26.50
Ohio silvery, 8 per cent sil.	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.52
Basic, Northern	23.52
Malleable	24.52

Finished Material.—The market is unusually quiet. Most steel buyers are of the opinion that lower prices will prevail in the immediate future and for that reason are holding off buying for other than their immediate and pressing needs. The opinion is becoming more general among steel men that a price reduction with some guarantees of permanency would go a long way towards stimulating business. Only small orders are being received, though occasionally 100-ton lots are inquired for. Some orders for light rails have been placed during the week and several car loads of bars have also been taken. Prices altogether depend on the ability of the buyers to drive a bargain, as there does not appear to be any recognized level. Two cents appears to be the general quotation on bars, shapes and plates, though occasionally one hears of 1.90c. being done. The business going, however, is so small, that it is doubtful whether this price has any basis in sales. Tonnage business, however, undoubtedly could be placed at better than 2c. The sheet market is unusually quiet, the recent reductions having failed to stimulate any business. Mill quotations are 2.65c. to 2.85c. on blue annealed, 3.50c. to 3.75c. on black and 4.50c. to 4.75c. on galvanized. There is very little activity in structural steel. No award has been made for the Ohio State University stadium project. It is expected that the building committee will consider the bids some time this week. There is a well defined rumor that this project will be postponed for a short time and that eventually new bids will be called for. The Kanawha & Michigan Railroad has asked bids on four plate girder spans, involving approximately 600 tons. The Middletown Hotel Co., Middletown, Ohio, will shortly ask bids on a 180-room hotel which will take about 450 tons of steel. A number of projects in which small tonnages of reinforcing bars will be required are also up for bids. Plant operations will not materially change next week. Most of the sheet mills operating in this territory will close down pending the outcome of negotiations with the Amalgamated Association at Columbus, commencing July 5.

Warehouse Business.—Local jobbers report the market as spotty. Some days will see a spurt in orders but the next two or three will bring practically no inquiries. Local jobbers have reduced the prices on cold rolled products to 4.25c. for rounds and 4.75c. for flats, squares and hexagons. No other price changes have been made.

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c. base; shapes, 3.45c. base; plates, 3.45c. base; reinforcing bars, 3.42½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 6.25c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.60 per 100 lb.

Tool Steel.—Pick up business is about the only activity. Tool steel prices are about the same as previously noted, 18 per cent tungsten high speed steel being quoted at $1.00 per lb., base.

Coke.—Connellsville furnace coke is being quoted at $3, foundry at $4 to $5; Wise County furnace is quoted at $5, and foundry at $6. New River foundry is bringing $8.50.

Old Material.—There is very little activity. According to the local dealers, prices do not mean anything to-day, as there is practically no market. Some of them are taking advantage of the low prices to lay down yard stocks, but are not buying heavily. Consumers in this territory have practically abandoned the market, although occasionally a carload sale is made. Prices are quotably unchanged.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$5.00 to	$7.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	4.50 to	5.00
Steel turnings	2.00 to	2.50
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	17.00 to	17.50
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	6.00 to	6.50

San Francisco

SAN FRANCISCO, June 29.

Pig Iron.—Activity continues very much limited in the Coast market; in fact, the situation is prevailingly quiet, except for an occasional sale. Recently a comparatively small quantity of Belgian iron changed hands at $33, ex ship. The Southern Pacific Co. is in the market again for 800 tons of Nos. 2 and 3 grades. These are the only specific instances of business reported in two weeks. Belgian pig iron is being freely offered here from about $30 to $34, but little interest is taken. The Chinese iron situation is very dull. Foundry operations are constantly being restricted, which is reflected in the buying market. The proposed reduction of about 10 per cent in railroad freight rates from Eastern points is a topic of discussion on the Coast, but not much is expected of it.

Coke.—A few spot orders are being placed, which suggest some activity, at least. A little foreign tonnage, principally Australian, comes in occasionally for local smelters, but this is not material. The railroads are working on a reduction in freight rates, possibly around 33⅓ per cent.

Cast Iron Pipe.—This market presents an unsettled appearance, with opinion divided on the future trend of prices. At present business is light from all quarters. The city of Santa Monica received bids last week for 1000 tons of 4-6-8-10 and 12 in. pipe. Ft. Mason, San Francisco, opened bids for 142 tons of 8-in. pipe, and the Luke Field Distribution System, Honolulu, for 150 tons of 6-in. pipe. A small tonnage recently arrived on the steamer West Caddoa.

Old Material.—This market continues in a stagnant condition. Practically all the foundries of this district are closed or will be shortly. The Pacific Coast Steel Co. is planning to shut down its open hearth department July 1, having already a large supply of manufactured ingots on hand. Prices are nominal at about $24 for heavy melting steel and $10 for cast iron scrap.

Finished Iron and Steel.—With the building trades' lockout still persisting in San Francisco and environs, the situation is very quiet, as building construction work is about the only possibility in these times. Reports from the South indicate a falling off in new large structural jobs, which is the condition in northern California. At this time, there is a good deal of talk about bridging San Francisco Bay, thus connecting with the trans-bay cities. Ralph Modjeski and John Vipond Davies, distinguished bridge engineers, have arrived, and state that the project is plausible, but have not yet decided what kind of bridge will be most suitable. The steel interests are much interested, as a heavy tonnage is involved. The Columbia Steel Co. has decided to continue quoting $2.35, mill, California, on structural steel during the second quarter. The Southern Pacific Co. will be in the market for a quantity of miscellaneous material, including track spikes.

Philadelphia

PHILADELPHIA, July 5.

The announcement to-day by the Bethlehem Steel Co. of a reduction in prices on finished and semi-finished steel was promptly followed by other independent steel companies, which notified their district sales agents to quote the same figures. The attitude of the Steel Corporation was not made known to consumers in this district to-day, but it was presumed that the leading interest would immediately name the same prices without any formal announcement. The new price schedule is a reduction of $4 a ton from the April schedule on plates, shapes and bars and semi-finished steel, 50c. per box on tin plate, $4 on blue annealed sheets and $5 per ton on black and galvanized sheets. The new prices on sheets are $9 and $10 per ton below the April schedule, a $5 reduction having been put into effect a little more than two weeks ago. Plates and shapes are now quoted by the leading independents at 2c., bars at 1.90c., tin plate at $5.75 per base box, rerolling billets, 4 x 4 in., $33, slabs, $34, sheet bars, $35, blue annealed sheets, 2.65c., black sheets, 3.50c. and galvanized sheets, 4.50c.

As the new prices became known only to-day, there has not been time to determine whether they will have any effect in releasing some of the tonnage which has been held back during the past few weeks when rumors of further price reductions have been widely circulated.

Holiday week has intensified the dullness of the local market, there being few inquiries or sales. Most of the Eastern steel mills are shut down because of lack of orders.

Ferroalloys.—There is no demand for ferromanganese or spiegeleisen and prices are nominal, $70 to $80, delivered, for ferromanganese, and $28 to $30, furnace, for spiegeleisen.

Semi-Finished Steel.—The new price for open hearth rerolling billets, as announced by the Bethlehem Steel Co. and also quoted now by other steel producers, is $33, Pittsburgh, with a freight rate to Philadelphia of $5.74. The differential of $5 for forging billets will probably be maintained, making forging quality $38, Pittsburgh. Slabs are now $34, sheet bars, $35 and skelp 2c. per lb., Pittsburgh.

Pig Iron.—It now develops that an eastern Pennsylvania furnace took 2500 tons of the foundry iron business recently placed by a New England melter. The price was about $20.50, furnace. A sale of 250 tons to a consumer in this district is reported to have been made at $23, base, furnace, but the bulk of the current business, which consists mainly of carload lots, is being done at $24 for No. 2 plain and $25 for No. 2 X, furnace. The furnaces in this district are trying to maintain these prices in the immediate Philadelphia territory, where competition from furnaces in other districts is not a factor, but in competitive territory lower furnace prices are being quoted to equalize the higher freight rates. There is an inquiry for 1000 tons of foundry iron from a radiator company. An inquiry for basic comes from the American Steel & Wire Co., Worcester, Mass., but no tonnage is named. The Harrisburg company, which a week or so ago bought 600 tons of basic, is negotiating for an additional lot of about 1000 tons. The Robesonia furnace was put in blast to-day (Tuesday) and will make low phosphorus iron to fill old contracts.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.75 to $25.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.50 to 26.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99
Basic deliv. Eastern Pa.	23.50 to 24.00
Gray forge	23.00 to 23.50
Standard low phos. (f.o.b. furnace)	38.00
Malleable	26.00 to 27.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Plates.—With plates obtainable from some mills at 1.90c., Pittsburgh, the reduction from 2.20c. to 2c., Pittsburgh, by those steel companies which have been holding to the former price since April, probably will not be influential in stimulating buying. We now quote universal and sheared plates at 1.90c. to 2c., Pittsburgh.

Structural Shapes.—The reduction from 2.20c. to 2c. on shapes may release some building work which has been held up for the past few weeks pending an expected adjustment of prices. A few structural jobs have been let within the past month or so on which fabricators have not covered for the steel. We quote plain material at 2c., Pittsburgh.

Bars.—A few sales of soft steel bars had been made at 1.90c., Pittsburgh, during the past two weeks; hence the formal reduction to that figure by the leading producers, following the lead of Bethlehem, meets this competition. Bar iron makers continue to quote 1.90c., Pittsburgh, but are doing practically no business.

Sheets and Tin Plate.—Scarcely had the reduction of $5 a ton on sheets been put into effect two weeks ago before some of the smaller mills began cutting the new prices. The further reductions put into effect to-day meet these low prices and for the moment, at least, put practically all mills on the same basis. Stock tin plate has been selling at $5.75, but now production tin plate is reduced to that price. Blue annealed sheets are now quoted at 2.65c., black at 3.50c. and galvanized at 4.50c., Pittsburgh.

Warehouse Business.—Local warehouses will probably put some price reductions into effect this week. Business continues slow.

Coke.—Furnace coke on contract is available at $3 per ton, Connellsville. Foundry coke contracts have been made at $4.50, Connellsville.

Old Material.—With most of the Eastern mills idle, the demand for scrap is even smaller than it has been for some weeks. Prices remain almost stationary, however, there being a little buying by brokers to apply against old orders. Some of the railroads are said to be holding their scrap for higher prices. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.00
Scrap rail	$10.00 to 10.50
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	18.00 to 19.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	8.50 to 9.00
Cast borings (for chemical plants)	No market
No. 1 cast	16.00 to 17.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	No market

Chicago

CHICAGO, July 5.

The announcement of price reductions by the Bethlehem Steel Co. has failed to cause any stir in the market, as it merely gives the stamp of official recognition to quotations which have been common in this section for several weeks. Whether other independents will decide to adhere to these new prices in view of the losses incurred in taking business at lower quotations, is as yet uncertain. Although mill bookings are not improving, neither are they getting much worse. It is to be noted, however, that a large proportion of the current orders are for Government, State, municipal and county work. Railroad buying has not yet developed in the volume expected in some quarters. Perhaps the most striking inquiry is one for 100 to 130 locomotives from the Illinois Central. The Southern Pacific is in the market for 4800 kegs of spikes and 3300 kegs of track bolts, which are expected to go to the Colorado mills.

There has been no material change in average furnace and mill operations. The Illinois Steel Co. still has eight active blast furnaces and is producing steel at the rate of about 30 per cent of normal. The Inland Steel Co. is operating at close to 30 per cent of ingot capacity and has two out of three furnaces in blast. The Interstate Iron & Steel Co. was idle over the holidays but will resume at its East Chicago and South Chicago mills some time this week and at its steel works July 11. The Wisconsin Steel Works is idle except for one blast furnace. The Republic Iron & Steel Co. continues to operate its bar iron plant at East Chicago.

Pig Iron.—There has been little buying during the past week outside of carload lots, but it is apparent that $20, Chicago furnace, is the top of the market on No. 2 foundry, malleable and basic and it is not unlikely that $19.50 furnace, could be done on tonnage. There are few inquiries in the market, the principal ones being 200 tons of malleable wanted by the Link-Belt Co., 100 tons of malleable for a Wisconsin melter, 100 tons of low phosphorus for another Wisconsin foundry, and two 100-ton lots of foundry for Michigan delivery. The resale silvery which has been sold of late at several dollars under the furnace prices has been entirely disposed of. The disappearance of this material has failed to strengthen the market, however, because the demand for silvery has fallen off. Foundry operations in this territory probably do not average 25 per cent, as most plants are running, if at all, only two or three days a week. The blast furnace situation is unchanged. Local by-product foundry coke continues to be quoted at $11.25 delivered, Chicago foundry, while standard beehive foundry coke is bringing $4.50 to $4.75 oven, or $9.12 to $9.37 Chicago.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$37.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos.	20.00
Southern foundry, sil. 1.75 to 2.25	27.67
Malleable, not over 2.25 sil	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	35.00
Low phos., f.o.b. Birmingham, sil. 1 to 2 per cent copper free	31.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—The Crane Co. is inquiring for 200 tons of spiegeleisen. This alloy is slightly weaker, now being available at from $36 to $37 delivered.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Plates.—The placing of oil storage tank and railroad car repair work has brought some respectable tonnages to the mills. Eighteen hundred eighty tons of plates for tanks to be built for the Midwest Refining Co. at Casper, Wyo., has been placed with a local mill. The steel for 600 gondola cars to be repaired for the Illinois Central by the General American Car Co. as noted last week, will amount to about 4000 tons of plates, shapes and bars which will also be furnished by a Chicago mill. A Chinese railway has let 300 box cars to the General American Car Co., requiring 2000 tons of steel which will be supplied by a local steel company. The Wabash has let repairs on 300 hopper cars to the Western Steel Car & Foundry Co. and the Missouri Pacific has awarded repairs on 500 box cars to the Sheffield Car & Equipment Co., Kansas City. The Wabash cars call for about 1500 tons of steel while the Missouri Pacific cars are wooden and will require little steel. In the East, the Western Maryland is in the market for repairs on 1000 gondola cars and is also asking for figures on 500 new hopper bodies. The price of 2c. Pittsburgh on tank plates announced by the Bethlehem company has made little impression on the market as 2c. and less have been done here for several weeks.

The mill quotation is 2c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.23c. for plates out of stock.

Cast-Iron Pipe.—The market is quiet for the time being, possibly on account of the holidays, and no new inquiries have been reported. Detroit has not yet awarded the 16,000 tons on which it took bids recently, and Akron has not yet taken action on 6500 tons. There has been no disposition of the 200 tons wanted by Minneapolis, and Ft. Wayne, Ind., has rejected bids on 470 tons and will readvertise. Spring Wells, Mich., has awarded 667 tons to the United States Cast Iron Pipe & Foundry Co. The Detroit Board of Fire Commissioners has let 100 tons to the Flower Valve Co. of that city and Kansas City, Kan., has awarded 200 tons to the National Cast Iron Pipe Co. Fifty tons for Moweaqua, Ill., was also let to the National company.

We quote per net ton f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $52.10 to $57.10; 6-in. and above, $49.10 to $54.10; class A and gas pipe, $3 extra.

Bolts and Nuts.—The bolt and nut quotations published in this paragraph a week ago are adhered to by many companies, although there is a tendency on the part of few makers to quote f.o.b. works instead of f.o.b. Pittsburgh. Rivets are exceptionally weak, as low as $2.47½ having been quoted on large structurals. The largest recent purchase of bolts and nuts was by the Ford Motor Co, which was inquiring for 12,000,000 nuts, as well as bolts, and is understood to have bought all it asked for. The Ford company expects to maintain its present high rate of production throughout July, while the Dodge company has increased its output to 500 cars a day and some other Michigan plants are also on a fairly good operating basis. Most automotive plants still have large stocks and for a time will continue to buy in small quantities to fill in. A Western railroad is in the market for from 75 to 100 tons of large structural rivets.

Jobbers quote structural rivets, 4.53c.; boiler rivets, 4.63c.; machine bolts up to ⅝ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Rails and Track Supplies.—Inquiries and orders for track fastenings are scattering and small. Track spikes and bolts are weak and have been quoted recently at as low as 3c. and 4.10c., Pittsburgh, respectively. The Mobile & Ohio is in the market for 550 kegs of spikes.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 2.20c. f.o.b. makers' mills.

Standard railroad spikes, 3.25c., Pittsburgh; track bolts with square nuts, 4.20c., Pittsburgh; steel tie plates, 2.50c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.50c., f.o.b. makers' mills.

Wire Products.—The market remains quiet with no changes in the price situation. A few railroads have put out inquiries for nails and fair purchases of not only nails, but fencing and barbed wire, are expected to be made by the carriers in the near future. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 47.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.63 per 100 lb.; No. 9 and heavier bright basic wire, $3.78 per 100 lb.; common wire nails, $3.73 per 100 lb.; cement coated nails, $3.05 per keg.

Structural Material.—The market is unusually quiet. No new fabricating awards have been announced and no new prospects have developed. The new Bethlehem

price of 2c., Pittsburgh, on plain material seems to represent the ruling market.

The mill quotation is 2c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.23c. for materials out of warehouse.

Sheets.—The Bethlehem Steel Co.'s prices of 2.65c., Pittsburgh, on No. 10 blue annealed, 3.50c., Pittsburgh, on No. 28 black and 4.50c., Pittsburgh, on No. 28 galvanized represent the ruling market on those products in this section. Business is principally from domestic sources and is sufficient to keep about half of the capacity of one of the local mills in operation. Warehouse prices on sheets have been reduced again and Armco iron sheet have likewise been cut by the jobbers, No. 28 galvanized having been marked down to 7.35c. and No. 10 blue annealed to 4.63c. The new warehouse prices on steel sheets are given below.

Mill quotations are 3.50c. for No. 28 black; 2.65c. for No. 10 blue annealed and 4.50c. for No. 28 galvanized, these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Old Material.—With the exception of the purchase of about 1000 tons of wrought by an iron mill, buying by consumers has been almost nil. Prices are still weak, but owing to the extreme dullness of the market there are few actual declines to record. Two important local mills have temporarily stopped all shipments of scrap on contract. The Pennsylvania, Southwestern Region, is offering 3500 tons, while the Lake Erie & Western and the Michigan Central have issued blind lists.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.50 to $16.00
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	18.00 to 18.50
Steel car axles	12.50 to 13.00
No. 1 busheling	8.50 to 9.00
No. 2 busheling	6.00 to 6.50
Cut forge	9.00 to 9.50
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.50 to 9.75
No. 2 railroad wrought	9.00 to 9.50
Steel knuckles and couplers	10.50 to 11.00
Coil springs	11.75 to 12.25
No. 1 machinery cast	12.50 to 13.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	10.00 to 10.50
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75
Country mixed	7.00 to 7.50

Bars.—Aside from car repairs and a fair amount of reinforcing work, there is little demand for bars. Recent car repair awards are mentioned in the plate paragraph. The largest recent letting of reinforced work was 600 tons for a continuation school at Milwaukee, which went to the Worden-Allen Co. The Inland Steel Co. will furnish the steel. Other recent lettings include:

McElmore viaduct, Illinois Central, Memphis, 400 tons, to Corrugated Bar Co.

Carpenter Building, Des Moines, Iowa, 250 tons to the Paul J. Kalman Co.

Bridge, Racine, Wis., 120 tons, to Paul J. Kalman Co.

Among pending reinforcing jobs is 150 tons for State highway work at Wisconsin Rapids, Wis. It is not yet apparent whether the announcement of a price of 1.90c., Pittsburgh, on soft steel bars by the Bethlehem company will tend to stabilize the market. Lower prices have been named in this territory of late, in some cases as low as 1.825c., Pittsburgh. The railroads are commencing to buy bar iron a little more freely for repair purposes, but this far no individual order has exceeded 400 tons. Prices have weakened, the present ruling market being from 2.10c. to 2.20c., Chicago. The demand for rail carbon steel bars remains light and the price situation is unchanged.

Mill prices are: Mild steel bars, 1.85c. to 1.90c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2.10c. to 2.20c., Chicago; rail carbon, 1.90c. to 2c., mill or Chicago.

Jobbers quote 3.13c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.63c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.48c. base.

Changes in By-Products Coke Corporation

At a recent meeting of the directors of the By-Products Coke Corporation held in Syracuse, N. Y., William L. Brown, chairman of the board, tendered his resignation. Mr. Brown resigned because of his desire to withdraw from some of his many business activities. H. H. S. Handy resigned as president and was elected chairman of the board to succeed Mr. Brown. Mr. Handy is also vice-president of the Allied Chemical & Dye Corporation, the requirements of that position demanding most of his time. It was the unanimous decision of the board to further concentrate the management of affairs in Chicago, where the coke oven plant and the blast furnace plant of the company are located. Clifford D. Caldwell of Chicago was the choice for president to succeed Mr. Handy. Mr. Caldwell has been associated with the By-Products Corporation for seven years, and for two years has been vice-president in direct charge of the company's activities in Chicago. E. L. Pierce and A. W. Hudson resigned as vice-presidents; M. D. Whitford as treasurer; H. H. Fisher and Seymour Wheeler as assistant treasurers; E. D. Winkworth as secretary; B. H. Handy and Donald S. Boynton as assistant secretaries; A. D. Allibone as auditor; V. N. Morey and H. W. Ostrander as assistant auditors. The successors to the above are all Chicagoans. James A. Galligan, formerly sales manager, has been appointed assistant to the president. The new treasurer is Donald S. Boynton and Seymour Wheeler has been elected secretary. Both of these men are also vice-presidents of Pickands, Brown & Co. Charles P. Fitzgerald, formerly cashier, is assistant secretary and assistant treasurer; and Benjamin L. Lynch, formerly assistant cashier, becomes auditor. The company's offices will continue in the McCormick Building, Chicago.

Steel Corporation Case Reopened

WASHINGTON, July 5.—The Interstate Commerce Commission has entered an order reopening the case relating to the application of the United States Steel Corporation, its exporting subsidiary, the United States Steel Products Co., and subsidiary rail lines, in which request was made of the commission to determine whether the operation of two steamship lines, the New York & South America Line, and the Isthmian Steamship Lines, through the Panama Canal, was in contravention of the law prohibiting railroad owned boat lines from using the canal or other waterways where such operation substantially reduces competition.

Industrial Relations Conference

An industrial relations conference, authorized by Gov. William C. Sproul, Pennsylvania, is being arranged by Dr. Clifford B. Connelley, Commissioner of Department of Labor and Industry, Commonwealth of Pennsylvan to be held at Harrisburg, Pa., Oct. 24 to 27.

This conference will include the features of the welfare and efficiency conferences and safety congresses of other years. The main topics to be discussed will include Industrial Waste, Industrial Co-operation, Industrial Publicity, Industrial Education, Women and Children in Industry and the Medical Supervision of Industry.

IRON AND INDUSTRIAL STOCKS

Better Feeling in Banking Circles Evinced in Market for Securities

That a better feeling exists in leading banking circles of the country is evinced by the further average recovery in iron and industrial stocks the past week. The showing is all the more significant in view of the fact that little improvement is noted in the steel industry, and the fact that car loadings are once more on the decrease. Stocks presumably are inclined upward, because banks are beginning to discount commercial paper slightly more freely, the Administration is planning smaller operating expenses, and because of the clearing of the labor atmosphere in England. The proposed new Fordney tariff bill evidently is displeasing to certain oil and other interests, as is attested by the course of security values involved, but investors in a majority of steel and industrial stocks are satisfied with most of the protective features as they line up today. With the recovery in stock values has come less desire to liquidadte holdings by those who had become disturbed over the general business situation.

With this resumption of confidence, railroads show indications of becoming interested in new equipment and car repair work, realizing as they must there will be a severe strain on carrying capacities when the movements of crops begin. Shares of equipment companies have responded to the prospect of business. In certain quarters, at least, buyers are beginning to believe iron and steel quotations are at or near the bottom, which possibly acounts for the recent better character of buying of steel shares. Late developments in the copper metal market have not been sufficiently reassuring to result in very much higher prices for stocks. The fabric markets seem established on a stable basis, although it is reported the margin of manufacturing profit is small. Merchants are placing orders for fall merchandise, another sign, according to bankers, that we can reasonably expect a slow but steady recovery in general business from now on.

The range of prices on active iron and industrial stocks from Monday of last week to Tuesday of this week was as follows:

Allis-Chalm. com.	30¾ - 31⅝	Midvale Steel....	23 - 24
Am. Can com...	25½ - 26⅞	Nat.-Acme	15 - 15¾
Am. Can pf.....	76¾ - 78	Nat. E. & S. com.	42½ - 44½
Am. C. & F. com.	119½-124½	N. Y. Air. Brake	56 - 57¼
Am. C. & F. pf..	108¼-109¾	Nova Scotia Steel	22 - 22¼
Am. Loco. com..	78½ - 81½	Pitts. Steel pf... ..	- 80
Am. Rad. com.. ..	- 68½	Pressed Stl. com.	65⅝ - 69
Am. Stl. F. com.	25 - 26⅝	Ry. Stl. S. com.	74 - 81
Bald. Loco. com.	66¼ - 72	Replogle Steel	- 20¼
Bald. Loco. pf...	95 - 97	Republic, com. ..	43½ - 47
Beth. Steel com..	45 - 45¾	Republic, pf.	- 80
Beth. Stl. Cl. B..	44⅛ - 47⅞	Sloss com.	32⅛ - 32½
Beth. Stl. 8% pf.	96¼ - 97	Sloss pf.	- 68¼
Chic. Pneu. Tool	49 - 50	Superior Steel... ..	- 29
Cruc. Steel com..	55 - 59¾	Sup. Steel 1st pf. ..	- 92¼
Cruc. Steel pf... ..	- 77	Un. Alloy Steel..	22 - 23½
Gen. Electric 126	-128¾	U. S. Pipe com..	13⅛ - 14½
Gt. No. Ore Cert.	26½ - 27	U. S. Pipe pf.... ..	- 43¼
Gulf States Steel	30 - 33	U. S. Steel com..	72½ - 75
Int. Har. com...	79 - 84	U. S. Steel pf...105¾	-109½
Int. Har. pf.... ..	-100⅛	Vanadium Steel.	27 - 29¾
Lack. Steel	35⅝ - 39⅞	West'ghouse Elec.	43½ - 45

United States Steel Stockholders

The largest number of holders of common stock of the United States Steel Corporation on record in the company's history appeared when the books were closed for the June dividend. The number, 105,310, compared with 104,376 in March. Preferred stockholders at the closing of the books for the May dividend totalled 81,614, compared with 81,462 in February.

Exclusive of duplication the holders of common and preferred combined now number approximately 165,000. The gain in the last year has been 18,081, and since 1916, 67,590, or nearly 180 per cent. The number on Dec. 31, 1916, was 37,720.

Fiscal Year of the American Car & Foundry Co.

The American Car & Foundry Co. earned $8,551,000 net in the fiscal year ended April 30, 1921, compared with $10,401,000 for the previous year. This was equivalent to $21.50 a share on the common stock, compared with $27.67 in 1920. The orders on hand at the end of the year amounted to $30,000,000. The company had to carry its customers to an extent much greater than normal, due partly to the fact that the Railroad Administration held back payments to the railroads; accordingly, accounts and notes receivable in the 1921 fiscal year amounted to $28,302,000, compared with $8,574,000 the year before.

Materials on hand inventoried at cost or less and not in excess of present market prices, amounted to $14,010,000 this fiscal year, compared with $15,007,000 the year previous. During the year the company sold $29,000,000 of United States certificates of indebtedness, Liberty bonds and Victory notes, reducing the amount held at the end of the year to $5,009,000.

Contemplated car repair work did not develop as the railroads placed damaged cars into storage rather than into repair shops. Accordingly only one-fifth of the profits of the company was realized from car repair work. A greater part of the profit came from the manufacture and sale of miscellaneous products.

President W. H. Woodin has expressed doubt as to the success of developing broader foreign markets without Government aid. He also realizes the keen competition with Europe.

Industrial Finances, Etc.

The voting trust agreement of the Penn Seaboard Steel Corporation has been extended five years from June 26, 1921.

A creditors' petition has been filed against the Phoenix Mfg. Corporation, Lowell, Mass., automatic firearms, by creditors with claims of $2,534.

The National Scale Co., Chicopee Falls, Mass., has filed a voluntary petition in bankruptcy in the United States District Court, Boston, giving liabilities of $172,743 and assets of $152,561.

Stockholders of the Hydraulic Steel Co. have rejected plans proposing a merger of the company with the Detroit Pressed Steel Co. The stockholders also have decided to drop a contemplated issue of preferred stock and to relinquish an option on the Detroit concern.

The Graton & Knight Mfg. Co., Worcester, Mass., leather belting, etc., has filed a statement of its financial condition as of March 23, 1921, with the secretary of Massachusetts which shows total assets and liabilities of $21,029,867, as against $23,114,783 on Dec. 31, 1919. The two most important changes in the balance sheet are an increase of $1,802,400 in the capital stock and a drop from $1,249,947 to $62,739 in the reserves account.

Stockholders of the Standard Parts Co., Cleveland, now in the hands of a receiver, have petitioned the court to continue the receivership instead of accepting the proposed reorganization suggested by creditors. The company in March had $600,000 business, in April and May $1,000,000 each, in June $600,000. All receivers' debts have been paid except current, and the company has $1,000,000 in the bank. Frank A. Scott, Warner & Swasey Co., machine tools, is receiver.

A voluntary petition in bankruptcy has been filed by the Springfield Automatic Screw Machinery Corporation, Springfield, Mass., citing liabilities of $374,111 and assets of $290,337.

Directors of the Wheeling Steel Corporation voted to pass the quarterly dividend on the common stock at a meeting in Wheeling, June 29. In explanation of this action the following statement was given out: "The question of a dividend on the common stock was given careful consideration, and in view of the present very unsatisfactory condition of the steel industry and the rather gloomy prospects for the immediate future, together with the fact that the Corporation has not shown a profit in any month this year, the directors decided it unwise to make a cash dividend on the common stock at this time."

The Wickwire Spencer Steel Corporation has filed with the Massachusetts commissioner of corporations a statement of its financial condition as of Dec. 31, last, which shows total assets and liabilities of $39,009,037, contrasted with $18,415,641 at the close of 1919.

A. Judson Brown & Co., Inc., New York, has been incorporated with a capital of $50,000 by E. R., A. J., and A. Judson Brown, to manufacture marine machinery and parts. I. Katz, 52 Broadway, represents the company.

The Terry Kitchen Device Co., New York, has been incorporated with a capital of $600,000 by E. B. and N. E. Terry and A. DeMatteteis, to manufacture metal specialties for domestic service. It is represented by E. P. Yaselli, 160 Broadway.

The Wollaston Foundry Co., Wollaston, Quincy, Mass., has issued an additional $20,000 of stock. George D. Woodbury is president, and Leonard W. Newell, treasurer.

The Hanna Furnace Co. is issuing $4,000,000 in first mortgage 8 per cent sinking fund gold bonds, due June 1, 1926, five years from date of issue.

Metal Schedule of the New Tariff Bill

(*Continued from page 22*)

of any other material, if less than 4 in. in length, exclusive of handle, 3c. *each;* if 4 in. in length or over, exclusive of handle, 8 cents each; and in addition thereto, on all of the foregoing, 35 *per cent* ad valorem (25 to 30 per cent) [not under 40 per cent]: *Provided,* That all articles specified in this paragraph when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk legibly and indelibly upon the blade in a place that shall not be covered.

356. Planing-machine knives, tannery and leather knives, tobacco knives, paper and pulp mill knives, roll bars, bed plates, and all other stock-treating parts for pulp and paper machinery, shear blades, circular cloth cutters, circular cork cutters, circular cigarette cutters, meat slicing cutters, and all other cutting knives and blades used in power or hand machines, 35 *per cent* ad valorem.

357. Steel laid scissors and shears, and blades for the same, finished or unfinished (30 per cent), 10c. *each and* 30 *per cent* ad valorem; all other scissors and shears, and blades for the same, finished or unfinished, valued at not more than 50c. per dozen, 3c. *each and* 35 *per cent* ad valorem; valued at more than 50c. and not more than $1.75 per dozen, 15c. *each and* 35 *per cent* ad valorem; valued at more than $1.75 per dozen, 20c. *each and* 35 *per cent* ad valorem (30 per cent) [15c. per dozen and 15 per cent to 75c. per dozen and 25 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk conspicuously and indelibly on the outside of the blade between the screw or rivet and the handle.

358. Razors, finished or unfinished, valued at less than $2 per dozen, 10c. *each;* valued at $2 and less than $3 per dozen, 12c. *each;* valued at $3 and less than $4 per dozen, 16c. *each;* valued at $4 or more per dozen, 20c. *each;* and in addition thereto, on all of the foregoing, 30 *per cent* ad valorem (35 to 55 per cent) [35 per cent up to 15c. each and 35 per cent]: Provided, That handles, unfinished razors and blades (except for safety razors), safety razors, and safety-razor handles and frames, shall pay no less duty than that imposed on finished razors valued at $2 per dozen: Provided further, That finished or unfinished blades for safety razors shall pay a duty of 1c. *each and* 30 *per cent* ad valorem: Provided further, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the name of the country of origin die-sunk conspicuously and indelibly on the blade or shank or tang of each and every blade and on safety razors and parts thereof.

359. Surgical and dental instruments, or parts thereof, composed wholly or in part of iron, steel, copper, brass, nickel, aluminum, or other metal, finished or unfinished, valued at not more than $5 per dozen, 60c. *per dozen;* valued at more than $5 per dozen, 12c. *per dozen* for each $1 per dozen of such value; and in addition thereto, on all of the foregoing, 35 *per cent* ad valorem (20 per cent) [45 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the country of origin die-sunk conspicuously and indelibly on the outside, or if a jointed instrument on the outside when closed.

360. Philosophical, scientific, and laboratory instruments, apparatus, utensils, appliances (including drawing, surveying, and mathematical instruments), and parts thereof, composed wholly or in chief value of metal, and not plated with gold, silver, or platinum, finished or unfinished, not specially provided for, 40 *per cent* ad valorem (20 per cent) [45 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the country of origin die-sunk conspicuously and indelibly on the outside, or if a jointed instrument on the outside when closed.

361. Pliers, pincers, and nippers of all kinds, finished or unfinished, 4 in. in length and under, 8c. *each;* over 4 in. and not over 6 in. in length, 10c. *each;* over 6 in. in length, 12c. *each;* and in addition thereto, on all of the foregoing, 25 *per cent* ad valorem (30 per cent) [8c. per lb. and 40 per cent]: Provided, That all articles specified in this paragraph, when imported, shall have the name of the maker and beneath the same the country of origin die-sunk conspicuously and indelibly on the outside of the joint.

362. Files, file blanks, rasps, and floats of all cuts and kinds, 2½ in. in length and under, 25c. *per dozen;* over 2½ and not over 4½ in. in length, 47½c. *per dozen;* over 4½ and under 7 in. in length, 62½c. *per dozen;* 7 in. in length and over, 77½c. *per dozen.*

363. Sword blades, and swords and side arms, irrespective of quality or use, wholly or in part of metal, 40 *per cent* ad valorem (30 per cent) [50 per cent].

364. Muzzle-loading muskets, shotguns, rifles, and parts thereof, 20 *per cent* ad valorem (15 per cent) [25 per cent].

365. Double and single-barreled sporting breech-loading and repeating shotguns, rifles, and combination shotguns and rifles, valued at not more than $5 each, $1.50 *each;* valued at more than $5 and not more than $10 each, $4 *each;* valued at more than $10 and not more than $25 each, $6 *each;* valued at more than $25 each, $10 *each;* and in addition thereto, on all of the foregoing, 35 *per cent* ad valorem; barrels for sporting breech-loading shotguns and rifles, further advanced in manufacture than rough bored only, $4 *each;* stocks for sporting breech-loading shotguns and rifles, wholly or partly manufactured, $5 *each;* and in addition thereto, on all of the foregoing, 40 *per cent* ad valorem (35 per cent) [75c. each and 25 per cent extra to $6 each and 35 per cent extra]; on all parts of such guns or rifles, and fittings for such stocks or barrels, finished or unfinished, 45 *per cent* ad valorem (35 per cent): Provided, That all sporting breech-loading shotguns and rifles imported without a lock or locks or other fittings shall be subject to a duty of $10 *each and* 40 *per cent* ad valorem.

366. Pistols: Automatic, magazine, or revolving, and parts thereof and fittings therefor, valued at not more than $4 each, $1.25 *each;* valued at more than $4 and not more than $8 each, $2.50 *each;* valued at more than $8 each, $3.50 *each;* and in addition thereto, on all of the foregoing, 25 *per cent* ad valorem (35 per cent) [75c. each and 25 per cent].

367. Watch movements, whether imported in cases or otherwise, assembled or knocked down for reassembling, if having less than seven jewels, 75c. *each* [70c.]; having seven and not more than eleven jewels, $1.25 *each* [$1.35]; having more than eleven and not more than fifteen jewels, $2 *each* [$1.85]; having more than fifteen and not more than seventeen jewels, unadjusted, $2.75 *each* [$1.25 and 25 per cent]; having seventeen jewels and adjusted to temperature, $3.50 *each;* having seventeen jewels and adjusted to three positions, $4.75 *each;* having seventeen jewels and adjusted to five positions, $6.50 *each;* having more than seventeen jewels, adjusted or unadjusted, $10.75 *each* (all the above, 30 per cent); watchcases and parts of watches, chronometers, box or ship, and parts thereof, 35 *per cent* ad valorem (30 per cent) [40 per cent]; all jewels for use in the manufacture of watches, clocks, meters, or compasses, 10 *per cent* ad valorem (10 per cent); enameled dials for watches or other instruments, 3c. *per dial and* 35 *per cent* ad valorem: Provided, That all watch and clock dials, whether attached to movements or not, when imported shall have indelibly painted or printed thereon the name of the country of origin, and that all watch movements and plates, lever clock movements with jewels in the escapement, assembled or knocked down for reassembling, and cases shall have the name of the manufacturer and the country of manufacture cut, engraved, or die-sunk conspicuously and indelibly on the plate of the movement and the inside of the case respectively, and the movement and plates shall also have marked thereon by one of the methods indicated the number of jewels and adjustments, said numbers to be expressed both in words and in Arabic numerals, and if the movement is not adjusted, the word "unadjusted" shall be marked thereon by one of the methods indicated, and none of the aforesaid articles shall be delivered to the importer unless marked in exact conformity to this direction: Provided further, That only the number of the jewels which serve a mechanical purpose as frictional bearings shall be marked as herein provided.

368. Clocks and clock movements, and clockwork mechanisms, cased or uncased, whether imported complete or in parts, and any device or mechanism having an essential operating feature intended for measuring time, or the flowage of water, gas, electricity, or similar uses, or for regulating or controlling the speed of arbors, drums, disks, or similar uses, or for recording, indicating, or performing any operation or function at a predetermined time or times, any of the foregoing whether wholly or partly complete or knocked down for reassembling (in which condition they shall be appraised at the valuation of the complete article); cases and casings for clockwork mechanisms imported separately; all the foregoing, 35 *per cent* ad valorem (30 per cent) [40 per cent]; and in addition thereto, upon any of the foregoing articles or parts thereof, having jewels, but not more than two jewels, in the escapement, $1 *each;* having more than two but not more than four jewels, $2 *each;* having more than four jewels, $4 *each;* if without jewels in the escapement and valued at not over $1.10 each, 35c. *each;* valued at more than $1.10 and not more than $2.25 each, 70c. *each;* valued at more than $2.25 but not more than $5 each, $1 *each;* valued at more than $5 but not more than $10 each, $2 *each;* valued at more than $10 each, $3 *each;* all parts and materials for use in any of the foregoing if imported separately, and not

specially provided for, 40 *per cent* ad valorem: Provided, That all dials and the front or back plate of the movement frame of any of the foregoing when imported shall have the name of the maker, the country where manufactured, and the number of jewels, if any, indelibly stamped on the most visible part of same; but if such markings are in whole or in part sufficiently similar to the trade name of an established American manufacturer as to be liable to deceive the user in the United States, entry thereof shall be denied if such trade name or trade-mark has been placed on file with the collector of customs.

369. Automobiles, automobile bodies, automobile chassis, and parts of automobiles, not including tires, 25 *per cent* ad valorem (30 per cent under $2,000; above $2,000, 45 per cent; parts, 30 per cent): Provided, That if there be imported into the United States any of the foregoing articles manufactured in or exported from any country which imposes a duty greater than 25 per cent ad valorem upon similar articles exported from the United States, there shall be levied, paid, and collected upon such articles a duty equal to the duty imposed by such country upon such articles imported from the United States, but not to exceed in any case 50 per cent ad valorem.

370. Airplanes, hydroplanes, motor boats, and parts thereof, 30 *per cent* ad valorem.

371. Bicycles, motor cycles, and finished parts of bicycles and motor cycles, 30 *per cent* ad valorem (25 per cent) [45 per cent]: Provided, That if there be imported into the United States any of the foregoing articles manufactured in or exported from any country which imposes a duty greater than 30 per cent ad valorem upon similar articles exported from the United States, there shall be levied, paid, and collected upon such articles a duty equal to the duty imposed by such country upon such articles imported from the United States, but not to exceed in any case 50 *per cent* ad valorem.

372. Steam engines (15 per cent) [30 per cent] and steam locomotives (15 per cent) [45 per cent], 15 *per cent* ad valorem; machine tools and parts of machine tools (15 per cent) [30 per cent], embroidery machines, including shuttles for sewing and embroidery machines, lace-making machines, machines for making lace curtains, nets and nettings (25 per cent) [45 per cent], and all other machines or parts thereof, finished or unfinished, not especially provided for, 35 *per cent* ad valorem: Provided, That machine tools as used in this paragraph shall be held to mean any machine operating other than by hand power which employs a tool for work on metal.

373. Shovels, spades, scoops, and drainage tools, and parts thereof, composed wholly or in chief value of iron, steel, lead, copper, brass, nickel, aluminum, or other metal, whether partly or wholly manufactured, 25 *per cent* ad valorem (20 per cent) [45 per cent].

374. Aluminum, aluminum scrap, and alloys of any kind in which aluminum is the component material of chief value, in crude form, 5*c. per lb.* (2c.) [7c.]; in plates, sheets, bars, rods, circles, disks, blanks, strips, rectangles, and squares, 9*c. per lb.* (3½c.) [11c.].

375. Metallic magnesium and metallic magnesium scrap, $1 *per lb.*; magnesium alloys, powder, sheets, ribbons, tubing, wire, and all other articles, wares, or manufactures of magnesium, not specially provided for, $1 *per lb.* on the metallic magnesium content and 20 *per cent* ad valorem (10 per cent) [20 per cent].

376. Antimony, as regulus or metal, 1½*c. per lb.* (10 per cent) [1½c. per lb.].

377. German silver, unmanufactured, 20 *per cent* ad valorem (15 per cent) [25 per cent].

378. Copper wire not coated or covered, and copper wire and copper-clad wire, coated with tin, 1½*c. per lb.*; copper in rolls, rods, or sheets, 2½*c. per lb.* (5 per cent) [2½c. per lb.]; copper engravers' plates, not ground, and seamless copper tubes and tubing, 7*c. per lb.*; copper engravers' plates, ground, and brazed copper tubes, 11*c. per lb.*; brass wire, brass rods, sheet brass, brass plates, bars, and strips, Muntz or yellow metal sheets, sheathing, bolts, piston rods and shafting, 4*c. per lb*; seamless brass tubes and tubing, 8*c. per lb.*; brazed brass tubes, brass angles and channels, 12*c. per lb.*; bronze wire, bronze rods and sheets, 4*c. per lb.*; bronze tubes, 8*c. per lb.* (20 per cent) [45 per cent].

379. Bronze powder, powdered tin, brocades flitters, and metallics, 16*c. per lb.* (25 per cent) [12c. per lb.]; bronze, or Dutch metal or aluminum, in leaf, 8*c. per* 100 *leaves* (25 per cent) [6c. per 100 leaves]. The foregoing rate applies to leaf not exceeding in size the equivalent of 5½ by 5½ in.; additional duties in the same proportion shall be assessed on leaf exceeding in size said equivalent.

380. Gold leaf, 50*c. per* 100 *leaves.* The foregoing rate applies to leaf not exceeding in size the equivalent of 3⅜ by 3⅜ in.; additional duties in the same proportion shall be assessed on leaf exceeding in size said equivalent (35 per cent) [35c. per 100 leaves upward].

381. Silver leaf, 5*c. per* 100 *leaves.* (30 per cent) [10c. per 100 leaves].

382. Tinsel wire, lame or lahn, made wholly or in chief value of gold, silver or other metal, 10*c. per lb.* and 30 *per cent* ad valorem (6 per cent) [5c. per lb.] bullions and metal threads made wholly or in chief value of tinsel wire, lame or lahn, 10*c. per lb.* and 35 *per cent* ad valorem (25 per cent) [5c. per lb. and 30 per cent.]; ribbons, beltings, toys, and other articles made wholly or in chief value of tinsel wire, lame or lahn, and India rubber, bullions, or metal threads, not specially provided for, 45 *per cent* ad valorem (40 per cent) [15c. per lb. and 60 per cent]; woven fabrics, fringes, and tassels, made of any of the foregoing, 55 *per cent* ad valorem (40 per cent) [15c. per lb. and 60 per cent].

383. Quicksilver, 7*c. per lb.* (10 per cent) [7c. per lb.]; Provided, That the flasks, bottles, or other vessels in which quicksilver is imported shall be subject to the same rate of duty as they would be subjected to if imported empty.

384. New types, 15 *per cent* (15 per cent) [1½c. per lb. on the lead contained therein].

385. Nickel, nickel oxide, alloy of any kind in which nickel is the component material of chief value, in pigs or ingots, or similar forms, 5*c. per lb.* [6c. per lb.]; in bars, rods, plates, sheets, strips, strands, anodes, or electrodes, 30 per cent ad valorem (sheets or strips 20 per cent; all other 10 per cent) [sheets or strips 35 per cent; bars, rods, plates, 35 per cent.]

386. Tin in bars, blocks or pigs, and grain or granulated and scrap tin, 2*c. per lb.* (free list).

387. Bottle caps of metal, collapsible tubes and sprinkler tops, if not decorated, colored, waxed, lacquered, enameled, lithographed, electroplated, or embossed in color, 25 *per cent* ad valorem (30 per cent) [½c. per lb.]; if decorated, colored, waxed, lacquered, enameled, lithographed, electroplated, or embossed in color, 40 *per cent* ad valorem (40 per cent).

388. Lead-bearing ores and mattes of all kinds, 1½*c. per lb.* on the lead contained therein (¾c. per lb.) [1½c. per lb.]: Provided, That such duty shall not be applied to the lead contained in copper mattes until after two thousand tons of such lead shall have been imported in any one year, to be allocated under rules and regulations to be prescribed by the Secretary of the Treasury. [Here follows the usual administration provision.—EDITOR.]

389. Lead bullion or base bullion, lead in pigs and bars [2⅛c. per lb.], lead dross [1½c. per lb.], reclaimed lead, scrap lead, antimonial lead, antimonial scrap lead, type metal, Babbitt metal, solder, all alloys or combinations of lead not specially provided for, 2⅛*c. per lb.* on the lead contained therein [2½c. per lb.]; lead in sheets, pipe, shot, glaziers' lead, and lead wire, lead in any article or material not specially provided for, 2⅜*c. per lb.* (25 per cent) [2⅜c. per lb.].

390. Zinc-bearing ore of all kinds, including calamine containing less than 10 per cent of zinc, shall be admitted free of duty; containing 10 per cent or more of zinc and less than 20 per cent, one-fourth of 1*c. per lb.*, on the zinc contained therein; containing 20 per cent or more of zinc and less than 25 per cent, one-half of 1*c. per lb.*, on the zinc contained therein; containing 25 per cent of zinc, or more, 1*c. per lb.* on the zinc contained therein: [Here follows the administrative provision.—EDITOR.] Provided, That for a period of two years beginning on the day following the enactment of this act the rate of duty on zinc-bearing ores of all kinds, including calamine, containing 10 per cent or more of zinc, shall be as follows: If containing 10 per cent or more of zinc and less than 20 per cent, ½*c. per lb.* on the zinc contained therein; containing 20 per cent or more of zinc and less than 25 per cent, 1*c. per lb.* on the zinc contained therein; containing 25 per cent of zinc or more, 1½*c. per lb.* on the zinc contained therein.

391. Zinc in blocks or pigs and zinc dust, 1⅜*c. per lb.* [1⅜c. per lb.)]; in sheets, 1⅝*c. per lb.*. [1⅝c. per lb.]; in sheets coated or plated with nickel or other metal, or solutions, 1¾*c. per lb.* [1¾c. per lb.]; old and worn-out, fit only to be remanufactured, 1*c. per lb.* (15 per cent) [1c. per lb.]: Provided, That for a period of two years beginning on the day following the enactment of this Act the rates of duty shall be as follows: On zinc in blocks, pigs, or slabs, and old and worn-out zinc fit only to be remanufactured, 2*c. per lb.*; zinc in sheets, plates, strips, or coils, plated with nickel or other base metals, or in fabricated form, and zinc dust, 2⅜*c. per lb.*

392. Print rollers and print blocks used in printing, stamping, or cutting designs for wall or crêpe paper, linoleum, oilcloth, or other material, not specially provided for, composed wholly or in chief value of iron, steel, copper, brass, or any other metal, 30 *per cent* ad valorem (20 per cent) [45 per cent].

393. Articles or wares not specially provided for, if composed wholly or in chief value of platinum, gold, or silver, and articles or wares plated with platinum, gold, or silver, or colored with gold lacquer, whether partly or wholly

manufactured, 45 *per cent* ad valorem (50 per cent) [45 per cent]; if composed wholly or in chief value of iron, steel, lead, copper, brass, nickel, pewter, zinc, aluminum, or other metal, but not plated with platinum, gold, or silver, or colored with gold lacquer, whether partly or wholly manufactured, 35 *per cent* ad valorem (20 per cent) [45 per cent].

394. No allowance or reduction of duties for partial loss or damage in consequence of rust or of discoloration shall be made upon any description of iron or steel, or upon any article wholly or partly manufactured of iron or steel, or upon any manufacture of iron or steel.

Free List

1504. Agricultural implements: Plows, tooth and disk harrows, headers, harvesters, reapers, agricultural drills and planters, mowers, horserakes, cultivators, thrashing machines, cotton gins, machinery for use in the manufacture of sugar, wagons and carts, and all other agricultural implements of any kind and description, whether specifically mentioned herein or not, whether in whole or in parts, including repair parts.

1509. Antimony ore and needle or liquated antimony, but only as to the antimony content.

1514. Articles the growth, produce, or manufacture of the United States, when returned after having been exported, without having been advanced in value or improved in condition by any process of manufacture or other means if imported by or for the account of the person who exported them from the United States; steel boxes, casks, barrels, carboys, bags, and other containers or coverings of American manufacture exported filled with American products, or exported empty and returned filled with foreign products, including shooks and staves when returned as barrels or boxes; also quicksilver flasks or bottles, iron or steel drums of either domestic or foreign manufacture, used for the shipment of acids, or other chemicals, which shall have been actually exported from the United States; but proof of the identity of such articles shall be made, under general regulations to be prescribed by the Secretary of the Treasury, but the exemption of bags from duty shall apply only to such domestic bags as may be imported by the exporter thereof, and if any such articles are subject to internal-revenue tax at the time of exportation, such tax shall be proved to have been paid before exportation and not refunded; photographic dry plates and films of American manufacture (except moving-picture films), exposed abroad, whether developed or not, and photographic films light struck or otherwise damaged, or worn out, so as to be unsuitable for any other purpose than the recovery of the constituent materials, provided the basic films are of American manufacture, but proof of the identity of such articles shall be made under general regulations to be prescribed by the Secretary of the Treasury; articles exported from the United States for repairs may be returned upon payment of a duty upon the value of the repairs at the rate at which the article itself would be subject if imported, under conditions and regulations to be prescribed by the Secretary of the Treasury: Provided, That this paragraph shall not apply to any article upon which an allowance of drawback has been made, the reimportation of which is hereby prohibited except upon payment of duties equal to the drawbacks allowed; or to any article manufactured in bonded warehouse and exported under any provision of law.

1519. Bells, broken, and bell metal, broken and fit only to be remanufactured. (Free list).

1534. Brass, old brass, clippings from brass or Dutch metal, all the foregoing, fit only for remanufacture. (Free list).

1541. Cash registers, linotype and all typesetting machines, sewing machines, typewriters [all 30 per cent], shoe machinery [45 per cent], sand-blast machines, sludge machines, and tar and oil spreading machines [all 45 per cent], used in the construction and maintenance of roads and in improving them by the use of road preservatives; all the foregoing whether in whole or in parts, including repair parts. (All on free list).

1544. Chromite or chrome ore. (Free list).

1545. Coal, anthracite, bituminous [45c. per ton], culm, slack, and shale; coke [20 per cent]; compositions used for fuel in which coal or coal dust is the component material of chief value, whether in briquets or other form [20 per cent]. (All above on free list). Provided, That when any country, dependency, or other subdivision of government imposes a duty on such articles imported from the United States, an equal duty shall be imposed upon such articles coming into the United States from such country.

1547. Cobalt and cobalt ore.

1552. Composition metal of which copper is the component material of chief value, not specially provided for.

1553. Copper ore; regulus of, and black or coarse copper, and copper cement; old copper, fit only for remanufacture, copper scale, clippings from new copper, and copper in plates, bars, ingots, or pigs, not manufactured or specially provided for.

1559. Metallic mineral substances in a crude state, and metals unwrought, whether capable of being wrought or not, not specially provided for.

1565. Emery ore and corundum ore.

1589. Iridium, osmium, paladium, rhodium, and ruthenium and native combinations thereof with one another or with platinum.

1590. Iron ore, including manganiferous iron ore, and the dross or residuum from burnt pyrites. (Free list). [15c. per ton].

1613. Minerals, crude, or not advanced in value or condition by refining or grinding, or by other process of manufacture, not specially provided for.

1617. Needles, hand sewing and darning.

1627. Ores of gold, silver, or nickel, and nickel matte; ores of the platinum metals; sweepings of gold and silver.

1633. Platinum, unmanufactured or in ingots, bars, plates, sheets, wire, sponge, or scrap.

1647. Shotgun barrels, in single tubes, forged, rough bored.

1669. Tin ore or cassiterite, and black oxide of tin: Provided, That there shall be imposed and paid upon cassiterite, or black oxide of tin, a duty of 4c. per lb., and upon bar, block, pig tin and grain or granulated, a duty of 6c. per lb. when it is made to appear to the satisfaction of the President of the United States that the mines of the United States are producing one thousand five hundred tons of cassiterite and bar, block, and pig tin per year. The President shall make known this fact by proclamation, and thereafter said duties shall go into effect.

1679. All barbed wire, whether plain or galvanized.

Provisions from Other Schedules

A number of products and materials in which the iron and steel trades are interested appear elsewhere than in the Metal Schedule of the new tariff bill. Some of these are given below:

Bauxite or beauxite, crude, not refined or otherwise advanced in condition in any manner, $1 *per ton.* (Free.)

Fire brick, weighing not more than 10 lb. each, not glazed, enameled, ornamented, or decorated in any manner, and brick other than fire brick, 10 per cent ad valorem; glazed, enameled, ornamented, or decorated, 20 per cent ad valorem; weighing more than 10 lb. each and not specially provided for, not glazed, enameled, ornamented, or decorated in any manner, 17 per cent ad valorem; glazed, enameled, ornamented, or decorated, 20 per cent ad valorem; magnesite brick, ¾c. per lb. and 10 per cent ad valorem; chrome brick, not glazed, enameled, painted, vitrified, ornamented, or decorated in any manner, 20 per cent ad valorem; if glazed, enameled, painted, vitrified, ornamented, or decorated in any manner, 23 per cent ad valorem; bath brick, 23 per cent ad valorem.

Graphite or plumbago, crude or refined, not specially provided for, 10 per cent ad valorem. (Free.)

Carbons and electrodes, of whatever material composed, and wholly or partly manufactured, for producing electric arc light; electrodes, composed wholly or in part of carbon or graphite, and wholly or partly manufactured, for electric furnace or electrolytic purposes; brushes, of whatever material composed, and wholly or partly manufactured, for electric motors, generators, or other electrical machines or appliances; plates, rods, and other forms, of whatever material composed, and wholly or partly manufactured, for manufacturing into the aforesaid brushes; and articles or wares (composed wholly or in part of carbon or graphite), wholly or partly manufactured, not specially provided for, 35 per cent ad valorem.

Grindstones, finished or unfinished, $2 per ton.

Fluorspar, $5 per ton; after one year, $4 per ton. ($1.50 per ton). [Free].

Calcined magnesia not suitable for medicinal use and calcined magnesite, including dead burned and grain, ¾c. *per lb.;* and magnesite, crude or ground, ½c. *per lb.*

Domestic Values as Basis of Duties

An important feature of the new tariff bill is a section evidently designed to counteract the competitive effect of the low exchange values in European countries. It provides that the market values of competitive products in the United States shall be taken as the basis for calculating duties. The section in full is as follows:

Sec. 402. Value.—Except as otherwise provided by law, the word "value" wherever used in this act or in any other law relating to the appraisement or the classification of imported merchandise shall mean the price on the date of exportation of the imported merchandise at which comparable and competitive products of the United States were ordinarily sold or freely offered for sale in the usual wholesale quantities and in the customary wrappings, coverings, and containers, whether holding liquids or solids, to

all purchasers in the ordinary course of trade, including all costs, charges, and expenses, in the principal market or markets of the United States; or, when such value can not be ascertained to the satisfaction of the appraising officer, shall mean the value of the imported merchandise on said date for sale (whether or not there shall be an actual sale), for consumption or use in the United States in its condition, including wrappings, coverings, and containers, whether holding liquids or solids, as imported. In determining the value for sale, appraising officers may take into consideration, among other matters, the selling price or cost of production of comparable products of the United States and of articles made therefrom or from like imported materials, not sold in usual wholesale quantities or not sold or freely offered for sale to all purchasers in the ordinary course of trade, or not sold at all, and the selling price in the United States of comparable imports, or the selling price or market value or cost of production of the imported merchandise in the foreign country, and may exclude or include all or any costs, charges, and expenses, including duties, and also profits and commission, if any, keeping always in mind the legislative intention that duties ad valorem shall be assessed upon the fair market value of the imported merchandise in the United States. No pretended sale or offer for sale, and no sale or offer for sale tending to establish a fictitious market, shall be held to establish value as herein defined; nor shall a value substantially raised or lowered at the time of exportation otherwise than in the ordinary course of trade be deemed to be such value.

More Wage Reductions Expected

YOUNGSTOWN, OHIO, July 5.—While steel companies in the Mahoning and Shenango Valleys have as yet announced no wage reduction, following announcement of the cut effective July 16 by the Bethlehem Steel Co., such action is declared to be eventually inevitable. The new common labor rate of 27c. per hr., paid by the Bethlehem company at its Steelton plant, compares with 37c. paid in the Youngstown district.

"Liquidation of both wages and values is still going on," states a leading independent steel maker, "and this must and will continue until the equalizing process reaches the farmers, who are the largest single group of consumers and require the largest amount of transportation."

Another Valley manufacturer states: "It is impossible for us to pay 10c. an hour more for our labor than does an important competitor; we will have to make some further reduction shortly, but it is unfair that we are forced to do so, with neither the railroads nor the building trades down to even our first cut."

As earlier in the year, the independents are expected to take the lead in the further adjustment of wages. Valley steel producers state that a revision of wage rates to make them conform more nearly to what competing interests are paying will be discusssd immediately. Valley employers have generally paid a few cents more per hour than Eastern steel independents. A 30-cent rate in the Valleys for common labor would mean a reduction of 20 per cent., and would compare with 19 1-2c. paid before the war. It would represent a reduction of about 35 per cent. from the war peak, but would still be 60 per cent above the rate which was paid at the opening of the war.

Much common labor outside the industry in the Youngstown district is being paid 25c. per hr.

Will Build Great Dam

BIRMINGHAM, ALA., July 5.—The Alabama Power Co. will at once begin construction of the Mitchell dam on the Coosa River, the Federal Power Commission having granted the permit. The dam will take two years to build and will cost $7,000,000 to $8,000,000. It will be 74 ft. high and 1800 ft. long. Initial installation will be 60,000 hp.; eventual, 120 000.

The International Nickel Co. has purchased a 3-ton electric furnace from the Pittsburgh Electric Furnace Corporation, Pittsburgh, for its new plant at Huntington, W. Va. The furnace will be used for the melting of Monel metal. A few weeks ago the Chapman Valve Co., Indian Orchard, Mass., purchased a 5-ton furnace from the same company.

BETHLEHEM PRICES

Announcement of New Schedule Follows Closely Reduction of Wages

Following closely the reduction of 15 per cent in wages and 10 per cent in salaries by the Bethlehem Steel Co., E. G. Grace, president, announced on July 4 a new schedule of prices of steel products effective the following day as follows:

	Old Prices	New Prices
Bars	$2.10	$1.90
Structural shapes	2.20	2.00
Plates	2.20	2.00
Sheet bars	39.00	35.00
Billets, 4 x 4	37.00	33.00
Slabs	38.00	34.00
Blue annealed sheets	2.85	2.65
Black sheets	3.75	3.50
Galvanized sheets	4.75	4.50
Tin plate	6.25	5.75
Skelp	2.20	2.00

The new prices represent a reduction of $4 a ton on bars, structural shapes, plates, skelp, billets, sheet bar, slabs and blue annealed sheets; $5 a ton on black and galvanized sheets; $10 a ton on tin plate," said Mr. Grace.

"Present manufacturing costs do not in any sense warrant these reductions," he added, "but this company desires to contribute even more than its full share to re-establish conditions in the steel trade on what might be regarded as a normal basis. There has been so much said about steel prices not having been reduced to pre-war levels that an analysis of the new prices is desirable and will be illuminating to both the trade and the general public.

Freight Largest Factor

"The increase in freight rates has been the largest factor in increasing the cost of manufacturing steel products because the making of a ton of finished steel involves the transportation of more than five tons of raw materials. The cost factors next in importance are materials and labor.

"Taking as an example the price for structural shapes, under the new schedule of prices, 2c. a pound, or $44.80 a gross ton, the comparison with pre-war prices, reflecting concretely the three more important cost factors, is as follows: The increase over pre-war cost in transportation on ore, coal, limestone, scrap and miscellaneous supplies amounts to $7.85 per ton of finished steel; the increase in the cost of coal, ore, limestone, alloys, refractories, lubricants and miscellaneous supplies at point of shipment amounts to $7.10 per ton of finished steel; the increase in the cost of labor under the present wage scale, as compared with pre-war wages in the steel plant proper, is $5.64 per ton of finished steel.

"These items account for an increase in present day costs over pre-war costs of $20.59 per ton of finished product. The new price of $44.80 for structural steel is equivalent to a pre-war price of $24.21 per ton, or 1.08c. per pound.

"Statistics covering the last 20 years show in only one month (December, 1914) has structural material been sold as low as this figure (1.08c.). The ten year pre-war average (1904-1913) was 1.51c. per pound.

"The figures I have used are the results of actual compilation made by the company's comptroller in the every day conduct of the business."

The number of surplus or idle freight cars on the railroads of the country continue to decline, according to reports just received from the carriers by the car service division of the American Railway Association. These show that on June 23 there were 377,850 cars in excess of current freight requirements or a reduction of 3896 cars compared with the total on June 15.

For the first time this year the Girard, Ohio, plant of the A. M. Byers Co., Pittsburgh, was wholly suspended last week. Other companies in the Mahoning Valley whose plants are idle are the Falcon Steel Co. and the Mahoning Valley Steel Co.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes, and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2c.

Wire Products

Wire nails, $3 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.75 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.75; galvanized wire, $3.25; galvanized barbed wire, $3.65; galvanized fence staples, $3.65; painted barbed wire, $3.15; polished fence staples, $3.15; cement-coated nails, per count keg, $2.60; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 65½ to 68 per cent off list for carload lots, 64½ to 67 per cent for 1000-rod lots, and 63½ to 66 per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.90
Large boiler rivets.....$2.85 to $3.00
Small rivets .....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 60 and 10 to 65 and 10 per cent off liist
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads .....60 and 10 per cent off list
Longer and larger sizes. 60 and 5 to 60 and 10 per cent off list
Lag bolts .....70 per cent off list
Plow bolts Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S.. 80 and 10 to 80, 10 and 10 per cent off list
Same sizes S. A. E.. 80, 10 and 10 to 80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E.. 70, 10 and 10, 70, 10, 10 and 10 per cent off list
Stove bolts in packages .....80 and 10 per cent off list
Stove bolts in bulk .....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4c. to 4.20c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $45 to $48; chain rods, $45 to $48; screw stock rods, $50 to $53; rivet and bolt rods and other rods of that character, $45 to $48; high carbon rods, $55 to $70, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3.25 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3.25 base; 5/16-in., $3.25 base. Boat and barge spikes, $3.25 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 to $4.20 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $12.30 per package; 8-lb. coating, I. C., $12.60; 12-lb. coating, I. C., $14.30; 15-lb. coating, I. C., $15.30; 20-lb. coating, I. C., $16.55; 25-lb. coating, I. C., $17.80; 30-lb. coating, I. C., $18.80; 35-lb. coating, I. C., $19.80; 40-lb. coating, I. C., $20.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.90c. from mill. Refined bar iron, 2.75c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 2½	+28½
¼ to ⅜	52½	26	½	27½	9½
½	56½	42	¾	33½	18½
¾	60½	48	1 to 1½	35½	20½
1 to 3	62½	50			

Lap Weld

2	54½	42	2	30½	16½
2½ to 6	58½	46	2½ to 6	33½	20½
7 to 12	54½	41	7 to 12	29½	16½
13 to 14	45	..			
15	42½	..			

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+10½	+43½
¼ to ⅜	48½	31	½	26½	14½
½	53½	42	¾	33½	19½
¾	58½	47	1 to 1½	35½	21½
1 to 1½	60½	49			
2 to 3	61½	50			

Lap Weld, extra strong, plain ends

2	52½	41	2	31½	18½
2½ to 4	56½	45	2½ to 4	34½	22½
4½ to 6	55½	44	4½ to 6	33½	21½
7 to 8	50½	37	7 to 8	24½	12½
9 to 12	45½	32	9 to 12	19½	7½

To the large jobbing trade an additional 1, 5 and 2½ per cent is allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	19½	1½ in.	+10
2 to 2¼ in.	30	1¾ in.	List
2½ to 3 in.	41	2 to 2¼ in.	—10
3¼ to 13 in.	47	2½ to 2¾ in.	—15
		3 to 3¼ in.	—16
		3½ to 4½ in.	—20

Carload Discounts on Standard Commercial Seamless—

Cold Drawn

1 in.	56	2 to 2½ in.	17½
1¼ in.	49	2¾ and 4 in.	20
1½ in.	48	4½ to 5 in.	7½
1¾ in.	25		

Hot Rolled

3 to 4 in. 30

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.55	Nos. 11 and 12	2.75
Nos. 9 and 10 (base)	2.65	Nos. 13 and 14	2.85
		Nos. 15 and 16	2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.30	No. 28 (base)	3.50
Nos. 22 to 24	3.35	No. 29	3.60
Nos. 25 and 26	3.40	No. 30	3.70
No. 27	3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.50	Nos. 25 and 26	4.25
Nos. 12 to 14	3.60	No. 27	4.35
Nos. 15 and 16	3.75	No. 28 (base)	4.50
Nos. 17 to 21	3.90	No. 29	4.75
Nos. 22 to 24	4.05	No. 30	5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.30	No. 28 (base)	3.50
Nos. 17 to 21	3.35	No. 29	3.55
Nos. 22 to 24	3.40	No. 30	3.55
Nos. 25 to 27	3.45	Nos. 30½ and 31	3.60

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
June	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
29	12.75	12.62½	28.87½	4.40	4.25	4.75	4.25
30	12.75	12.62½	29.00	4.40	4.25	4.80	4.30
July							
1	12.75	12.62½	29.37½	4.40	4.25	4.85	4.35
2	12.75	12.62½	....	4.40	4.25	4.85	4.35
5	12.75	12.62½	29.87½	4.40	4.35	4.85	4.35

NEW YORK, July 5.

The markets have been exceedingly quiet, the inactivity being intensified by the July holiday. Buying of copper has not improved but prices are steady. There has been very little change in the tin market. Conditions in the lead market have been quiet with the price tendency firm. There has been a better feeling in the zinc market and prices are higher. In the tin, lead and zinc markets the predominating topic has been the proposed duty in the tariff bill just introduced into Congress.

New York

Copper.—There has been very little change in the fundamental conditions as reported a week ago. Most of the large producers refuse to quote at anything less than 13c. to 13.25c. for electrolytic copper for July delivery, but there are two or three other sellers who are willing to meet any reasonable offer and such business as is going, which is decidedly small, is being taken by these sellers at an average of 12.87½c., delivered, or 12.62½c., New York, which we quote as the market. Some sellers report a slight increase in foreign purchases, but in general interest on the part of the domestic consumer continues light. Quotations for Lake copper are largely nominal and at nearly the same levels as in the electrolytic market.

Copper Averages.—The average price of Lake copper for the month of June, based on daily quotations in THE IRON AGE, was 12.91c. The average price of electrolytic copper was 12.88c.

Tin.—With the exception of last Friday, July 1, the market has been nearly stagnant with very few buyers or sellers and a decided lack of interest, which is characterized by some as greater than ever before in the history of the market. Late on Friday dealers turned buyers and about 300 to 400 tons of prompt shipment from England and of future shipment from the East was sold around 29.25c. to 29.37½c. The feature of the week has been the proposed duty of 2c. per lb. on pig tin with tin ores free, as presented in the new tariff bill recently introduced into Congress. General satisfaction over this seems to prevail among importers, due largely to the fact that there was a strong movement to obtain a duty of 10c. per lb. on pig tin and 6c. on tin contained in the ore. Spot Straits tin, New York, has been steady during the week around 29c. to 30c., with the quotation to-day at 29.87½c., New York. The London market is again higher than a week ago by £5 to £6 per ton, the quotations to-day standing at £172 5s. for spot standard, £174 5s. for future standard and £172 15s. for spot Straits. Deliveries into consumption during the month were 1590 tons, with 2546 tons in stocks and landing on June 30. Imports for the half year have been only 8918 tons, as compared with 27,743 tons to July 1, 1920.

Lead.—The feature of the market is the fact that it is practically impossible to buy the metal from any of the independent producers, thus leaving the market practically in the hands of the leading interest. At the best, however, there is very little business, at least not enough to establish a market among independent sellers. The market may be characterized as quiet at from 4.40c., New York, or 4.25c., St. Louis. The new tariff bill proposes a duty of 2⅛c. per lb. on pig lead as compared with the present rate of 25 per cent ad valorem.

Zinc.—There has been a stiffening in quotations and prime Western cannot be bought from producers at less than 4.35c., St. Louis, or 4.85c., New York, for early delivery. The stronger feeling is due partly to the proposed tariff of 2c. per lb. on imports for the first year as compared with the present rate of 10 per cent ad valorem, but there is also a feeling that July will see the bottom of the zinc market, if it has not already appeared, and that from then on a better demand at higher prices will rule. It develops that some galvanizers are bare of stocks, while others are well supplied.

Antimony.—Wholesale lots for early delivery are quoted largely nominal at 4.75c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading interest at 28c., f.o.b. plant, with foreign metal of the same grade obtainable at a range of 22c. to 23.50c., New York, depending on the seller and the source of the metal.

Chicago

July 5.—Tin has advanced in sympathy with London, where the improved English industrial outlook has strengthened the market. Lead is slightly stronger, principally because sellers refuse to sell at the prices which buyers offer. In both lead and spelter there is something of a deadlock between buyers and sellers because of inability to agree on price. Most of the old metals have declined. We quote: Tin, 32c.; lead, 4.45c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.

St. Louis

July 1.—The non-ferrous markets continue dull, with lead quoted at 4.25c. and spelter 4.25c. in car lots. We quote Lake copper at 13.61c. in car lots; tin, 29.86c.; antimony, 5.49½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 9c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Lake Iron Ore Shipments in June

The movement of Lake Superior iron ore by water in June and for the season up to July 1 was less than that of the corresponding period in 1920. June shipments from upper lake docks amounted to 3,600,989 gross tons, against 9,233,566 tons in June, 1920, a decrease of 5,632,577 tons. The total to July 1 was 6,371,227 tons, or 10,069,278 tons less than to July 1 last year. The shipments by ports for June, 1920 and 1921, and for the season were as follows in gross tons:

	June, 1920	June, 1921	To July 1, 1920	To July 1, 1921
Escanaba	1,147,136	138,756	1,942,809	210,804
Marquette	553,367	38,959	928,403	52,944
Ashland	1,299,820	309,398	2,312,869	526,937
Superior	2,256,250	873,674	4,445,496	1,716,230
Duluth	2,528,446	1,681,411	4,216,685	2,908,299
Two Harbors	1,448,547	558,791	2,594,243	956,013
Total	9,233,566	3,600,989	16,440,505	6,371,227
Decrease		5,632,577		10,069,278

Duluth shipments this year have been considerably less than to July 1, 1920, which is true also of Escanaba, Marquette, Ashland and Superior.

Union molders in foundries in the Youngstown, Ohio, district have agreed to accept a new wage scale 20 per cent lower than the old scale. The new rate, which became effective July 1, provides for a minimum wage of 80c. per hr., as compared with a minimum of $1 under the old scale.

The Metropolitan Paving Brick Co., Canton, Ohio, has reduced the price of paving block from $30 to $27 per 1000. The new price is a decline of 20 per cent from the peak. Kilns of the company at Bessemer, Pa., are operating at 75 per cent of normal.

MANUFACTURE OF MACHINERY

Census Bureau's Summary Concerning the Industry, 1919

WASHINGTON, D. C., June 25.—A preliminary statement of the general results of the 1919 census of manufactures has been issued by the Bureau of the Census, Department of Commerce, furnishing statistics concerning the value of various kinds of machinery manufactured during the year 1919, with comparisons for 1914.

	1919		1914	
	Number Establishments	Value of Products	Number Establishments	Value of Products
Adding and calculating machines	54	*$57,454,000	44	*$14,734,000
Air compressors	57	13,960,000	84	5,158,000
Bakers' machinery	62	10,186,000	32	2,555,000
Blowers and fans	43	9,498,000	..	†
Blotting machinery	38	6,439,000	29	1,359,000
Brick, pottery and other clay working machinery	43	5,371,000	89	2,439,000
Cash registers and parts	20	*31,038,000	19	*15,935,000
Concrete mixers	62	9,579,000	44	2,956,000
Condensers	16	9,387,000	..	†
Cotton gins	21	8,632,000	25	4,902,000
Confectioners' machinery	49	8,469,000	..	†
Cranes:				
Electric	33	25,865,000	..	†
Steam and hydraulic	13	13,515,000	26	4,194,000
Other	38	9,568,000	..	†
Dairy mach'y and apparatus	139	34,456,000	78	*12,998,000
Dredging machinery	11	1,939,000	..	†
Elevators and elevator machinery	195	54,052,000	213	17,228,000
Excavating machinery	34	6,641,000	21	2,969,000
Firearms, ordnance and ammunition machinery	18	2,814,000	..	†
Flour and grist mill machinery	86	16,366,000	101	5,018,000
Gas machines and apparatus	70	7,898,000	90	4,426,000
Glass making machinery	23	3,015,000	30	1,091,000
Hydraulic rams	13	1,369,000	..	†
Laundry machinery:				
Power machines	30	10,341,000	73	6,135,000
All other	18	2,192,000	35	1,430,000
Lawn mowers	14	2,176,000	22	2,848,000
Leather working machinery, other than shoes	47	5,108,000	27	1,067,000
Metal working machinery, other than machine tools	155	36,348,000	277	17,420,000
Meters, gas and water	39	*20,572,000	40	*11,638,000
Mining machinery, exclusive of oil-well machinery	107	41,866,000	153	13,254,000
Motion picture machinery	24	*3,510,000	16	*1,820,000
Oil-well machinery	61	22,219,000	127	10,569,000
Oil-mill machinery, cottonseed and other	20	6,598,000	20	1,878,000
Ore crushers	17	1,162,000	...	†
Paper and pulp mill mach'y	121	16,198,000	139	8,588,000
Photo engraving machinery	7	660,000	..	†
Printing machinery:				
Presses	45	15,520,000	88	8,397,000
Typesetting machines, linotype and other	11	15,197,000	10	7,635,000
Other	81	9,334,000	56	3,197,000
Pumps and pumping mach'y	204	*65,360,000	298	*27,457,000
Refrigerating machinery:				
Ice making	44	14,624,000	73	10,522,000
Other refrigerating	40	15,277,000		
Road making machines	43	13,915,000	31	3 545,000
Rubber working machinery	51	13,302,000	14	2,726,000
Sandblast machines	12	686,000	..	†
Sewing machines	29	*48,946,000	46	*21,711,000
Shoe machinery	58	7,459,000	72	5,949,000
Slot vending machines	17	1,206,000	..	†
Steam shovels	8	9,654,000	..	†
Stokers, mechanical	9	2,811,000	..	†
Sugar-mill machinery	49	13,249,000	42	1,972,000
Typewriters	39	*43,313,000	53	*20,517,000
Vacuum cleaners	9	1,641,000	39	2,059,000
Washing machines	115	*50,955,000	111	*7,600,000
Well drilling machinery, other than oil well	30	1,663,000	..	†
Windmills	33	*9,923,000	50	*5,843,000
Wire-drawing machinery	12	619,000	..	†
Woodworking machinery:				
Sawmill	69	10,046,000	182	6,304,000
Planing mill	36	6,338,000	196	7,089,000
Other	136	13,198,000		
Other machinery		121 930,000		
Machine parts and castings		53,504,000		72,545,000
Amount received for contract work, repairs, etc.		35,922,000		

*Includes value of all products of establishments engaged primarily in the manufacture of machines specified.
†Comparative figures not available.

The Edwin Forrest Forge Co., San Francisco, has secured the contract for approximately 400 tons of forgings to go to the Southern California oil fields.

LOWER FREIGHT RATES

Revision of Schedule to Seattle Expected—Shipping Steel to Alaska

SEATTLE, June 27.—It is the opinion of jobbers that sheets must come down before there will be any late summer movement, and advices this week indicate that some further reductions, which will meet the view of investors and the trade, are in prospect.

Pipe in sizes of three-quarters and halves, the two sizes most popular in the north Pacific territory, has been moving well. Present stocks have begun to show breakage and jobbers report that it is difficult to fill in. Some sheets have begun again to move by water, the difference in rail and water rates being attractive to buyers, but the same reconditioning process has been necessary and the saving is of doubtful proportions. Freights from Pittsburgh to Seattle by rail are to be cut, it is understood, from $1.66 to $1.05, applicable to sheets, plates and pipe. This is believed to be a hopeful sign. Reports here indicate that Eastern rail lines that have steadily opposed the trans-continentals in the desire for workable rate reductions have assented to the decline.

Advices here this week are in effect that the Isthmian Steamship lines will dispatch the steamer Charlton Hall from Baltimore and Mobile for Seward and other Alaska ports with a full cargo of rails for the Alaska Engineering Commission. This will be the first intercoastal vessel traveling through without transshipment at Seattle to deliver steel into Alaska.

The National Steel Construction Co., John Wilson, president, has established in the company's Duwamish Waterway plant the first range boiler factory west of the Rocky Mountains. Heretofore this section has had to draw from the Middle West for its range boilers. The factory will have an initial capacity of 80 range boilers per day. Establishment of the factory followed eight months of experimental work in getting a competitive high standard product. In establishing the plant a pickling division and special equipment and machinery were added to the company's steel construction and shipbuilding plant. The steel used in the boilers is pickled in a series of chemical solutions to prevent rust or scaling. Range boilers built in the East, it is stated, are not constructed for the high water pressure used in the North Coast territory. While developing the boiler feature the company will continue in the steel construction and shipbuilding industry. Its plant is the only one left in Seattle with facilities for building steel ships.

Jobbers complain of the heavy amount of second-hand tools, heavy duty and otherwise, that has been offering from shipyard stocks. The result has been heavy reductions in the spring and summer orders for new material. Frequent revised price lists, with declining prices for these mixed stocks, are adding further to the embarassment.

Employees of the Pennsylvania Railroad shops at Altoona, Pa., on July 1 began working under new conditions agreed upon with the management after a series of conferences. The new order constitutes a piece-work system, which the management claims will enable the workmen to earn more than under the day rate system. A 48-hr. basic week, with not more than nine hours or less than eight hours, with half-holidays on Saturdays, has been established. Overtime is to be paid pro-rata for the ninth and tenth hours, with time and a half after the tenth hour.

The Interstate Commerce Commission has entered an order changing from July 1 to Sept. 1, 1921, the effective date for the payment by the Louisville & Nashville and other railroads of reparation to the Sloss-Sheffield Steel & Iron Co., and other Southern iron and steel produeers on account of unreasonable rates charged on pig iron shipments from points in Alabama and Tennessee to Ohio river crossings and points in Central Freight Association territory.

PERSONAL

Additional business representatives have been appointed by THE IRON AGE as follows: H. E. Barr, Eastern New England advertising manager; F. W. Schultz, New York City advertising manager; E. Sinnock, Brooklyn and Long Island advertising manager; C. L. Rice, eastern New York State advertising manager; B. L. Herman, western New York State advertising manager; W. C. Sweetzer, New Jersey advertising manager; A. L. Marsh, central Pennsylvania advertising manager, and D. G. Heinly, Michigan advertising manager. The branch offices in Philadelphia, Cincinnati, Chicago, Pittsburgh, Cleveland, Washington and San Francisco will continue under their present managers.

William D. Kelly, works manager Oakland Motor Car Co., Pontiac, Mich., has resigned.

Frank H. Crockard, president Woodward Iron Co., has been elected president of the Alabama Coal Operators' Association.

Clarence V. Brown, head of the United States Pressed Steel Co., Ypsilanti, Mich., has been appointed receiver of the Universal Utilities Corporation, Alpena, Mich. He has announced that the plant will be in operation in a short time.

C. E. Kitchen, formerly in charge of coal and coke sales for the Iron Trade Products Co., Pittsburgh, and R. B. Loos, until recently associated with the Pittsburgh office of the Walter Wallingford Coal Co., Cincinnati, have organized the Penn-Empire Coal, Inc., with a capitalization of $200,000 and have opened offices in the Empire Building, Pittsburgh. The new company controls some production and also will do an agency business in coal and coke.

Floyd Rose, secretary Heppenstall Forge & Knife Co., Pittsburgh, was made general manager of sales of both that company and its subsidiary, the Heppenstall Forge Co., at a recent meeting of the board of directors.

Walter J. Kohler, president Kohler Co., Kohler, Sheboygan County, Wis., manufacturer of sanitary plumbing fixtures, farm lighting plants, etc., was elected president of the board of regents of the University of Wisconsin at the annual meeting on June 27.

Harry R. Jones, president United Alloy Steel Corporation, Canton, Ohio, sailed for Europe a few days ago and will spend two months in Iceland, Norway and England.

Joseph E. Jacobson, formerly in charge of the Chicago office of the Continental Iron & Steel Co., is now associated with Luria Brothers & Co., Inc., iron and steel scrap, will be district manager in its Pittsburgh office, Oliver Building.

John Booth, coke sales department, New England Coal & Coke Co., Boston, has resigned to becomes sales representative for a Pennsylvania anthracite coal producing company, with headquarters in Boston.

Capt. Harry K. Cage has been appointed manager Charlestown Navy Yard, Boston, in charge of ship repairs.

Sven Binquist, Swedish inventor and founder of the S. K. F. industries, and B. G. Prytz, president of the affiliated organizations, were given a banquet at the Farmington Country Club, Farmington, Conn., last week by B. M. W. Hanson, Whitney-Hanson Mfg. Co., Hartford, Conn. About 35 representatives of leading Connecticut, Rhode Island and Massachusetts manufacturing industries attended.

Everett Morss, president Simplex Wire & Cable Co., Boston, recently returned from a nine weeks' tour in Europe, last week was tendered a complimentary dinner at the Boston City Club by 37 members of the company's organization.

James R. Mills, Cleveland sales manager of the Carnegie Steel Co., sailed from New York on July 5 on a European trip.

Joshua A. Hatfield, president American Bridge Co. of New York, sailed on the Aquitania on Tuesday on a trip to England and the Continent.

A. A. Fowler, New York resident partner of Rogers, Brown & Co., has returned from a four months' stay in Europe.

Charles M. Muchnic of the American Locomotive Sales Corporation, New York, has returned from a business trip to Mexico.

OBITUARY

Benjamin Nicoll

BENJAMIN NICOLL, long a prominent figure in iron and steel circles in New York, died unexpectedly from apoplexy Saturday evening, July 2, while talking with friends at the Somerset Country Club, Bernardsville, N. J. Mr. Nicoll was born on Shelter Island, Long Island, and was 66 years of age. He graduated from Princeton University in 1877 at the age of 22 and soon after became connected with the Mt. Pleasant Mining Co., which was operating iron ore properties in New Jersey. After being engaged in the selling of ore of this company for several years, Mr. Nicoll started in the mining of ore in New Jersey in his own interest, and in the late 80's organized the firm of B. Nicoll & Co. Although associated with partners in the early days of the business, Mr. Nicoll was the dominating factor in the firm, which continued until January, 1921, when it became incorporated as B. Nicoll & Co., Inc., the officers being Benjamin Nicoll, president; G. F. Eldridge and H. K. Stauffer, vice-presidents; Edward Mullen, treasurer, and Courtlandt Nicoll, secretary.

B. Nicoll & Co. carried on a large business in ore and pig iron, both domestic and for export, also did a considerable business in importing, and at times were heavy exporters of steel products. In 1902 coal was added to the products, and in 1917 non-ferrous metals were included. For many years the firm was the sales agent for the Wharton Steel Co., as it was also for the Wickwire Steel Co. until that company became a part of the Wickwire-Spencer Steel Corporation in 1919. Mr. Nicoll had been a director of the Colorado Fuel & Iron Co., Rossie Iron Ore Co. and the Vulcan Detinning Co., but had withdrawn from all of these. Mr. Nicoll had homes at 46 West Fifty-fourth Street, New York; Morristown, N. J.; Water Mill, Long Island, and Peapack, N. J. He is survived by his wife; his son Courtlandt Nicoll, who is an attorney; a daughter and a brother, Delancey Nicoll. Mr. Nicoll was a man of strong personality, great energy, and in a quiet way was happy in being of service to his fellow men.

JOHN FINDLEY WALLACE, best known as one time chief engineer of Panama Canal, died suddenly at a hotel in Washington on the evening of July 3. He had gone to Washington to testify before a Senate committee investigating the railroad situation. He was born in Fall River, Mass., Sept. 10, 1852, and was graduated from the University of Wooster as a civil engineer. He was identified for years with railroads, notably with the Illinois Central from 1891 to 1904, or until he became connected with the Panama Canal. From 1906 to 1917 he was first president, and then chairman of the board of Westinghouse, Church, Kerr & Co. Among his conspicuous achievements was the building of a joint entrance into Chicago for the Santa Fe and Illinois Central roads and the building of the World's Fair terminals at Chicago in 1892.

OSCAR IRWIN, aged 47 years, superintendent of the spike plant at the Soho Works, Jones & Laughlin Steel Co., Pittsburgh, died at the Southside Hospital, Pittsburgh, June 29, as a result of injuries sustained at the plant, Friday, June 24.

ERNEST NICKERSON, Wellesley, Mass., engineer and erector of many bridges throughout the United States, died in that town June 30, at the age of 52 years.

British Iron and Steel Market

Signs of a Resumption of Activity—British Prices Still Too High to Compete with Continent

(*By Cable*)

LONDON, ENGLAND, July 5.

Official prices of pig iron are unchanged, but up to 15s. ($2.80) premium is being paid for No. 3 Cleveland. Some furnaces are preparing to start up again, but much depends on fuel prices. Coke is expected to fall to 30s. to 35s. ($5.59 to $6.53) at ovens, against 42½s. ($7.93) before the strike; but everything is very uncertain at present. Wage agreements are being arranged in various directions, with provision for arbitration to settle disputes. Belgian foundry pig iron is arriving, delivered in the Midlands at £7 5s. ($27.04).

There is more inquiry for steel, but British prices are still too high. The tendency is downward, and a more substantial revision is expected very soon. Common iron bars are £3 ($11.19) down at £16 ($59.68).

German merchant bars are being sold here at £8 ($29.84) and Belgian bars at £8 10s. ($31.70). German billets are offered at £5 17s. ($21.82) f.o.b.; French billets at £6 5s. ($23.31) f.o.b.; French sheet bars at £6 10s. ($24.24) f.o.b.; Belgian billets at £6 17½s. ($25.64) c.i.f.

Efforts for price convention on galvanized sheets have failed. Makers quote £22 10s. ($83.92) upward, but there is more inquiry and there are some signs from India of a revival of buying.

Tin plates show little fresh features. For prompt delivery, quotations are 27¼s. to 27½s. ($5.07 to $5.12) f.o.b.; for forward delivery, 25½s. to 26s. ($4.75 to $4.85) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.73 per £1 as follows:

Durham coke	£2 2		$7.83
Cleveland basic	6 0		22.38
Cleveland No. 1 foundry	6 5		23 31
Cleveland No. 3 foundry	6 0		22.38
Cleveland No. 4 foundry	5 19		22.19
Cleveland No. 4 forge	5 17½		21.91
Hematite	7 0*		
East Coast mixed	8 0 &	£7 5*	29.84 & $27.04
Ferromanganese	18 0 &	15 0*	67.14 & 55.95
Ship plates	15 0 to	15 10	55.95 to 57.81
Boiler plates	19 0 to	21 0	70.87 to 78.33
Tees	15 0 to	15 10	55.95 to 57.81
Channels	14 5 to	14 15	53.15 to 55.01
Beams	14 0 to	14 10	52.22 to 54.08
Round bars, ¾ to 3 in.	14 0 to	14 10	52.22 to 54.08
Rails, 60 lb. and up	13 0 to	15 0	48.49 to 55.95
Billets	11 0 to	11 10	41.03 to 42.89
Sheet and tin plate bars, Welsh	10 10		39.16
Galvanized sheets, 24 g.	22 10 to	23 0	83.92 to 85.79
Black sheets	19 0 to	20 0	70.87 to 74.60
Tin plate base box	1 5½ to	1 8	4.75 to 5.22
Steel hoops	17 0		63.41

*Export price.

SOUTH MANCHURIA BUYS

Inquires for Railroad Material and Tie Plates—Public Works in Shanghai—Mexican Locomotives

NEW YORK, July 5.—Although there is a slight inclination on the part of European buying centers to place some orders in the United States, Japan still maintains the greatest activity. In addition to about 300 tons of structural material recently inquired for from Japan, evidently for shipbuilding, an additional 300 tons has been asked for from the same source. The greater part of these two orders will probably be placed in Europe. The South Manchurian Railroad, which has been actively buying of late, has purchased a number of electric car heaters and parts and a quantity of car couplers totaling about $15,000. This railroad is also in the market for about 1500 tons of tie plates.

American Locomotive Co. is understood to have closed on 45 locomotives for Mexico.

Japanese Inquiries Continue

New inquiries continue to appear from Japanese sources. In all about 10,000 boxes of tin plate are reported in the market, 5000 boxes previously mentioned being for the Imperial army. One of the largest Japanese shipyards, which is represented in the United States, has inquired for about 1700 tons of ship plates and there is a small inquiry in the market for a tonnage of 75-lb. rails. A contract for transmission towers, similar to those in the market some time ago, is reported to have been issued. A fair-sized tonnage of reinforcing bars is being handled by a Japanese export house, part of the order being for shipment to Kobe and part for Yokohama, for building projects in both cities.

Light Buying of Foreign Material

Not only are warehouses and exporters in New York showing an interest in foreign material, but in a few cases sales have been made of small tonnages, purchased largely as an experiment as to quality, price and delivery. While low bids are being received from the United Kingdom, they are generally from commission merchants and exporters, who are importing Belgian and German material for re-export. British manufacturing costs are reported as altogether too high to permit of more than normal competition with American material. A representative of a large German interest is said to have been offering cotton ties in the Southern States at a low figure.

In a general way it may be said that European prices on steel delivered in the Orient correspond to about 1c., Pittsburgh; in other words, there is a difference at present in favor of European business of about $20 a ton, taking into consideration all factors of prices at European mills, exchange and freight rates. No great concern is felt, as with any expansion in the volume of business the disparity would, it is believed, tend to vanish. It follows that on business which is done here on export account prices are low; in one case of plates the Steel Corporation is believed to have closed at a price figuring back to 1.60c., Pittsburgh, probably shipping the material from the Gulf.

Improvements in China

A new sewerage system is to be installed in the International settlement in Shanghai, China. Besides the pipe, about 20 pumps will be installed for 4-in. and 6-in. pipe. The Stereophagus type of pump has been specified. The existing wharves at Pukow, at the terminus of the Tsientsin-Pukow Railroad, which are about 10 years old, will be reconstructed and two additional wharves built to accommodate the increased mining traffic. Contract has been awarded to the Kiangnan Dockyard, Shanghai.

Research facilities and the development activities of American industries are to be described in the forthcoming revision of "Bulletin of the National Research Council." Only 300 such laboratories were listed in the first edition but it is hoped that several hundred new names will appear in the revision and that a more nearly complete reference list will thus become available.

The General Electric Co., Schenectady, N. Y., has acquired the electrical manufacturing company of Societa Elettrotecnica Galileo Ferraris, Milan, Italy, and in the future will operate the property. This concern formerly was known as the Thomson-Houston Co. The electrical business will be separated from the steam equipment manufacturing operations, and placed under another management.

SEE FAVORABLE SIGNS

Youngstown Manufacturers Hope for Improved Conditions at Not Far Distant Date

YOUNGSTOWN, OHIO, July 5—While actual production of iron and steel probably reached a new low level this week in the Mahoning Valley, due to the combined influence of the holiday suspension and the closing down of union sheet and tinplate mills, manufacturers, nevertheless, see hopeful signs for a betterment in the industry. Joseph G. Butler, Jr., vice-president of the Brier Hill Steel Co. and a director of the Youngstown Sheet & Tube Co., believes there will be a definite upturn in buying of some finished steel lines by fall, which will gather force before the end of the year. Mr. Butler attributes the slump in sheets and plates to an over-expansion in productive capacity, superinduced by war demands. Withdrawal of such requirements left the country with greater capacity, and any diminution in demand would therefore appear for the time being more pronounced than it really is, he points out. Gradual growth in demand, he believes, will absorb any excess capacity which may exist, which in the case of sheets will be accelerated by the new uses to which such material is being constantly put.

Only those departments requiring continuous operation, such as blast furnaces and coke ovens, were operated over the week-end and the holiday. On Tuesday but five of the 51 independent open-earth furnaces in the Valley resumed, while the Carnegie Steel Co. operated nine furnaces. But 19 of the 105 sheet mills are under power, 10 of the Newton Steel Co. at Newton Falls and nine of the Youngstown Sheet & Tube Co., all union mills being suspended through failure of the manufacturers and employees to reach a new wage agreement. Tin mills of the Trumbull Steel Co. are idle for the same reason. The Youngstown Sheet & Tube Co. has five pipe furnaces fired and the Republic Iron & Steel Co. two. The Trumbull company is operating a number of strip mills. The 84-in. plate mill of the Brier Hill Steel Co. is running on a part-time schedule.

Expansion in Production

Fabricating interests whose products go into building construction generally, report an expansion in production. President Julius Kahn of the Truscon Steel Co. states productive capacity is to be enlarged to 75 per cent., from 60, to take care of increased inflow in new business. The William B. Pollock Co., on the other hand, a fabricating interest whose work in the past has been devoted to a large extent to blast furnace construction and repairs, is virtually suspended and may continue so for an indefinite period.

Price readjustments in some important finished lines are believed impending, through the general disregard of nominal quotations by all the leading district interests. An impetus to fall buying is expected in view of the drastc readjustments which have already taken place in the industry, especially in prices, and because of the very satisfactory crop conditions throughout the country. Exceptionally limited buying by the farmers for the past year will bring them into the market for many miscellaneous needs, steel makers here believe, which will directly and indirectly benefit the steel industry through the improved demand for farm implements, tractors, automobiles and railroad equipment to haul them. Lower freight rates, for which important independent steel makers are contending, will help the farmer realize a larger net return on his products and thus bring into the market a large group of consumers who are at present buying little or nothing because they cannot supply their needs at the same relative prices they receive for their grain, cattle, hogs and other products.

Price Determined by the Size of Order

The tonnage produced by one large interest in June was somewhat better than that in May, the smallest for any month in many years. It is generally acknowledged that the price situation is weak and determined to a large degree by the size of the order and nature of the specifications.

There is generally more activity in wire, nails, conduit, smaller sizes of merchant pipe and fabricated materials entering into construction. Renewed inquiry for steel plates is coming from car repair and tank interests and a strengthened buying movement is anticipated by Valley makers in view of the awarding of substantial repair contracts by some of the railroads. One consuming interest reports that plates have been offered at 1.85c, Pittsburgh base, which is 35c per 100-lb.. below the market. The plate market maximum appears to be 2c on business placed.

Lower prices which are being quoted on buttweld pipe and line pipe and casing are in line with the trend of finished commodities generally. Lapweld business is lifeless through overstocking by the oil fields, and is consequently moving on a highly competitive basis.

In strip steel, demand for hot-rolled supersedes that for cold rolled, auto builders and makers of automobile parts taking most of the tonnage. The cold material has settled to 5c, declining from 5.50c, and hot rolled is quotable at 2.50c to 2.60c, a decline from 2.75c.

Offerings of lapweld pipe in the resale market are interfering to an appreciable extent with the primary market, say producers, who estimate that 100,000 tons are in the hands of oil groups in mid-continent and adjacent fields. This product is now being freely offered at prices well below those quoted by the makers, which is turning business from them.

Tinplate business has been accepted at $6, with stock plate moving at $5.50 to $5.75.

In raw materials, prime Western spelter has sold at 4.25c and consumers look for a record low price of 4c before the upward swing gets under way.

COKE WORKERS' WAGES

Reduction Announced by Two Large Companies —Rainey Operations Curtailed

UNIONTOWN, PA., July 2.—A further reduction of 10 per cent in wages affecting all employees was announced this week, immediately effective, by W. J. Rainey, Inc., and the Washington Coal & Coke Co., two of the largest independent operators in the Connellsville bituminous district. No notices have been posted by the other independents in the region but it is considered likely that the majority will put the reduced scales in effect. No further reduction is expected at this time by the H. C. Frick Coke Co., subsidiary of the United States Steel Corporation.

Rainey operations have been reduced to between 30 and 40 per cent on coke. All ovens at Allison and Vanderbilt were blown out this week and 299 ovens were blown out at Revere. Washington Coal & Coke Co., with operations at Dawson, has 140 ovens in blast making foundry coke almost exclusively. The Washington company has landed a northwest coal order requiring delivery of 40 cars daily for shipment by lakes. This is in addition to a railroad order and other contracts held by the company which boosts its operations to between 60 and 70 per cent.

With the reduction in wages announcement was made by both companies of reduced prices, practically to cost, of commodities in their stores and reduced rents for houses.

All ovens of the H. C. Frick Coke Co. remain out of operation. Coal production of the Frick company is between 30 and 40 per cent.

There are insufficient sales in the region, either on coal or coke, to base accurate prices. Some furnace coke has been sold at below $3 to clear unconsigned lots. Coal has dropped to $1.65.

C. Davis & Co. with offices at 909-912 B. F. Jones Building, Pittsburgh, and a warehouse at West Homestead, Pa., has taken over the business of Davis, McCloy & Co. The latter did a business in pipe for structural and agricultural purposes, including railing, fence, columns and other structural purposes where internal pressure is not required. U. L. Tierney is manager of this division of C. Davis & Co.

Trade and Office Changes

The National Machinery Sales Co., 28 North Des Plaines Street, Chicago, was recently incorporated to engage in the machine tool business. The officers include, James L. Gough, president and treasurer; James Jay Sheridan, secretary; and George D. Benson assistant secretary. Mr. Gough unti. a year ago was president of the Federal Machinery Sales Co., Chicago, a machine tool house which he was largely instrumental in founding in 1915, and which became one of the prominent companies of its kind in the Central West. Mr. Gough has been in the machine tool business for more than 25 years, having become identified with it in his early youth. Prior to his connection with the Federal Machinery Sales Co., he had been sales manager the E. L. Essley Machinery Co., and assistant manager the Marshall & Huschart Machinery Co., both Chicago houses. Mr. Sheridan, secretary, is resident attorney for the National Bank of the Republic, Chicago, and is an ex-president of the Hamilton Club, the Republican Club of the city. Although not a machinery man, strictly speaking, he has a wide acquaintance in the trade, having been for five years vice-president of the Federal Machinery Sales Co. Mr. Benson was formerly connected with the Federal Machinery Sales Co. and has been in the machine tool business about five years.

JAMES L. GOUGH

Harry W. Torney, Torney & Co., recently made president of the reorganized Sharon Pressed Steel Co., 66 Broadway, New York, has taken in hand the refinancing of the concern and states that its former financial difficulties have been satisfactorily adjusted. The company is now in a position to handle production and delivery of car and truck frames up to 1500 per day. Manufacture is now in charge of Arthur W. Swan, general manager, who was formerly chief engineer and works manager of the Crucible Steel Co. A recent addition to the plant is the 4000-ton Mesta press. Lack of work in the surrounding district has enabled it to add to its force a corps of picked, all-American labor.

The Brown Instrument Co., Philadelphia, manufacturer of instruments for indicating and recording temperatures, pressure, speeds, operations, and drafts, has opened a branch office in Cleveland, 201 Reliance Bank Building, 1634 Euclid Avenue. This now makes at total of 11 district offices, located in New York, Pittsburgh, Detroit, Cleveland, Chicago, St. Louis, Denver, Los Angeles, San Francisco, and Montreal.

The Hydraulic Hoist Mfg. Co., Detroit, has moved from 954 East Milwaukee Avenue into larger quarters at 5730 Michigan Avenue, Detroit.

The offices of the Schuylkill Iron Works and the John Wood Mfg. Co., of the Alan Wood Iron & Steel Co., Conshohocken, Pa., will be consolidated on July 1, covering the rolling mill department of the organization. The offices will be maintained at the Schuylkill works, with William A. Cooper continuing in the capacity of manager of rolling mills.

The office of W. A. Jackson, purchasing agent, Walworth Mfg. Co., Boston, wrenches, etc., is now located at 88 Pearl Street, fourth floor.

The Standard Pressed Steel Co., Philadelphia, has moved to Jenkintown, Pa.

On June 1 the Chicago sales offices of the New Departure Mfg. Co. were removed from 2721 South Michigan Avenue to the People's Gas Building, 122 South Michigan Avenue.

Roper, Hurrey & Parks, business and government consultants, Munsey Building, Washington, have retained as their general counsel William L. Frierson, former solicitor general of the United States, and have opened a New York office in the Canadian-Pacific Building, Forty-fourth Street and Madison Avenue. The firm comprises Daniel C. Roper, C. B. Hurrey and Franklin C. Parks.

The Clark-Turner Piston Co., Los Angeles, Cal., manufacturer of Deluxe light weight cast-iron pistons, has appointed the Laystall Motor Engineering Works, Ltd., London, England, distributors of Deluxe pistons in Great Britain and Ireland.

The Progressive Mfg. Co., Torrington, Conn., maker of wire products, will close its factory about July 1 for about one week or ten days for annual inventory and repairs.

The Joseph L. Skelton Engineering Co., 242 Water Street, Toledo, has opened a Detroit office at 1156 Penobscot Building, in charge of H. E. Heilman. This company specializes in municipal and general power plant construction. It also acts as representative for the Ames Iron Works, Otsego, N. Y., Houston, Stanwood & Gamble, Cincinnati, the American Steam Pump Co., Battle Creek, Mich., and several other lines.

The Falk Co., Milwaukee, Wis., has changed its name to the Falk Corporation.

The C. H. Wheeler Co., of Philadelphia, manufacturer of condensers, pumps, etc., has opened a new branch office in Boston; at 53 State Street, room 613.

The Ohio Pipe Bending & Machine Co., Cleveland, is now located at 2010-20 Elm Street, corner of Washington.

The Rock Point Sand Co., 635-639 Wabash Building, Pittsburgh, has established a branch office at Youngstown, Ohio, in charge of C. C. Whiteside, general manager. The company produces silica sands of various kinds for the foundry trade.

The Atlantic Welding Works, welding engineers, will change its name to Atlantic Welded Products Co. and will move into its own building at 1725-27 North Howard Street, Philadelphia, both changes to take effect on or about June 15.

The Sturgis Steel Go-Cart Co., Sturgis, Mich., has changed its name to Sturgis Go-Cart Co. and has increased its capitalization from $650,000 to $3,150,000.

The Master Machine Co., Philadelphia, has filed notice of change of name to the Victor Slicing Machine Co., to manufacture special cutting machines and parts.

The Erickson Pattern & Mfg. Co., Beaver Dam, Wis., has changed its corporate style to Beaver Pattern & Mfg. Co. It manufactures wood and metal patterns, templates and other similar supplies for foundries of all kinds.

The Sheldon Co., 41 Park Row, New York, has been made the exclusive agent in New York territory for the sale of the Houston, Stanwood & Gamble Co.'s new plate press for boiler, tank and stack shop use, or for use in plants doing plate or structural work.

The New York offices of the Jeffrey Mfg. Co., Columbus, Ohio, are now located at 30 Church Street, with Harold B. Wood as district manager.

The Acme Motor Truck Co., Cadillac, Mich., has organized in New York the Acme Motor Truck Corporation, a subsidiary, which will act as direct factory branch. Headquarters are at 647 West Fifty-fifth Street, with assistant sales manager C. A. Ward, Jr., in charge.

The Mueller Metals Co., Port Huron, Mich., is appointing sales representatives in all the larger cities of the country. Hunter & Wilkie, 603 Kerr Building, Detroit, will handle the Mueller products, exclusive of rods and tubing, in Detroit and vicinity, and the Steel Sales Corporation, with offices at 129 South Jefferson Street, Chicago, and 404 Book Building, Detroit, will handle rods and tubing in Detroit, and the complete Mueller line in Illinois, northern Indiana and Michigan territory outside Detroit, and also in Iowa, Missouri and Wisconsin. The Mueller company manufactures red-tip brass rods, blue-tip bronze rods, red-tip brass and copper seamless tubing, sand castings and forgings in brass, bronze and aluminum, die castings and screw machined parts.

The Dayton-Dowd Co., manufacturer of centrifugal pumps, Quincy, Ill., has opened a new district office for the sale of pumping machinery in the Pioneer Building, St. Paul, Minn., in charge of the George M. Kenyon Co. The firm consists of George M. Kenyon, president and general manager; Robert D. Lewis, vice-president, and James C. Willson, vice-president, all of whom are engineers of long standing in St. Paul, well acquainted with the power plant, railroad and municipal field.

The Johnson-Peter Co. has opened an Eastern branch office at Warehouse 34, Bush Terminal, Brooklyn, N. Y., in charge of Edward H. Gill, vice-president. A complete stock of boiler tubes will be carried here, as well as at Pittsburgh. The company has specialized in the sale of this commodity entirely until the Eastern branch was opened. However, it will now handle diversified products, including mechanical tubing, pipe, bars, sheets, tin plate, wire and wire products.

The factory of the Root Co., Bristol, Conn, automatic counters, will be closed from July 2 to July 18.

Machinery Markets and News of the Works

JUNE POOREST MONTH

Some Offices Make No Sale During Entire Period

One Sale of Ten Machines; Another Inquiry for Five Is Pending

June was decidedly the poorest month of the year. In New York there were local sales offices which did not make one sale during the month. In some centers, notably Pittsburgh, new plant construction proceeds at a lively pace, but little interest is manifest in buying the equipment for these new plants.

In the New York district, prospective crane buyers seem in a mood more receptive to give heed to sellers. In the Milwaukee district, there is a certain degree of confidence in future business from railroads and the automotive industries, including the motor truck industry.

Two 10 per cent price reductions are announced in the Middle West: That of the Richards Machine Co., Milwaukee, on drill presses, and that of the United States Electrical Tool Co., Cincinnati, on electric drills.

An eastern Pennsylvania steel company is asking for the following machines for doing work on the New York-New Jersey vehicular tunnel: A 42-in. lathe; two shapers, 16-in. and 32-in.; a 5-ft. radial drill and a 31-in upright drill. The Champion Wrench Co., Chicago, recently purchased about 10 machines.

Neither the Illinois Central nor the Rock Island has taken action on its inquiries.

New York

NEW YORK, July 5.

The pre-holiday week was as dull in the local machine-tool trade as those which preceded. There is very little inquiry and few orders. Several local sales offices of machine-tool companies did not sell a single machine during June, which was the poorest month of the year for the whole trade.

It is generally conceded that purchasers of cranes are to-day in a slightly more receptive mood than for some time past. A fair volume of inquiries is in the market, but the number of sales reported is small. Among current inquiries, upon which bids are being submitted, is one from the Amoskeag Mfg. Co., Manchester, N. H., calling for a 60-ton overhead traveling crane.

Among recent sales are: Industrial Works, a 20-ton, 50-ft. boom locomotive crane with grab bucket to H. F. Curtis, 1270 Broadway, New York; Pawling & Harnischfeger Co., a 10-ton, 71-ft. span overhead traveling crane to the Chapman Derrick & Wrecking Co., 17 Battery Place, New York; Alfred Box & Co., a 2-ton, electric overhead traveling crane to the Williams Harvey Corporation, Brooklyn, N. Y.

The Telescope Cot Bed Co., 535 East Seventy-ninth Street, New York, manufacturer of metal beds, has awarded contract to F. M. Webster, 229 Baker Avenue, Syracuse, N. Y., for a new one-story plant, 70 x 420 ft., at Granville, N. Y., to cost about $100,000. A power house will also be built.

The Remington-Burnelli Aircraft Co., New York, has been incorporated with a capital of $100,000 by G. C. T. Remington, V. J. Burnelli and J. A. Nugent, care of Nugent & Nugent, 280 Madison Avenue, to manufacture airplanes and parts.

The Verne Mfg. Corporation, New York, has been incorporated with a capital of $100,000 by S. T. Paley, S. S. Rand and E. J. Whitlock, to manufacture electrical specialties. It is represented by H. S. Mansfield, 55 Liberty Street.

The Columbia Valley Paper Co., 44 Howard Street, Albany, N. Y., F. B. Oldham, president, is making inquiries for materials and equipment for the construction of a new paper mill at Mellenville, N. Y. Plans for the factory have been completed.

The Koffee Saver Mfg. Co., New York, has been incorporated with a capital of $100,000 by J. T. Pedersen, M. M. and A. M. Sloss, 18 West Eighteenth Street, to manufacture metal coffee urns and kindred products.

The P. & R. Auto Specialty Mfg. Co., Brooklyn, has been incorporated with a capital of $50,000 by B. and L. Robbins, and G. Portmoy, to manufacture automobile equipment. The company is represented by H. O. Falk, 145 West Forty-fifth Street, New York.

The Dodge Building Corporation, an interest of the Dodge Mfg. Co., 21 Murray Street, New York, manufacturer of transmission machinery, has secured a loan of $800,000 for the erection of a new twelve-story building on West Broadway, extending from Park Place to Murray Street. The company will occupy three floors. Plans are being prepared by Shape, Bready & Peterkin, 220 West Forty-second Street, architects.

The Winner Wire Goods Mfg. Co., New York, 349 East 133rd Street, New York, has been organized under state laws by J. and M. Spiegel, to manufacture wire products.

Russell G. Cory, 50 Church Street, New York, consulting engineer, is placing on the market a four-story plant building at New Haven, Conn., approximating 80,000 sq. ft. of manufacturing area.

The New York & Harlem Railroad Co., 1874 Second Avenue, New York, has filed plans for a one and two-story repair and mechanical shop at 2155 Madison Avenue, 38 x 154 ft., to cost about $45,000. Contract for erection has been let to James Stewart & Co., Inc., 30 Church Ctreet.

A one-story power house will be erected in connection with the new plant of the Hires-Turner Glass Co., Thirtieth and Walnut Streets, Philadelphia, on Tivoli Street, Albany, N. Y., miscellaneous construction contracts for which are being awarded. The entire plant will cost about $100,000.

Durant Motors, Inc., 1764 Broadway, New York, will commence the production of its new popular priced automobiles at its new plant at Long Island City about Aug. 1, and it is planned to develop a capacity of about 25,000 cars per year at these works. W. C. Durant is president.

The National Autoparts Corporation, New York, has been incorporated with a capital of $4,000,000 to manufacture automobile parts. It is represented by Arthur W. Britton, 65 Cedar Street.

The International Cement Corporation, Boston, has arranged for the acquisition of the Knickerbocker Portland Cement Co., 30 East Forty-second Street, New York, with plant at Hudson, N. Y., rated at 1,250,000 bbl. of material per annum. About $3,169,000 will be given for the property.

The New York Central Railroad, Grand Central Terminal, New York, will receive bids up to noon, July 12, for bridge parts, steel and material for track scales and bridge repairs, in accordance with plans and specifications on file at the office of W. C. Bower, general purchasing agent.

The New York Electric Installation Co., 147 West Thirty-fifth Street, New York, has leased the four-story factory, 26 x 100 ft., at 71 Eighth Avenue for 21 years, with aggregate rental of $94,500, for the establishment of a new plant.

The Ash'and Contracting Co., Brooklyn, referred to in a recent issue of THE IRON AGE, has arranged for offices at 186 Remsen Street, and from which matters pertaining to its new industrial project at Fulton Street and New York Avenue, Jamaica, L. I., will be handled. The cold storage and refrigerating plant to be erected, in connection with market building, warehouses and light manufacturing plants, will cost about $300,000 with machinery. A power plant will be constructed for central station service. The entire project will cost in excess of $1,250,000. Michael H. Wolpert,

head of Caruci & Wolpert, general contractors, is president of the company; Herman Froeb, treasurer, and A. A. Carucci, secretary.

The Laurant-Kelly Co., East Rutherford, N. J., has been incorporated with a capital of $25,000 by Henry J. Laurant and John J. Kelly, East Rutherford, to manufacture surgical instruments and other precision equipment.

In connection with a new high pressure water system to be installed at Boonton, N. J., bonds for $100,000 for which have been approved, a large pumping plant with high-pressure pumping machinery will be constructed near Sheep Hill. Frederick V. Pitney, 21 South Street, Morristown, N. J., consulting engineer, has been retained to prepare plans and specifications.

The Ajax Battery Co., Buffalo, has been incorporated with a capital of $1,000,000 by O. M. Gallagher, G. N. Culbertson and E. H. Hill, to manufacture electric storage batteries and kindred products. The company is represented by Layton H. Vogel, Ellicott Square.

The Martin Automatic Fishing Reel Co., Mohawk, N. Y., has been incorporated with a capital of $75,000 by C. Maurice, D. Moynihan and A. B. Maury, to manufacture nickeled metal fishing reels and kindred products. J. E. Rafter, Mohawk, represents the company.

The Mayer Coating Machines Co., 205 St. Paul Street, Rochester, N. Y., is about to begin the erection of a factory building and is in the market for material used in construction.

New England

BOSTON, July 5.

The machine tool market for July has started off fairly well, and, while business continues spotty, it has every indication of exceeding that for June. One local house has under negotiation a sale involving approximately $20,000 worth of new and used equipment for one company, and other prospects, bringing the gross value considerably above that figure, which are expected to close this week. Another dealer is figuring on a fairly large list of new production tools issued by a local concern, while other interests report a number of sales pending on one, two and three machines which are expected to close within the next 15 days. In view of the condition of the machine tool market the first six months of 1921, it is of interest to note that one New York corporation recently mailed bonus checks to outlying sales organizations covering equipment delivered in the quarter ended March 31.

The city of Springfield, Mass., has purchased through the E. S. Stacey Supply Co., one 16-in. x 6 ft. and six 13-in. x 5 ft. South Bend lathes. It is intimated the city of Manchester, N. H., will close on its list of school equipment this month, as will also the city of Worcester, Mass. The Worcester list probably will be placed with local manufacturers, athough there is some doubt as to the 10 lathes involved. Bids have been submitted to Washington for two arbor presses, a motor-driven wet tool grinder and a 2 x 24 flat turret lathe for the Boston Navy Yard. The Lowell Electric Light Co. will need machine shop equipment for its proposed new plant, but no list has been compiled.

A majority of other machines sold the past week were used tools. Sales include a large list of production equipment to the Badger Fire Extinguisher Co., Roxbury, which is reported in the market for die castings. A Cambridge, Mass., manufacturer of fasteners has covered on milling and tapping equipment, and another company in that city on four-spindle high speed drilling machines, while a Providence, R. I., firm bought six-spindle high speed drilling machines.

Local machine tool houses were closed from Friday evening, July 1, until Tuesday morning, July 5.

The Montague Machine Co., Millers Falls, Mass., the past week purchased $600 worth of small tools.

Cleveland interests have issued a second price list on drills and reamers showing a further reduction amounting to approximately 5 per cent on some lines.

Inquiries, largely from leather manufacturers and fabric mills, have appeared in this market for twenty gross and larger lots of files, the demand being more active than for many months.

Most of the machine tools sold June 30 at the public auction of the Iverson Piano Player Co., Worcester, equipment brought remarkably good prices. For instance, a Consolidated Press Co. practically new No. 4 open back power press went at $662.50, compared with a factory price of about $675. Bench precision lathes sold at $90 to $130, mostly the top price. A J. E. Snyder & Son 23-in. upright drill, in good condition, sold for $200; a Blair automatic plain surface grinder, $362.50; a No. 6 Perkins open back geared power press, $250; an almost new Flather 14-in. x 6 ft. screw cutting engine lathe, $312.50; a Waltham bench automatic spur gear cotton machine, $262.50; No. 1 Consolidated open back power press, $162.50; No. 2½ open back power press made by the same concern, $200, and a No. 3 open back Consolidated power press, $300.

The Worcester Electric Light Co., Worcester, Mass., will erect a machine shop and storehouse, 60 x 70 ft., at an estimated cost of $20,000.

The New Britain Machine Co., New Britain, Conn., has secured several Government orders, the most recent of which is for 6-in. sights for naval guns representing more than $100,000. It has been working on reduced schedule.

The Maine Central Railroad Co. is taking bids for a one-story roundhouse and one-story, 50 x 220 ft. repair shop to replace those recently destroyed by fire at Calais, Me. The roundhouse will contain eight pits, each 77 ft.

The Dennison Mfg. Co., Framingham, Mass., paper goods, has purchased 233,000 sq. ft. on Maple Street, Marlboro, Mass., on which it plans to erect a factory. The first unit probably will be two stories which will be enlarged as the business requires.

The Waltham Motor Manufacturers, Inc., capitalized for $3,500,000, has been granted a Massachusetts charter to manufacture motor vehicles and parts. The incorporators are Charles H. Metz and Charles H. Wolf, Waltham, and Matthew C. Dittman, Weston. It will take over the Metz plant, Waltham.

The Fowler Co., Worcester, hardware and hardware specialties, recently incorporated under Massachusetts laws, has taken over the business of Henry A. Fowler, 65 Beacon Street, manufacturer of curtain fixtures which it will enlarge and plans to erect new works. Tempest C. Garbutt, Brookline, is president and treasurer. Charles B. Rugg, son of Chief Justice Arthur P. Rugg of the Massachusetts Supreme Court, and Henry L. Green are interested financially in the company.

The Worcester Automatic Sprinkler Co., Worcester, Mass., recently incorporated, has secured manufacturing quarters at 60 Ellsworth Street. It proposes to have its sprinklers made in Baltimore and assembled in Worcester. George F. Nixon, formerly with Stone & Webster, Boston; Frank P. Bergin, at one time superintendent Globe Automatic Sprinkler Co., Philadelphia; Joseph R. Zink, Baltimore; Frank O'Reilly, who has been connected with the General Fire Extinguisher Co., Providence, and Thomas J. McDermott, formerly with the Rockwood Sprinkler Co., Worcester, are interested in the new project. A permanent organization has not been completed as yet.

H. D. Meadows, 100 School Street, Springfield, Mass., president New England Steel Castings Co., Longmeadow, Mass., is said to be planning for the immediate rebuilding of the plant, recently destroyed by fire with loss of about $100,000, including equipment.

The Positive Mfg. Co., Springfield, has been chartered under State laws to manufacture automobile and street signals and other metal products. John A. Hamberg is president, and A. E. Snow, 36 Irvington Street, treasurer.

The Boston & Albany Railroad Co., F. A. Ryer, purchasing agent, Room 237, South Station, Boston, will receive bids up to noon, July 12, for the following material: Complete turntable center, in accordance with specifications for material of roller bearing center for heavy 85 ft. turntable, together with cross and longitudinal girders, rivets, bolts, etc.; cast steel wheel bearings and caps for turntable wheels, one right and one left; 16 bearings, with bolts, nuts, etc.

The David Brown Co., Lawrence, Mass., manufacturer of shuttles, bobbins and other textile machine equipment, has completed plans for a new two-story and basement building, 40 x 100 ft., estimated to cost about $40,000.

E. T. Davis, 398 Bridge Street, Springfield, will commence the immediate erection of a new two-story automobile service and repair works, 73 x 180 ft., at Chestnut and Taylor streets, estimated to cost about $120,000.

The North Shore Machine Co., Lynn, Mass., has been organized under State laws to manufacture machinery and tools. L. A. Porter is president, and Eugene R. Dennett, Cedar Heights, Mass., is treasurer.

The Peerless Mfg. Co., Providence, R. I., has been incorporated with a capital of $300,000, by Theodore Beauregard, Providence; Leon S. Courcy and John B. Pinault, Attleboro, Mass., to manufacture tools and other metal products.

The Boston Ornamental Iron Works, Boston, has filed notice of organization to manufacture iron and steel specialties. Nathan Cohen, 108 Washington Street, North, heads the company.

Chicago

CHICAGO, July 5.

The Illinois Central and the Rock Island have not yet taken action on their inquiries and business from industries continues very light. Buying is confined principally to single tools, although occasionally a group of machines is purchased. The Champion Wrench Co., Chicago, recently closed for three automatic milling machines, two drill presses, a riveting hammer, a cutter tool grinder, and three case hardening and tempering furnaces with complete equipment. The Duplex Printing Press Co. is contemplating the purchase of considerable equipment for its plant at Battle Creek, Mich. The price situation remains substantially unchanged, only two reductions having been reported of late. The Richards Machine Co., Milwaukee, has reduced drill presses ten per cent, and the U. S. Electrical Tool Co., Cincinnati, has marked down electric drills a like percentage.

Albert N. Ruttenberg, 105 North Clark Street, Chicago, has begun the preparation of plans for a one-story garage, 94 x 214 ft., for erection on the West Side at a cost of $30,000.

H. Brands, 11343 Edbrooke Avenue, Chicago, has let contract for a one-story machine shop, 25 x 100 ft., 4532 West Madison Street, to cost $5,000.

The Ruel Lumber Co., 7046 Stoney Island Avenue, Chicago, has been granted a permit to build a one-story garage, 50 x 113 ft., to cost $15,000.

R. W. Olmsted, 171 West Jackson Boulevard, Chicago, has let a contract for a one-story garage, 112 x 165 ft., 704-12 South Wabash Avenue, to cost $48,000.

Holton Steelye & Co., real estate, 140 South Dearborn Street, Chicago, have let contract for a one-story factory, 3419-25 Wentworth Avenue, to cost $12,000.

The Atlantic Brass Works, 1335 West Lake Street, Chicago, has been organized to manufacture brass, bronze and other metal products. Herman W. Grossman heads the company.

The Motor Transport Division of the Army has let a contract for a repair shop, 250 x 1000 ft., Ft. Leavenworth, Kan., to cost $500,000.

A hearing on an application for the sale of the Wahle Foundry & Machine Works, Davenport, Iowa, filed by the guardian of LeRoy L. Wahle, part owner, will be heard in the Scott County District Court on July 5. The Western Pump Co., Davenport, is understood to have offered $39,000 for the property, which it is now renting.

A. J. St. Onge, Saskatoon, Can., plans to locate a factory in River Falls, Minn., for the manufacture of metal products, such as ventilators, cistern and house tanks, and cornices. It will be operated under the name of the Metal Roofing & Cornice Mfg. Co.

The Gem City Foundry, Quincy, Ill., has resumed operations after being idle for six months.

The Agrimotor Mfg. Co., Wichita, Kan., plans to erect a two-story factory to cost $100,000.

The Peelle Co., Brooklyn, N. Y., manufacturer of elevator doors, safety appliances, etc., has let contract for a factory, with 27,000 sq. ft. of floor space to be erected at Richmond, Ind. Some time ago the company acquired a controlling interest in the Richmond Safety Gate Co., which will be operated as the Richmond unit and will manufacture safety gates, exit and entrance doors, and fire door hardware. The old plant of the Richmond Safety Gate Co. has been acquired by the Quaker City Machine Co., manufacturer of ventilating machinery.

The Petroleum Motors Corporation, 220 South State Street, Chicago has completed foundations for the initial buildings of its new plant at Rockford, Ill., and will begin work on the superstructure at once. It will be one and two stories, and in three complete units, estimated to cost about $2,000,000 with machinery. The Holm-Page Co., Rockford, has the erection contract. The Arnold Co., 105 North Monroe Street, Chicago, is engineer. R. C. Cole is general manager.

The Marquette Electric Co., 222 West Austin Avenue, Chicago, has been incorporated with a capital of $200,000 by Harold B. Harvey, Harry I. Kirk and Samuel A. Hohman, to manufacture electrical devices and equipment.

The Domestic Electric Appliance Co., 315 South Jefferson Avenue, Peoria, Ill., has been incorporated with a capital of $50,000 by Milton V. Stagg, R. B. Cherry and E. G. Kuecks, to manufacture electrical appliances and equipment.

Fire, June 18, destroyed a portion of the works of the Curtiss Northwest Aeroplane Co., Minneapolis, Minn., with loss reported at about $70,000.

The St. Clair Foundry Co., Belleville, Ill., has been incorporated with a capital of $100,000 by Richard D. and Frank C. Wiechart, Belleville, to manufacture iron and steel and other metal castings.

The American Process Co., 815 Marquette Building, Chicago, has been incorporated with a capital of $50,000 by Clifford J. Thompson, Taylor E. Brown and David E. Peterson, to manufacture filters and filtering equipment.

Philadelphia

PHILADELPHIA, July 5.

The Bethlehem Steel Co., Bethlehem, Pa., has issued an inquiry for the following machines to be used on work for the New York-New Jersey vehicular tunnel at Jersey City, N. J.: 42-in. lathe, 16-in. shaper, 32-in. shaper, 5-ft. radial drill, 31-in. upright drill.

The J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia, manufacturer of foundry equipment and supplies, has filed plans for two shop buildings at Algon Avenue and Luzerne Street, to cost about $60,000, totaling 118 x 118 ft.

The Smith & Furbush Machine Co., Hancock and Somerset streets, Philadelphia, manufacturer of textile machinery, has awarded contract to Stewart Brothers, 2526 North Orkney Street, for extensions and improvements in its plant.

The Van Dusen & Stokes Co., 1123 Chestnut Street, Philadelphia, manufacturing jeweler, has leased space in the building at 2224 Chestnut Street, to be equipped with precision and other machinery for general manufacture.

The William Cramp & Sons Ship & Engine Building Co., Richmond and Norris streets, Philadelphia, is planning for the early erection of a new one-story automobile service and machine repair works for company trucks and automobiles at Wildey and Fletcher streets, estimated to cost about $32,000.

Fire, June 25, destroyed the automobile service and repair works of Richard J. Hill, 340 East Somerset Street, Philadelphia, with loss reported at about $100,000.

The New York Shipbuilding Corporation, Camden, N. J., has secured a contract for the construction of a 10,000-ton fuel ship for the Japanese Navy, and will commence work on the vessel at an early date.

C. E. Abel, Philadelphia Housing Corporation, Commonwealth Building, Philadelphia, has completed plans for the erection of a new one and two-story automobile service and repair works, 150 x 250 ft., at Fifty-sixth and Walnut streets, to cost about $100,000.

A new power plant will be built by the board of directors, St. James Mercy Hospital, Chester, Pa., in connection with the erection of a new main building.

Machine and mechanical equipment will be installed in the new vocational school to be erected by the Lower Paxton Township School Board at Linglestown, Pa., estimated to cost about $55,000. Frank G. Fahnestock, Jr., Patriot Building, Harrisburg, Pa., architect, is in charge.

Robert M. Hallowell, Inc., Ambler, Pa., has been incorporated with a capital of $100,000 by Robert M. Hallowell and Jefferson H. Thompson, Ambler, and George R. Oglesby, North Wales, Pa., to manufacture agricultural implements.

The Schmick Gear & Screw Co., Williamsport, Pa., care of F. Arthur Rianhard, Masonic Temple Building, architect, has awarded a contract to J. V. Bennett & Co., Williamsport, for a new one-story plant, 40 x 100 ft., at Edwin and Campbell streets.

The Phil-King Sanitary Cooler Co., Pottstown, Pa., has been incorporated with a capital of $100,000 by Jacob E. and J. Roy Kinckiner and Frank A. Phillippi, Pottstown, to manufacture water coolers, filters and other sanitary equipment.

The Lane Signal Accessories Co., Sayre, Pa., has been incorporated with a capital of $500,000 by William H. Lane, Harry S. Fish and Raymond L. Gebhardt, Sayre, to manufacture signal devices and other electrical equipment.

Detroit

DETROIT, July 5.

The Hinkley Motor Corporation, West Fort and Third streets, Detroit, is taking bids for the erection of its new one and two-story plant on Cicotte Avenue, Ecorse, Mich., 250 x 340 ft., to cost in excess of $200,000. Albert Kahn, 1000 Marquette Building is architect; H. M. Butzel is secretary.

The Fredericksen Co., Saginaw, Mich., has been incorporated with a capital of $100,000 by Niels J. Fredericksen,

5740 Lorain Avenue, Detroit; Alexander M. Lemke and Otto Schupp, Saginaw, to manufacture brass, bronze, aluminum and other metal castings.

The Street Railway Department, Detroit, Murphy Building, is completing plans for its new one-story car construction and repair shop, 260 x 370 ft., at St. Jean and Shoemaker streets, and will call for bids at an early date. William O. Markham, 312 Marquette Building, is consulting engineer. Ross Schram is secretary.

The Acme Boiler Works, Inc., Detroit, has been incorporated with a capital of $25,000 by N. G. and Charles L. Simmons, 1405 Nineteenth Street; and Samuel A. Reigel, Highland Park, Mich., to manufacture boilers, tanks, and other sheet and plate products.

The Auto Safety Signal Co., Detroit, has been organized by Joseph Miller and Henry A. Schoenberg, 5043 Allendale Avenue, to manufacture safety signals, lamps, and kindred products.

David Buick, Flint, Mich., founder of the original Buick Motor Co., and associates, have acquired control of the Lorraine Motors Corporation, Grand Rapids, Mich., and will use the plant for the manufacture of a popular-priced automobile. A large portion of operations will be devoted to assembling, and certain parts of the plant will be remodeled. It is understood that the capacity of the local works will be increased. Mr. Buick will be head of the new organization.

The Wyandotte More-Power Truck Co., Wyandotte, Mich., has been incorporated with a capital of $125,000 by Frank Armstrong, 119 State Street, Detroit; William Anderson and W. Allard, Grosse Pointe Village, Mich., to manufacture motor-driven trucks and parts.

Pittsburgh

PITTSBURGH, July 5.

The machine tool situation is disappointing. Plant construction and extensions have not ceased, but when it comes to buying equipment there is a marked tendency to wait. The Crane Co., Chicago, which is putting up a warehouse in this city, for which at least three cranes will be wanted, is going ahead with the building but is not interested yet in placing the cranes. The machine tool business has not been so small in years as it is at present and crane builders are finding it difficult to put orders on their books. The International Nickel Co. has placed an order for two more 15-ton Shaw cranes, making 10 in all for its new plant at Huntington, W. Va. The cranes for the Kelley Island Lime & Transport Co. for its new crusher plant at Marblehead, Ohio, and the crane inquired for sometime ago by the Greenville Steel Car Co., Greenville, Pa., are yet to be placed. Crane prices steadily are working downward and while current quotations are about 10c. per lb. below the average of the war period they still are about 5c. per lb. above pre-war prices. Union City, Pa., opens bids July 6 for an oil-burning pumping engine and air-compressor for deep well pumping, and the West Penn Power Co. is expected to be in the market soon for some power equipment in connection with the addition to its Springdale, Pa., plant. The city of Youngstown, Ohio, recently bought a DeLaval steam turbine-driven waterworks type centrifugal pumping unit, with condenser and auxiliaries. The gear drives for the new plant of the International Nickel Co., Huntington, W. Va., have not yet been placed.

In connection with the extensions to be erected at the plant of the Oliver Iron & Steel Co., Tenth Street, Pittsburgh, estimated to cost about $185,000, and addition to the bolt shop will be constructed, 40 x 80 ft.

The Phelps Can Co., Lawrence Street, Baltimore, is arranging for the early operation of its new plant at Clarksburg, W. Va. It will produce about 450,000 cans per day, and will give employment to over 200 operatives. G. S. Tibbits is manager.

The Standard Sanitary Mfg. Co., Pittsburgh, manufacturer of sanitary ware, has arranged for a stock issue of $1,500,000, the proceeds to be used for general expansion, including plant additions and improvements.

The Parsons Pulp & Lumber Co., Finance Building, Philadelphia, is reported to be planning for the erection of an addition to its pulp mill in the vicinity of Horton, W. Va., to double the present capacity.

The Romisch Mfg. Co., Morgantown, W. Va., has completed plans for a new two-story machine shop, 35 x 150 ft., on Beechurst Avenue, estimated to cost about $25,000. A. Romisch is head.

The Wheeling Bronze Casting Co., Wheeling, W. Va., has been reorganized with a capital of $100,000 to manufacture brass, bronze and other metal castings. It is headed by William J. Braddock, Wheeling, and J. W. Millard, Sr. and Jr., Martins Ferry, Ohio.

The West Virginia & Maryland Power Co., Kingwood, W. Va., has been organized by Col. Carleton C. Pierce, Kingwood, and associates, to carry out a large power project in this section, including the erection of a new electric generating plant and transmission system.

The Ellwood Foundry & Machine Shop recently reorganized with a capitalization of $75,000 now is known as the Ellwood Foundry & Machine Co., Ellwood City, Pa. C. W. Carbeau, formerly with the American Steel Co., Ellwood City, is treasurer. The company contemplates extensions to the pattern and machine shops, necessitating the purchase of additional equipment.

Baltimore

BALTIMORE, July 5.

The Seaboard Steel & Iron Corporation, 905 Lake Drive, Baltimore, has plans under way for the erection of a new one-story building at Paca and West streets, to cost about $25,000. William F. Holl is head.

The Holdtite Rubber Co., 919 Baltimore Street, Baltimore, recently organized to manufacture rubber specialties, has awarded a contract to R. B. Mason, 308 West Madison Street, for the superstructure of its new plant at Warner and Ostend streets, one-story, 50 x 125 ft., estimated to cost close to $30,000. Charles W. Lenden is in charge.

The quartermaster general, United States Army, Washington, is taking bids up to 3 p. m., July 25, for the purchase of two Government plants at Montreal, Que., comprising the works of the Peter Lyall Construction Co., with 24 buildings, totaling 260,350 sq. ft., and the plant of Munition & Machinery, Ltd., at Notre Dame, Seventeenth and Eighteenth streets, with one main three-story building, aggregating 45.000 sq. ft.

The Athens Railway & Electric Co., Athens, Ga., has arranged for a bond issue of $179,000, the proceeds to be used for general operations, improvements, etc.

The E. R. Parker Motor Co., Macon, Ga., is considering the rebuilding of its works, recently destroyed by fire with loss estimated at about $125,000.

Shapers, molders, sanders, jointers, band saws, rip saws and other machine equipment will be installed in the new plant to be erected by the Elkins Furniture Co., Elkins, N. C., to replace its works recently destroyed by fire with loss of about $100,000. Most of the machinery will be operated with individual motor drive. A list of equipment has been prepared. R. L. Hubbard is secretary and treasurer.

The War Department, Washington, will commence the immediate construction of a new automobile service and repair building at Columbia, S. C., for Federal motor trucks and cars. It will approximate about 3400 sq. ft. in floor area.

Plans for the construction of a new electric power plant for mill service are being prepared by the Thomaston Cotton Mills, Thomaston, Ga. R. E. Hightower is president.

The Albemarle Oil & Gas Co., Charlottesville, Va., is planning for the installation of new electrically operated pumping machinery, including self-measuring oil and gas pumps. A local building has been acquired for a new plant. J. B. Belk is manager.

Cleveland

CLEVELAND, July 5.

Sales during the week were in small volume and largely in single machines. The demand is coming mostly from small companies that need one or two tools to manufacture a new product. Some new inquiries for fair sized lots have come out, but as a rule these do not lead to the placing of orders, purchases being delayed until conditions improve. One new inquiry is for 32 machines. A Cleveland machine tool manufacturer has two inquiries for 10 or 12 gear hobbing machines for the automotive industries, one coming from Detroit and the other from Pennsylvania. Several inquiries are pending from Ohio schools for equipment for manual training departments, but in some cases the placing of the orders has been postponed. Sales by local dealers during June were generally lighter than in May, although one dealer reports more business in June than during the previous month. The State of Ohio has purchased several machines for the reformatory at Mansfield.

Price reductions of around 10 per cent have been announced by the U. S. Electric Tool Co., Cincinnati, on its line of tools. The Diamond Machine Co., Providence, R. I.,

has also made reductions on some of its types of grinding machines.

The Gaskill Industrial Furnace & Foundry Co., Cleveland, has been organized to manufacture the Gaskill oil-fired melting furnaces, the company having taken over the business of the Gaskill Furnace Co., Chicago, and moved it to Cleveland. It has been incorporated with a capital stock of $50,000 in preferred stock and 1000 shares of no par common stock and will make stationary, tilting and oscillating types of furnaces. Offices have been established at 402 Engineers Building. The officers have not yet been elected. James A. Gaskill will be the general manager. This design of furnace was described in THE IRON AGE, March 18, 1920.

The Riverside Bridge Works has placed a contract for an extension to its fabricating plant at Martins Ferry, Ohio, that will about double its capacity. The main building and machine shop will be extended and new blacksmith and pattern shops will be erected.

The Master Tool Co., 203 St. Clair Avenue, Cleveland, has been organized to succeed the Federal Engineering & Mfg. Co., and will devote its efforts largely to reclaiming old pneumatic tools. James Nightingale is president; C. F. Overly, vice-president and general manager, and William Eckert, secretary and treasurer.

The E. G. Atkins Co., Mansfield, Ohio, manufacturer of carburetors has increased its capital stock from 1300 to 2000 shares of no par value stock and is planning to increase its output.

The City Ice & Fuel Co., Cleveland, is planning the erection of a new ice manufacturing plant in Lakewood, a suburb. It is expected that the plant will involve an expenditure of $50,000.

A new one-story power house will be constructed by the Orr Felt & Blanket Co., Piqua, Ohio, for general mill service. Pretzinger & Susselman, 1155 Reibold Building, Dayton, Ohio, is architect.

The Lima Sheet Metal Products Co., Lima, Ohio, has awarded a contract to the Lima Construction Co., 215 South Central Avenue, for the erection of a one-story addition to its plant on Charles Street, 120 x 234 ft., estimated to cost about $50,000.

A power plant will be built by the Farmers Sugar Co., Defiance, Ohio, in connection with the erection of its one, two and three-story mill, estimated to cost about $1,000,000 with machinery. The power house will be of steam-operated type. A. H. Smith, 215 Nasby Building, Toledo, Ohio, is architect and engineer. Charles H. Allen is president.

Cincinnati

CINCINNATI, July 5.

Several of the larger manufacturers are contemplating closing down for a short period, as they have sufficient stock to take care of the present demand. While the market generally is dull, a few bright spots appear occasionally. One of these was the booking by a local concern recently of eight milling machines for a Japanese naval arsenal and another manufacturer secured several radial drills from the same source. Local manufacturers report the receipt of reinstatements on a number of machines destined for the automotive industry and the reinstatement of an order for a $10,000 machine with the prospects good for another order for a machine of the same type. Some of the above orders were canceled last fall. Dealers report the market for used machinery as very quiet although occasionally inquiries are received for several tools.

The Norton Iron Works, Ashland, Ky., recently purchased two-10-ton traveling cranes from the Bedford Foundry & Machine Co.

The Boss Service Co., Cincinnati, with a capitalization of $100,000 has been organized for the purpose of conducting a garage and service station at Twelfth and Sycamore streets. William Boss is president of the company.

The National Recording Pump Co., Dayton, Ohio, has been incorporated with a capitalization of $50,000 to manufacture a gasoline pump and oil filler. It has taken over the patents formerly held by the Protecto Pump Co. and is now in operation at Second and Dale streets. William T. Hatmaker is president.

An addition to the plant of the Herring-Hall & Marvin Safe Co., Hamilton, Ohio, has recently been completed at a cost of $75,000. It will be used for assembling purposes and practically all of the equipment has been purchased.

The Quick Change Chuck Mfg. Co., Arcanum, Ohio, manufacturer of the Quickchange chuck, is about to enter the aeroplane field and has signed a contract with the American Aeroplane Co. to manufacture and assemble its planes. Three of the machines are now in process. The company will devote its facilities to the manufacture of plane parts, tools, dies and special machinery. It is their intention in the near future to establish a landing field and erect hangars to house the machines. Fred Cline is president.

Milwaukee

MILWAUKEE, July 5.

A loosening tendency in the demand for machine tools is expected to develop with the passing of mid-year. While the local trade does not expect to see any large volume, nevertheless confidence is expressed in the possibilities of business from railroads, as well as from the automotive industries, which are getting back into a fair production schedule on passenger cars. The motor truck industry also is improving. Agricultural implements, including tractors, remain in a dull condition, with little hope of a revival before fall. Current transactions are light, and in general it may be said that June sales of tools were the smallest of any month this year.

The Bell Mfg. Co., Beaver Dam, Wis., manufacturer of barn equipment and other metal specialties for dairy and farm, has acquired the real estate, machinery and tools of the Helbing-Knaup Mfg. Co. in the same city, which recently went into the hands of a receiver. The Bell company intends to make alterations and rearrange the equipment, as well as to add some new machinery, and will then occupy the former Helbing-Knaup plant.

The Wisconsin Top Co., Inc., Racine, Wis., has been organized with an authorized capital stock of $300,000 to succeed to the business of the McAvoy Mfg. Co., Racine, manufacturer of closed bodies for passenger cars, winter tops, curtains, truck cabs, etc. The ownership and management remain unchanged. The incorporators are C. V. McAvoy, L. M. Johnston and O. M. Kalmeliano.

The Truckmixer Co., Milwaukee, has been incorporated to manufacture concrete mixers and allied machinery, as a development of the Stamp Machine Co., Milwaukee, The capital stock consists of $40,000 of preferred and 250 shares of common stock having no par value. For the present manufacturing operations will be carried on under contract with existing machine shops, but later it is intended to erect new works in Milwaukee. The incorporators are Edward Jacobi, Lorraine Stamp and H. O. Stamp, 3732 Walnut Street, Milwaukee.

The Hartenberger Double Wall Silo Co., Sheboygan, Wis., is completing plans for enlargement of its factory. The capital stock has been increased from $50,000 to $125,000 to finance the work and future increase in production.

The Moloch Co., Kaukauna, Wis., a consolidation of the Kaukauna Machine Works Co. and the Moloch Automatic Stoker Co., Chicago, on July 1 commenced operations in its new foundry and machine shop, erected and equipped at a cost of approximately $200,000. The foundry is 100 x 150 ft., and the machine shop of like dimensions. The principal product is mechanical stokers for boiler plants and the manufacture of Mayer power hammers also will be continued, on an increased scale. The Moloch Co. has unfilled orders which will keep it operating at capacity more than three months.

The village of Webster, Wis., has let contracts for the erection of a new high school, with manual arts department, costing about $90,000 complete. Shop equipment will be purchased within a short time. Paul C. Meyers is clerk of the board of education.

The Lighting Products Corporation, Wauwatosa, Wis., incorporated recently to manufacture electric lighting fixtures, devices, appliances, etc., has made a change of title to Light Products Co., and changed the capitalization to $25,000. Clarence Ullman, J. J. Meyer and W. F. Zack, all of Wauwatosa, are the principals in the enterprise.

Henry Fiege, Bayfield, Wis., who has succeeded Fiege Brothers as owner and manager of the Fiege Garage & Machine Co., will add a full story to the present building and erect a one-story brick addition, 30 x 100 ft., to be equipped as a machine and repair shop. Construction will begin about July 15.

The Fox Ice Co., Racine, Wis,, has purchased a site, 125 x 200 ft., at Sixth and Racine streets and will erect an artificial ice producing plant and warehouse, 80 x 198 ft. The contract for furnishing and installing an ice machine with a capacity of 120 tons a day, and with electric motor drive, has been let to the Vilter Mfg. Co., Milwaukee.

The Wisconsin Textile Mfg. Co., Two Rivers, Wis., manufacturer of wood and metal supplies and specialties for the textile mill industry, will spend about $30,000 in the erection of an addition, 60 x 180 ft., which will include a steam generating plant. Gus. C. Kirst is president.

The Six-Wheel Truck Co. of Wisconsin, organized at

Fox Lake, Wis., with a capital stock of $50,000, to manufacture a new design of motor truck having six wheels, is negotiating for a permanent location of works and offices in Portage, Wis. H. E. Plumner, Portage, Wis., is handling negotiations.

The Great Northern Pail Co., Gillett, Wis., will erect a two-story addition, 36 x 93 ft., of brick and concrete, to accommodate a new department being established for the manufacture of veneer shipping cases in addition to the present line of candy pails and similar stade containers. Veneer cutting, electric motor and other equipment is now being purchased.

The A. H. Peterson Mfg. Co., 1614 Fratney Street, Milwaukee, established four years ago for the production of special tools and dies, is discontinuing this line to concentrate upon the manufacture of portable electric drills and other automotive appliances and devices. The entire plant is being re-arranged and considerable new machinery and equipment is being purchased. Some of the present equipment will be exchanged or rebuilt. The company is continuing production on a partial basis for 60 days while the works are changed over for the new line. A force of 200 will them be employed. Arno H. Peterson is president-treasurer and general manager.

The Central South

ST. LOUIS, July 2.

The Duplex Tire & Rubber Co., 322 Frisco Building, Joplin, Mo., will take bids at an early date for its proposed new three-story plant, 100 x 300 ft., and estimated to cost about $175,000 with machinery. R. W. Crissey is manager.

The Tennessee Charcoal Iron Co., Collinwood, Tenn., is planning for the installation of a new ice-manufacturing and refrigerating plant at its local properties.

Crushing, grinding and other mechanical equipment will be installed at the proposed new line manufacturing plant to be constructed by the Robinson Lime Co., Anderson, Tenn., recently organized with a capital of $250,000. The plant will have an initial capacity of about 50 tons per day. A. J. Robinson is president; and M. H. Bates, treasurer.

The Common Council, Independence, Mo., has approved a bond issue of $35,000 for the installation of a municipal electric power plant. Plans will be prepared at once.

Fire, June 26, destroyed the plant of the Curtis-Bentley Woodworking Co., Oklahoma City, Okla., comprising a three-story brick structure, with power house. The loss is estimated at about $500,000, including machinery. It is planned to rebuild.

The Porter-Holtkamp Motor Corporation, Richmond Heights, Mo., has plans under way for a new two-story machine and service works, 40 x 60 ft., on Sunset Avenue. George C. Porter is president.

The Brown-Harrison Welding Co., 1500 East Sixth Street, Little Rock, Ark., will install new welding equipment.

The Willis-Smiley Production & Refining Co., Springfield, Mo., recently organized with a capital of $250,000, will operate a local oil refinery. William E. Willis is president and general manager.

The Brookhaven Lumber & Mfg. Co., Hattiesburg, Miss., is planning to rebuild its plant, recently destroyed by fire. It will include planing mill, 80 x 120 ft., roughing department, 100 x 200 ft., dressing department, 100 x 200 ft., and other structures. Equipment will be aranged for individual motor drive. The new plant is estimated to cost in excess of $175,000. W. J. Dreyfus is manager.

The Gulf States

BIRMINGHAM, July 2.

The Alabama Power Co., Birmingham, has been granted permission to build its proposed hydroelectric generating plant at Duncan's Riffle on the Coosa River, near Verbena, estimated to cost about $7,000,000. It will have an ultimate generating capacity of 120,000-hp., with initial installation to total 60,000-hp. Work will begin at once and it is said that 24 months will be required to complete the project. About 6 miles of railroad line will be constructed to reach the site. Thomas W. Martin is president.

Freight handling and conveying machinery will be installed on the new wharf and dock to be constructed by the City Council, Orange, Tex. Bonds for $250,000 for the construction have been voted.

F. W. Crane, Austin, Tex., manufacturer of automobile tops, has plans under way for the erection of an addition to its plant.

The F. Streigler Mfg. Co., Fort McKavett, Tex., has been incorporated with a capital of $100,000 by Fritz Streigler, Fort McKavett; M. Whitely and A. O. Streigler, Eden, Tex., to manufacture automatic valves and kindred mechanical equipment.

The Department of Public Utilities, St. Petersburg, Fla., has plans under way for the installation of a new electric generating unit and other equipment at the municipal lighting plant, to increase the capacity of 7000 kw. R. E. Ludwig is director of the department.

Fire, June 22, destroyed the plant of the Henderson Cotton Oil Co., Shreveport, La., with loss estimated at about $300,000, including machinery. It will be rebuilt.

The Cobb Motor Co., Gadsden, Ala., will install a complete mechanical and machine department on the second floor of its building, for construction and repair work. J. J. Cobb is head.

A. A. Miller, Chattanooga, Tenn., is planning for the erection of an addition to the former municipal light and power plant at Fort Payne, Ala., recently acquired. New machinery will be installed and the capacity increased.

The United States Gypsum Co., 205 West Monroe Street, Chicago, is perfecting plans for the construction of its proposed new manufacturing plant in the vicinity of Sweetwater, Tex., estimated to cost close to $1,000,000, including machinery.

Oil-loading and bunkering machinery, and kindred mechanical equipment will be installed on the new local dock to be erected at Morgan's Point, near Houston, Tex., by the Humble Oil & Refining Co., Houston. It will be 20 x 100 ft.

California

LOS ANGELES, June 28.

The Leach-Biltwell Motor Co., 4800 Santa Fe Avenue, Los Angeles, manufacturer of automobiles and parts, has plans under way for extensions and improvements to cost about $25,000. New machinery will be installed, including foundry apparatus.

The American Auto Signal Co., Inc., Los Angeles, has been incorporated with a capital of $200,000 by E. W. McKinley, Arthur Dietz and W. E. Coffman, 5909 South San Pedro Street, to manufacture automobile signals and devices, and other kindred products.

The Republic Steel Package Co., 7930 Jones Road, Cleveland, has acquired property at Los Angeles for a new plant to handle Pacific Coast trade. The initial unit will be one-story, 60 x 300 ft., and will give employment to about 100. It is expected to break ground at an early date. S. B. Merry is treasurer.

The Clark-Turner Piston Co., Los Angeles, has been incorporated with a capital of $100,000 by Edward W. Clark, S. S. Turner and Fred C. Calloway, to manufacture pistons, piston rings and other motor equipment. It is now operating a plant on South Los Angeles Street, and has general expansion plans under way, including the erection of new buildings on South Utah Street.

The Southern California Edison Co., Los Angeles, is perfecting plans for the initial work in connection with the erection of a number of hydroelectric power plants on the Colorado River. The entire project will require a number of years to complete, and will include at least five large generating stations, with total cost in excess of $100,000,000.

Plans of New Companies

The Cook & Willoughby Co., 4465 Second Boulevard at Prentis, Detroit, is a manufacturers' agent and controls for the State of Michigan the French Houdaille shock absorbers. It is open for one or two more high grade accounts.

The Multiple Storage Battery Corporation, 350 Madison Avenue, New York, recently incorporated with an authorized capital of $1,000,000, has acquired the business of the Multiple Storage Battery Co., and is building a large addition to its plant at Jamaica, Long Island. The work is in the hands of Consulting Engineer Harvey E. Mole, 55 Liberty Street, and the building contract is being carried out by John Lowry, Jr., 171 Madison Avenue, New York. Herbert G. Clopper, formerly of the New Jersey Zinc Co., and more recently vice-president of the Eagle-Picher Lead Co., has been elected president and treasurer. Norman D. Sturges remains as vice-president and general manager and Jasper Bayne as secretary. The board of directors has been increased to include Howard Bayne and L. N. DeVausney.

Manufacturers' Japanning & Enameling Co., 548-50-52 Rising Sun Avenue, Philadelphia, recently incorporated, does not expect to build at the present time and is not in the market for equipment. It plans to conduct the business along the lines of its predecessor, G. W. Parvis, Jr., who assumes the presidency of the new corporation.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	3.13c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	3.13c.
Hoops, base price	4.15c. to 4.18c.
Bands, base price	3.78c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.23c.
Channels, angles and tees under 3 in. x ¼ in., base	3.23c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	3.13c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.33c.
Toe calk, ½ x ⅜ in. and larger	3.75c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.50c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.23c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.88c.
No. 12	3.93c.
No. 14	3.98c.
No. 16	4.09c.

Box Annealed—Black

	Soft Steel C.R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.55c. to 4.95c.	.....
Nos. 22 and 24	4.60c. to 5.00c.	5.60c.
No. 26	4.65c. to 5.05c.	5.65c.
No. 28	4.75c. to 5.15c.	5.75c.
No. 30	5.00c. to 5.40c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.50c. to 4.75c.
No. 16	4.75c. to 5.00c.
Nos. 18 and 20	4.90c. to 5.15c.
Nos. 22 and 24	5.05c. to 5.30c.
No. 26	5.20c. to 5.45c.
No. 27	5.35c. to 5.60c.
No. 28	5.50c. to 5.75c.
No. 30	6.00c. to 6.25c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—46	—30	¾ in Butt....	—18	List
¾ in. Butt...	—52	—37	1-1½ in. Butt.	—20	— 2
1-3 in. Butt..	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap.	—49	—35	2½-6 in Lap..	—18	— 2
7-12 in. Lap..	—40	—24	7-12 in. Lap..	— 7	+10

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE	
High brass sheet	16 c. to 19¼c.
High brass wire	17¼c. to 21¾c.
Brass rod	15 c. to 20¾c.
Brass tube, brazed	29½c. to 31½c.
Brass tube seamless	19½c. to 20½c.
Copper tube, seamless	22½c. to 23¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 22c. to 24c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$7.30	$7.05
		90 lb....	7.40	7.15
		100 lb....	7.50	7.25
IC..	$11.10	$10.00	IC...	7.70	7.45
IX..	12.30	11.25	IX...	8.60	8.35
IXX..	14.10	12.75	IXX...	9.60	9.35
IXXX..	16.10	14.75	IXXX...	11.00	10.75
IXXXX..	17.70	16.50	IXXXX...	12.00	11.75

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$8.00
IC	8.25
IX	8.50
Fire door stock	11.50

Tin

Straits pig	32c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	24¼c.
No. 1 solder	21½c.
Refined solder	18½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 30c. to 33c.

Old Metals

The market continues quiet and transactions are scarce. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	8.00
Brass, heavy	5.00
Brass, light	4.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.75
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

New York, July 14, 1921

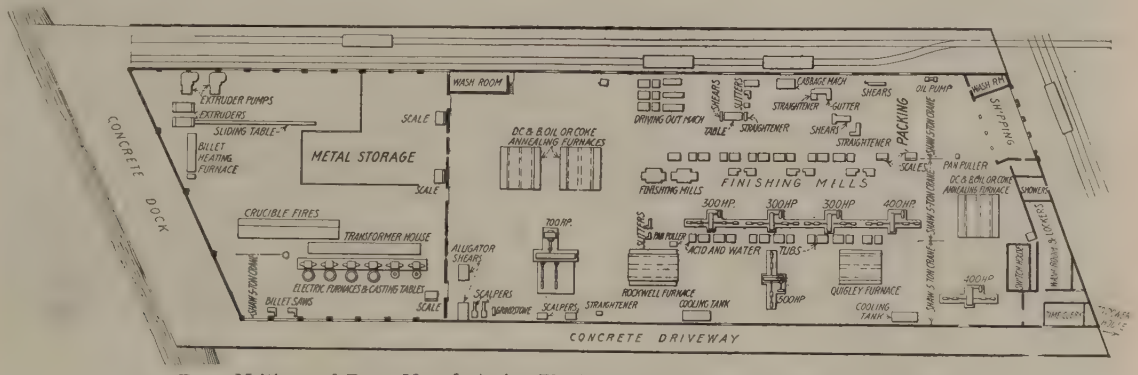
ESTABLISHED 1855 VOL. 108: No. 2.

Direct Routing in a Modern Brass Plant

Electricity Used Almost Exclusively for Melting in Detroit Copper and Brass Rolling Mills—Hand Labor Reduced to a Minimum

BY F. L. PRENTISS*

TWO new plant units recently have been placed in operation by the Detroit Copper & Brass Rolling Mills, Detroit, equipped according to the latest developments in processes and practices in the brass melting and manufacturing industry and arranged for economical production by the conservation of manual labor, use of handling equipment, and the direct routing of material in the process of manufacturing. A predominating feature is that electricity is used almost exclusively for the melting of brass. Pouring pits are virtually eliminated, thus economizing in labor. All mills shop through an alcove to the brass manufacturing department. After passing through break-down rolls, annealing furnaces, scalping machines, run-down rolls, other annealing furnaces and a second set of run-down rolls, the material goes through another annealing furnace at the end of the building, at right angles with the length of the building. Therefore the brass or copper charged into the furnace in the first bay is delivered from the opposite end of the annealing furnace into the second or middle bay, where all the finishing operations are performed. Two of the other annealing fur-



Brass Melting and Brass Manufacturing Plants Occupy Adjoining Connected Buildings

and other manufacturing equipment are motor-driven.

The plant extensions include a melting shop and brass manufacturing plant occupying adjoining connected buildings with a brick wall between. The casting shop supplies metal for the entire works in the form of flat slabs, known as bars, for the brass department, and billets for rods, seamless tube and wire. Its daily capacity is 180,000 to 200,000 lb. The operations in the plant have shown that a much more uniform mixture is secured by the use of the electric furnaces and that the production costs have been reduced considerably as compared with the use of pit furnaces.

The brass manufacturing department is designed for large production of light, thin gage sheets, about one-half of the product being in 30 gage and lighter down to 0.001 in., and the remainder in heavier than 30 gage. In widths, the sheets are made up to 12 in.

Material has a direct routing from the casting naces are similarly transversely arranged for convenience in routing the material from the finishing rolls to the adjoining bay for the operations that follow rolling.

The sheets pass back down the center bay in the opposite direction from which the material was routed in the first bay, the various rolling operations being performed en route. Then they pass directly over to the third bay for the operations following rolling, provided they are in the heavier gages. The lighter gages are given the necessary passes for further reductions through additional rolls on the opposite side of the center bay before going to the final finishing department.

Each bay is equipped with a 5-ton Shaw electric traveling crane, used for supplying the mills with metal. Trucks carry the metal from the rolls to the annealing furnaces. Similar cranes are provided in the casting shop for charging the furnaces, handling the bars and billets and for other service.

The casting shop is 199 ft. long and the brass manufacturing department, 474 ft. long. Both are

*Cleveland editor THE IRON AGE.

183 ft. wide, of steel and reinforced concrete, with practically continuous glass sides set in Fenestra steel sash. The casting house has two monitors, the side walls being 32 ft. high and the top being 45 ft. from the floor. The monitor sash are stationary, ventilation being provided through sixty-four 48-in. Swartwout ventilators in two rows, staggered. Continuous rolling steel doors are on each side of the building. Both buildings have wood block floors except in front of the furnaces. The roofs are of gypsum tile.

The casting shop extends over the Detroit River, the building site having been filled in for 150 ft. out to the harbor line, and a concrete dock extends along the water. It is the intention eventually to bring refined copper by boat from the head of the lakes direct to the plant. Two railroad tracks extend along the west side of the two buildings.

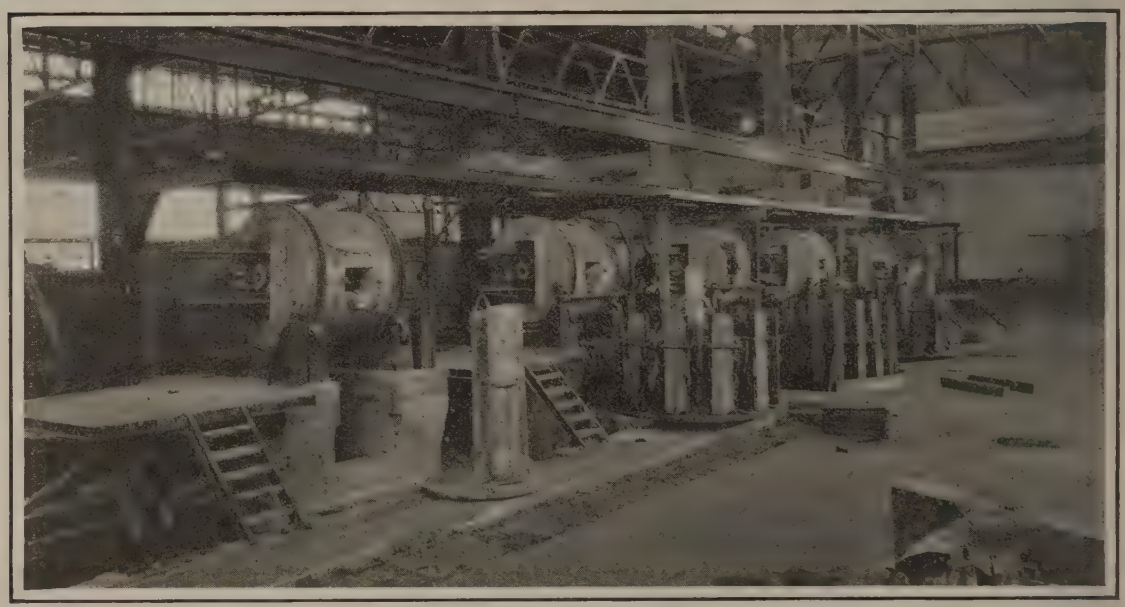
The brass manufacturing plant is of sawtooth construction, but differs in design from the usual building of this type. Instead of having equal column spacing in each direction, the distance between columns across the building is 60 ft. and the column spacing lengthwise is 20 ft. In place of the usual steel roof trusses, supported on the girders and columns, this building has sloping I-beam purlins, supported on lateral trusses and cantilevering over the trusses at the top, a distance of 2 ft. 4 in., to bring the sash out far enough from the truss to allow the ventilating sash in the sawtooth roof to swing in the center instead of at the top, as in the usual arrangement. The sash swings 120 deg., affording much better ventilation than a top-hung sash.

The casting shop is equipped with six 300 kw. melting furnaces of 2000 lb. capacity and two additional furnaces will be installed. One spare furnace drum is provided. The furnaces are of the rocking type, built by the Detroit Electric Furnace Co. They are in a row in the east bay and stand on 3½-ft. pedestals. The furnaces are fed from a charging floor that extends over the furnaces 2 ft. above the furnace tops and about 12 ft. above the floor of the casting shop. Above each furnace is a 14 x 22-in. hole in the charging floor, through which a funnel reaching down into the furnace is placed when charging.

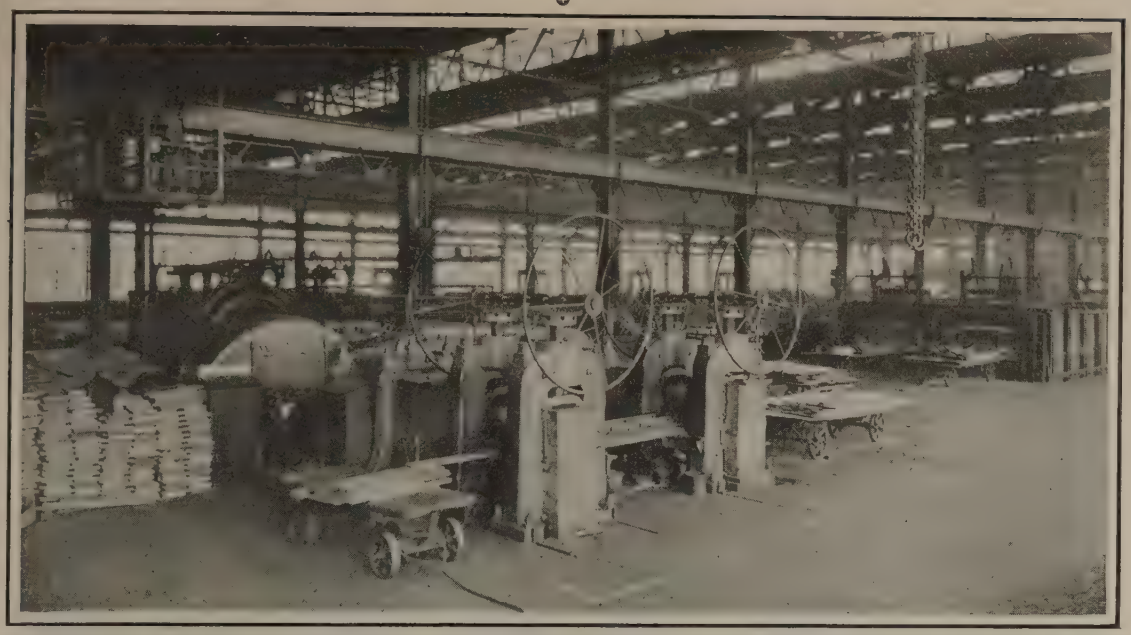
The charge of refined copper, spelter and scrap, and sometimes a little lead, is made up in the stock room in a portion of the two adjoining bays back of the melting furnace. A standard size of charging box is used, holding 2100 lb., the usual charge. This is placed on an electric truck which carries it to the furnace bay after being weighed. An electric traveling crane picks up the charging box and delivers it to the charging floor.

One of the interesting features of the casting shop is a specially designed turntable in front of each furnace on which the flat metal molds for casting brass sheet bars are carried. This turntable is approximately 10 ft. in diameter, and consists of a cast iron base, a section of pipe in the center forming the axis for revolving, and angle iron structural members which support the molds. The molds are of cast iron and consist of two parts hinged together, a stationary part being clamped to the frame of the turntable and the front part swinging on hinges. Before pouring, the two sections of the molds are clamped together at the top, bottom and center by three bands and wedges, the wedges being driven between the bands and the front of the molds, holding the two parts together firmly. Then a pouring box is placed over the top of the mold. The turntable revolves on ball bearings that support a sub-base 40 in. in diameter in which the turntable rests. The turntable is held in position by a cone cast to the sub-base into which the pipe axis of the turntable fits. At the top of this pipe is a hook for handling the turntable with the crane.

Turntables are provided in different heights to hold molds of different sizes, and little time is required in changing the table, should it be desired to pour molds of a different size. There is a mold capacity on the turntable for 2500 lb., but usually 20 molds are used for flat metal, these being sufficient for pouring one heat. The metal is poured directly from the furnace spout into a mold and then the turntable is moved until the next mold comes in line with the pouring spout. The turntable revolves so easily on the ball bearings that



Brass Is Melted in Electric Furnaces of the Oscillating Type and Poured Directly into Molds Set on Turntables. A standard sub-base is provided so that another table can be substituted if a change in the size of molds is required. A charging platform extends over the furnaces, the charging boxes being deposited on this platform by means of a traveling crane



The Break-down Rolls Are Arranged Tandem, the Bar Passing from One Side of the Rolls into the Second Rolls. The tandem rolls save considerable labor in handling the bars

one man can turn it. Turntables of similar design are used for handling billet molds, but as these are much larger, one turntable carries only three billet molds. The billets used for making rods and wire are cast 6 in. in diameter in 72 in. lengths, weighing approximately 750 lb. However, brass billets weighing as much as 5000 lb. have been cast in the plant. The billets are sawed into three 24-in. sections. A Newton cold saw cuts the billets and removes the gates.

In the center bay are 32 coke-fired, pit type, crucible furnaces, consisting of four floors with 8 furnaces to a floor. Adjoining these is a concrete pit for pouring the molds. The pit furnaces are used only as spare equipment for melting small quantities or special heats. Jib cranes handle the crucibles while pouring.

At the lower end of the center bay is a Marcy mill and three Wilfley tables for recovering brass and copper from the ashes of the pit furnaces and from the sweepings around the mills. These sweepings are dumped into a pit from which an elevator raises them to the mill. In this, the material is rotated in a barrel containing steel balls and crushed, separating the metal and ash. A stream of water washes the small pieces out through openings in the barrel to an oscillating separating, or washing table, over which water flows. The metal moves lengthwise over the table and is deposited in a trough, and the lighter matter, known as tailings, passes over one side of the table.

The scrap, or washings, from the table is passed through a magnetic separator and then sent back to the electric furnaces for re-melting. The fine material, or tailings, separated in the washing process, is sold to smelters. The reclaiming equipment was

For Removing Scale and the Rough Surface of Bars Up to 10½ In. Wide, Specially Designed Milling Machines Are Used. Two of these machines are shown at the right, and a straightening machine at the left

put in particularly for use with the pit furnaces, but with the departure from the original plan which has resulted in the almost exclusive use of the electric instead of pit furnaces, it is expected that there will not be much need for the mill and washing equipment. Experiments are now being conducted on the recovery of copper from the scale by the electrolytic process, which will be continued if it is found profitable.

The extrusion process will be used in the manufacture of rods from billets and two extrusion presses are now being installed in the cast shop. These are 2000-ton presses, built by the Southwark Foundry & Machine Co.

The brass manufacturing plant is equipped with 24 stands of rolls, located along the inner side of the east bay and on each side of the center bay, those in the center bay being finishing rolls. The first set is a tandem pair of 22-in. break-down rolls. The bar passes from the first set of rolls on to a guide and the roller pushes it along on the guide into the second set. Tandem rolls eliminate one trucking operation and the labor of two men is saved, as compared with the use of two separate single stands. Only four men are required to handle the bars through the tandem stands.

The bars, on entering the brass rolling department from the casting shop through an alcove, go to two motor-driven alligator shears where the gates are cut off and additional metal is removed, should the ends of the bars not be solid metal, and then go to the break-down rolls, each set reducing the thickness of the bars approximately 25 per cent.

After the two passes in the break-down rolls the bars are annealed in double-end annealing furnaces. There are 10 of these furnaces set in pairs, of the same size and generally similar in construction. They are of the under-fired type with chambers, 7 x 28 ft. The furnaces are oil-fired but they are so arranged that coal or coke can be substituted. The metal is charged into the annealing furnaces on long steel plates, or pans, placed on trucks that bring the pans to a level with the furnace floor. The pans are coupled and are pulled through the furnace with a winch, one charge being drawn in while the other is drawn out. The furnaces are Quigley and Rockwell makes and some designed in the plant.

After the first annealing the bars go to the opposite side of the bay where they are straightened on a five-roll straightening machine. Then the scale and rough surface are removed. Scalping machines, built by the Waterbury-Farrel Foundry & Machine Co., are used for the widest bars, but for widths up to 10½ in. a milling machine, built by the Torrington Co., is employed for scalping. This machine has a cutter 12 in. wide, similar to a milling cutter, and a capacity of milling both sides of 600 to 800 bars per day. After scalping, the bar is given another pass through each of the tandem break-down rolls, and on leaving the second set of rolls is coiled on a coiler attached to the mill stand.

All of the larger rolling units, after the break-down rolls, consist of two sets of rolls with a single drive. After the second pass through the break-down rolls, the next rolling operation is through 20-in. run-out rolls, and from there to another pair of annealing furnaces. Much of the metal is pickled after annealing by placing the brass on a truck and putting the truck and its load in a large pickling tank with an overhead crane.

After the 20-in. run-out rolls, the bar passes through a set of 18-in. run-out rolls. There are two sets of 18-in. rolls, one a finishing set having rolls 30 in. in width. The finishing rolls include six 16-in. rolls, arranged in pairs, and 10 smaller sets, six with 9-in. rolls and four with 10-in. rolls, both 16 in. in width. A separate drive is provided for each of the smaller finishing rolls.

The Finishing Mill Department in the Center Bay Has 18 Stands of Rolls, All Parallel. One of the annealing furnaces appears at the left

All of the rolls except the break-down rolls and the first run-out set are located in a line parallel to the length of the building. Unless sheets are to be rolled in very light gages the material, after passing through the larger finishing mills on the east side of the center bay, goes directly across to the west bay for the finishing operations that follow rolling. Some of the finishing rolls are so arranged that, if it is desired, the metal is given a pass through one set of rolls and back through the rolls of the adjoining mill that are running in the opposite direction. The mills were built by the Mesta Machine Co., Waterbury-Farrel Foundry & Machine Co., and the A. Garrison Foundry Co.

An interesting feature of the mill equipment is that the coilers are so designed that the motor that drives the coiler is attached to the bottom of the coiler table, and swings with the coiler to which it is directly geared, thus eliminating all belting. The motors for the coilers have push-button controls.

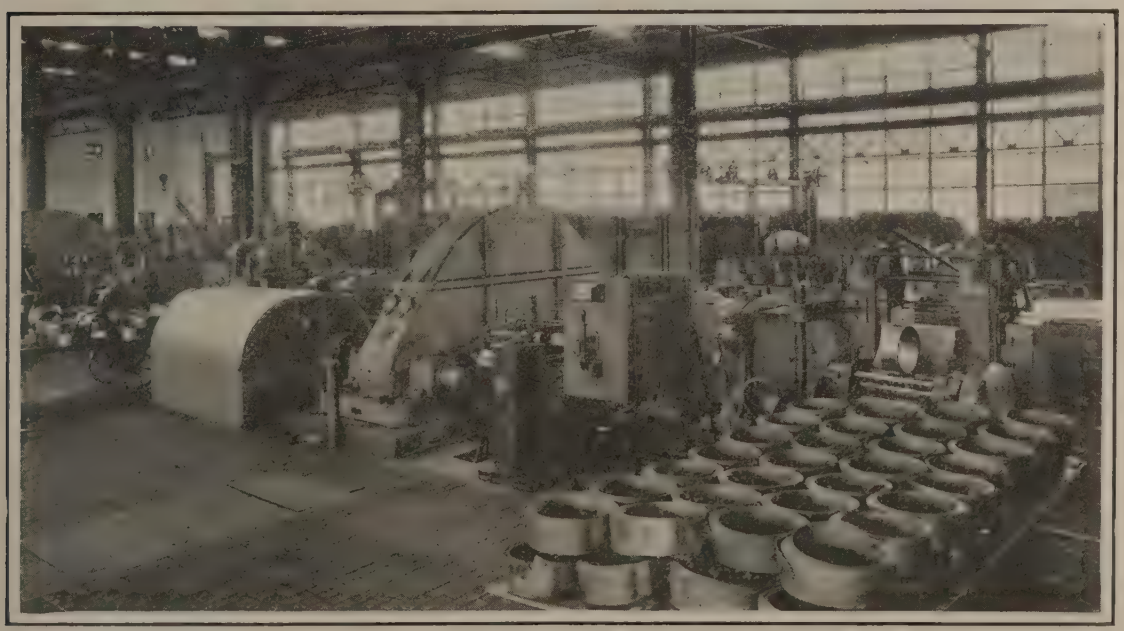
In the west bay are drying-out, shearing, slitting and straightening machines, and the packing and shipping department.

The Motor That Drives the Coiler Is Attached to the Bottom of the Coiler Table, with Which It Swings. Electric hoists run on the lower flange of the crane runway and serve pickling tables between the bays

Both rolls of the tandem break-down mill have an 800 hp. herringbone type of drive, furnished by the Mesta Machine Co. The speed of the first break-down roll is 19 r.p.m. and that of the second break-down roll 24 r.p.m. The drive is from a 750 hp. Allis-Chalmers motor. The other mills have the Falk drive and General Electric phase-wound induction motors. The 20-in. run-out mill is driven by a 500 hp. motor with a speed reduction from 435 to 29 r.p.m. The 18-in. run-out rolls are driven by a 400 hp. motor with a speed reduction from 450 to 39 r.p.m. The 18-in. finishing mill, with rolls 30 in. wide, is driven by a 400 hp. motor with a speed reduction from 450 to 39 r.p.m. For driving the six sets of 16-in. finishing rolls there are three 300 hp. motors with a speed reduction from 600 to 48 r.p.m. The smaller 9-in. and 10-in. finishing rolls have double reduction drives and are driven by 50 and 75 hp. motors at a speed reduction of from 1200 to approximately 75 r.p.m.

Electric current is received from a commercial station at 4600 volts and is stepped down to 440 volts for the rolling mill equipment, and to 110 volts for the electric furnaces. For emergency purposes current is also supplied at 440 volts from the power station. For the melting furnaces the current is stepped down at each furnace. A brick transformer house extends along the back of the melting furnaces. The mill motors up to 500 hp. are handled with relatively small drum control with only one lever. The controller rooms will be totally inclosed with a drum controller located in alcoves, connected to these rooms.

Uniform artificial illumination is provided in the brass manufacturing department with 500 watt Mazda lamps furnishing an intensity of 5 or 6 ft.



The Finishing Mill Has an Efficient Arrangement of Rolls, Drive, Control, Etc.

candles at the working plane. Most of the pickling tanks are between the columns and convenient to the adjoining finishing roll, a tank serving each set of rolls. Each of these tanks is served by an electric hoist that has as its runway the lower flange of the traveling crane runway, making a convenient and economical arrangement. Oil is stored in a 100,000-gallon concrete oil-proof tank located in the basement, from which it is pumped underground to the furnaces.

Well equipped physical and chemical laboratories and physical testing rooms are on the second floor at the front of the building. The physical testing room has equipment for testing temper, hardness and tensile strength. A sample of every heat when poured is taken for the laboratory.

A labor-saving method has been adopted for the delivery of sheet brass to Detroit consumers. The coils of brass are placed in a shipping box 3 ft. wide, 5 ft. long and 12 in. deep, having a capacity of 3600 lb. This is constructed of wood, with corners bound with angles and with steel straps and lugs at each end for handling with a crane. The material is delivered in the box and the empty boxes are brought back when the next delivery is made to the same plant.

The Detroit Copper & Brass Rolling Mills established a small plant in 1881 which has been extended from time to time and is one of the largest plants in this industry. Its products include brass and copper sheets and rods, seamless and brazed tubes and copper wire and various bronze products. It is stated that the plant is equipped to roll larger brass plates than are made in any other American plant and that during the war 80 per cent of the condensor plates for the Navy and Emergency Fleet Corporation were produced in these works. The plant has made brass plates up to 11 ft. 6 in. in diameter and 1 in. in thickness.

The new casting shop and brass manufacturing plant were designed by Smith, Hinchman & Grylls, engineers, Detroit.

POWER IN SUPERPOWER ZONE

Census Bureau Summary of Industrial Power and Fuel Consumption

WASHINGTON, July 9.—Power equipment and fuel consumption of plants in the superpower zone are shown by a statement prepared by the Census Bureau, in collaboration with the Superpower Survey of the United States Geological Survey. The superpower project contemplates the development of available water powers to supplement and equalize the power requirements of public service, manufacturing and other enterprises, and effect economies in fuel consumption.

The superpower zone embraces the North Atlantic area from Maryland to New Hampshire and includes all of Connecticut, Massachusetts, Rhode Island, New Jersey, and the District of Columbia; the southern portions of New Hampshire and Vermont, Kent and New Castle counties in Delaware; the central counties in Maryland; the eastern portion of Pennsylvania and the southeastern portion of New York.

Power and fuel statistics for the manufacturing establishments and mines and quarries in this area are given in the statement. The figures are based upon returns from 95,984 establishments. Of these 76,227, or 79.4 per cent, used power, the same including 73,694 manufacturers, 1563 laundries, 939 mines and quarries and 31 governmental institutions. The net total is 9,069,471 hp. of rated power equipment, primary and purchased, of which 5,336,627 hp., or 58.8 per cent, is represented as utilized, by electric motor equipment.

	Establishments Using Power	Horsepower Used, 1919			Fuel Used, 1919	
		Total	Prime Movers	Purchased Energy	Anthracite*	Coke and Bituminous†
Total	76,227	9,069,471	6,247,002	2,822,469	20,909,865	§40,330,352
Iron and steel	6,362	1,745,755	1,175,504	570,251	1,311,943	10,224,543
Metals, non-ferrous	3,423	405,249	245,774	159,475	883,861	1,545,733
Railroad repair shops	316	119,906	68,549	51,357	435,866	835,468
Vehicles	3,862	95,380	28,222	67,158	107,669	233,864
Mines and quarries	939	1,010,757	857,273	153,484	8,598,467	266,118
Above five classes	14,902	3,377,047	2,375,322	1,001,725	11,337,806	13,110,726
Per cent of total	19.5	37.2	38.0	35.5	54.2	32.5

*Tons of 2240 lb. †Tons of 2000 lb. §34,669,324 tons of bituminous coal and 5,661,028 tons of coke.

Power equipment	Units	Horsepower	Average Horsepower
Aggregate	....	9,069,471	...
Prime movers	....	6,247,002	...
Steam engines	33,379	4,255,868	127.5
Steam turbines	2,115	1,171,061	553.7
Internal combustion engines	6,246	279,040	44.7
Water wheels	4,708	541,033	114.9
Operated by purchased energy	....	2,822,469	...
Electric motors	361,961	2,770,715	7.66
Other (mainly shaft power and compressed air)	....	51,754	...
Electric motors, total	560,907	5,336,627	9.53
Run by current generated in establishment	198,946	2,565,912	12.90
Run by purchased current	361,961	2,770,715	7.66

Canadian Steel Industry

TORONTO, ONT., July 9.—Stopping in Toronto for a day or two on his way to New York, Roy M. Wolvin, president British Empire Steel Corporation, Montreal, in an interview outlined the various promising features in the outlook of the Canadian steel industry. "The strongest hope for betterment," he said, "rests on the prospect of a revival in the domestic trade of Canada. A bumper grain crop, which now appears a probability, will add greatly to the purchasing power of the whole Dominion. If, in addition to this, the national railway situation improves so that the railways, our biggest consumers of steel, are in a financial position to undertake the work of replacements and extensions which are so sorely needed, the demand for steel products will increase substantially . . . " As to the British Empire Steel Corporation, Mr. Wolvin said that it had now seen its worst quarter, that of the first three months of this year, and that there had been a steady improvement since.

"Coal production costs are being reduced to some extent, owing to the greater efficiency of labor, and the benefit which is being derived from expenditures made last year on power plants and other improvements. The same applies generally to the steel plants. The Dominion Steel plants are to-day running about 70 per cent of last year's operations at this time."

While in England lately Mr. Wolvin was impressed by the seriousness of the financial situation there. The last week or two, however, had witnessed a number of favorable developments, including the termination of the strike. Still, England did not promise to become a buyer of Canadian steel products for some time.

LOCKERS IN STEEL PLANT

Clothes Airing and Locking Device of Youngstown Wire & Iron Co.

A sanitary and space saving locker system has been installed by the Youngstown Wire & Iron Co., Youngstown, Ohio, which consists of individual garment hangers, provided with locks, forming in effect an open locker for each workman.

The system provides a lock-controlled clothes hanger for each individual on which the clothes are suspended under the ceiling, where they are aired and dried. The garments and toilet articles are held in security and are still easily accessible to the holder of the key. The system is arranged in a large room so that a maximum number of men are accommodated with individual safe storage of their clothing, together with toilet and bathing facilities, leaving the larger part of the space, however, available for gymnasium drills or other purposes.

The unit hanger consists of a pan for storing soap, comb and brush, to which are attached four hooks on which the garments are suspended. The detail of the arrangement may be seen from the illustrations. Each of the hangers is suspended from a small chain, which passes over a pulley depending from the ceiling, then passing over a guide pulley, also attached to the ceiling in a position approximately over the rack to which the chain is fastened and locked.

The pulleys are provided with chain guides to prevent the chains from slipping out of the grooves. They are suitably spaced to permit circulation of air and are fastened partly to ceiling beams and partly to tubes running longitudinally under the ceiling.

One of the illustrations shows the location of racks at the plant of the Youngstown Wire & Iron Co., allowing use of almost the entire floor space, with ample provision for bathing, washing and dressing. The locking racks are formed of vertical tubes, fastened by means of a strap bar, resting upon horizontal angle bars and supported by tubular end posts and columns of the building. The upper part of the tube is open and provides for locking of the chain by means of padlock and ring. The chain is long enough to allow the hanger to be lowered to within easy reaching distance and when pulled up to the ceiling, the excess chain is neatly and compactly stowed in the tube.

When a workman arrives at the plant in the morning, he unlocks the particular chain assigned to him, lowers it, takes off his street clothes and puts on shop clothing. He then pulls the hanger up to ceiling, and locks the chain in the rack. In the evening he reverses the process. The janitor carries a master key, in case of loss of an employee's key.

Installation of the Locker System in Plant Shows Racks in Foreground and Background, Also Showers and Wash Basins, and Illustrates Space Saving

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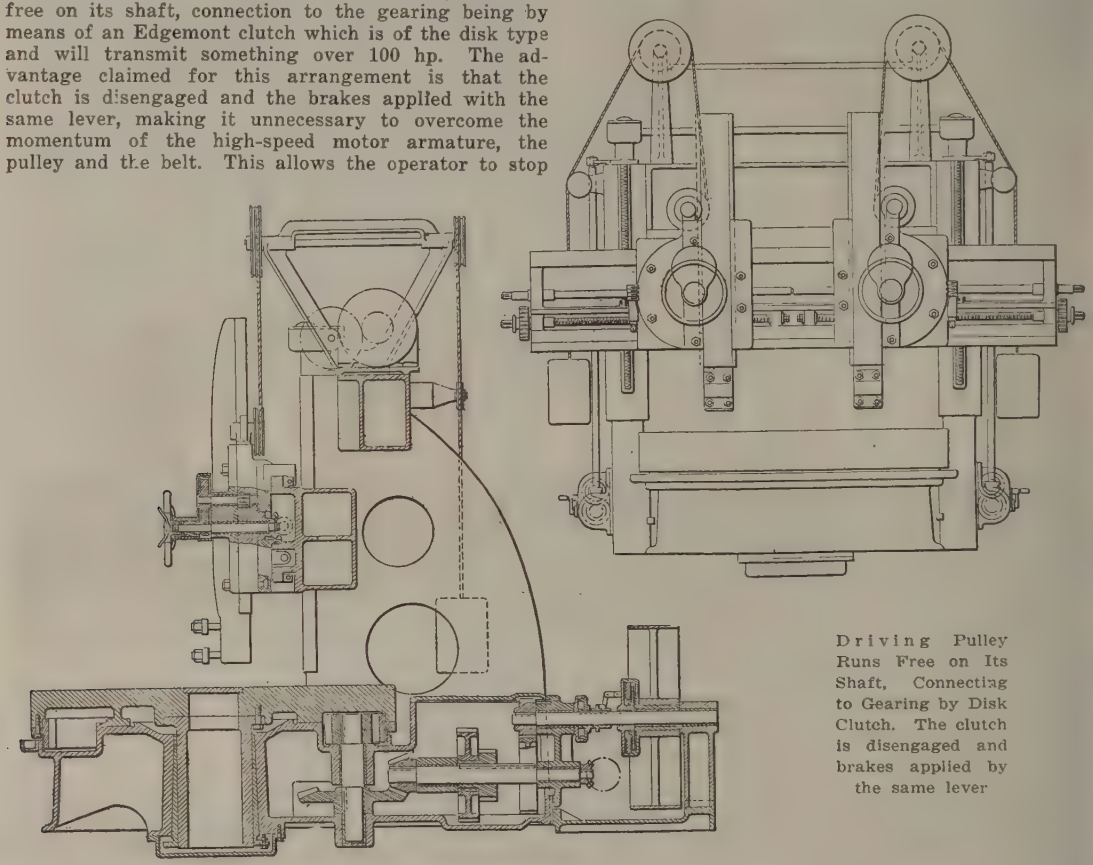
The Pennsylvania Coal & Coke Corporation, operating 34 bituminous mines in the Central Pennsylvania field, announced July 5 that it has made a complete revision and reduction in all salaries, averaging about 20 per cent. The reduction, the officials state, applies to all officers, superintendents, foremen, monthly men, clerks, and stenographers, all operating departments and the general office in New York are affected. A statement by officials says that only nine of the 34 mines are operating owing to the impossibility of meeting competition in other fields operating on the 1917 scale of wages. The nine mines operating are working only from one to four days a week.

Railroad Boring Mill

To meet the requirements of locomotive building and railroad shops in performing turning and boring operations on engine wheels, the Colburn Machine Tool Co., Cleveland, and the Dale Machinery Co., New York and Chicago, co-operated in the development of a 90-in. machine, front and side views of which are shown in the accompanying line drawings. The first six machines were built on order for the American Locomotive Co., whose standard specifications for a heavy duty wheel boring and turning mill of the movable cross-rail type were adopted as a general guide for the designers.

In design the established practice in the construction of boring mills of the movable cross-rail type is followed. The following details, however, may be emphasized: Power is delivered to a single pulley from a 42½-hp. 3 to 1 variable speed motor which runs on 220-volt, direct current. The driving pulley on the machine is 44 x 12 in., carries a 10-in. belt, and runs free on its shaft, connection to the gearing being by means of an Edgemont clutch which is of the disk type and will transmit something over 100 hp. The advantage claimed for this arrangement is that the clutch is disengaged and the brakes applied with the same lever, making it unnecessary to overcome the momentum of the high-speed motor armature, the pulley and the belt. This allows the operator to stop the table instantly or to move it around slightly when setting tools or work.



Driving Pulley Runs Free on Its Shaft, Connecting to Gearing by Disk Clutch. The clutch is disengaged and brakes applied by the same lever

From the driving pulley power is transmitted through gears which are inclosed in the bed of the machine and run in oil. Feed lubricators are used to deliver oil to the spindle drive gears and feed change-gears. All gears are of steel with cut teeth and heat treated, so that they possess ample strength and durability, and in this connection it is of interest to know that the full back gear ratio is 104 to 1 with a maximum gear speed of only 1064 ft. per min. The table is driven by a pinion meshing with an internal gear.

The machine is said to have demonstrated its capacity for taking a maximum feed of ½ by ⅛ in. in steel, with a cutting speed of 60 ft. per min. The bed is of box form, reinforced with ribs and flanges. A cast-steel trough surrounds the bed to provide for catching cutting compound as it drips from the table. Large fitted bolts connect the bed and housings, which are also of box form and reinforced with ribs and flanges. The spindle is mounted on the table and has a suitable tapered bushing in the bed, which is provided with means of adjustment to compensate for wear. A powerful built-in independent 4-jaw chuck is provided on the table, and in common with other gears in the drive, the table gear and pinion run in oil.

A 5-hp. independent motor is provided for elevating and lowering the cross-rail, which is equipped with two independent saddles that are made right and left hand to adapt them for working close together. Either saddle may be moved to the center of the table for use in the performance of boring operations. All wear between the cross-rail and saddles, except on the face of the cross-rail, may be taken up with gibs made of cast-iron. The cross-rail is of the narrow guide type. It is made of cast-iron and the saddles of steel. The rams are of steel with cut rack teeth, and both swivels have adjustment up to 30 deg. on each side of the vertical position. Swiveling is accomplished by a worm and ratchet adjustment. Rapid hand movement is provided for the rams, and they are equipped with counterbalances that are arranged to exert a direct pull on the rams in any angular position. Feeds are reversible, changes of feed being accomplished by sliding gears and clutches.

Among the important dimensions may be mentioned: Maximum swing, 91½ in.; maximum distance between table and cross-rail, 46 in.; spindle travel, 42 in.; diameter of table, 87 in.; diameter of track, 52 in.; width of track, 6 in.; diameter of spindle, 18 in.; length of spindle in bearing, 28 in.; table-speed with back gears in 1½ to 4½ r.p.m.; table-speed with back gears out, 6 to 18 r.p.m.; number of available table speeds, 32; minimum vertical feed, 1⅛ in.; minimum horizontal feed, 0.022 in.; maximum horizontal feed, 0.672 in.; number of available vertical and horizontal reversible feeds, 8. The approximate weight of the machine, including the motor, is 67,000 lb.

After a two-months' layoff, about 1200 machinists and helpers returned to work this week in the shops at Meadville, Pa., Kent, Cleveland and Galion, operated under jurisdiction of the Ohio region of the Erie railroad.

Ring and Circle Shear

A deep-throat ring and circle shear, designated as the No. 13-B, for light material, has been placed upon the market by the Niagara Machine & Tool Works, Buffalo, N. Y.

The machine is shown in the accompanying illustration and is regularly furnished for bench use, although high legs can be furnished if desired. Owing to the inclined position of the lower shaft and cutter internal circles or holes as well as outside circles can be cut. It is also suitable for cutting reverse curves within certain limits.

Cutters are 1⅝ in. in diameter, of tool steel, ground and hardened, and adjustment is provided for taking

Upper Cutter Can Be Raised and Lowered to Penetrate the Stock. This enables the cut to be started in the sheet, not only on the edge

up wear and for thickness of material to be cut. The upper cutter can be raised and lowered to penetrate the stock so that the cut can be started in the sheet, and not only on the edge. The slitting gage applied to the cutting head is accurate and readily adjustable for strips of various widths. The circle arm can be conveniently moved and fastened to proper distance from the cutters, according to the diameter to be cut. A scale graduated in 1/16 in. is marked on the circle arm support, and the proper position of the blank between the clamping disks is determined by a swinging gage and the cutters. An eccentric device is used for clamping. The clutch is actuated by a hand lever, permitting stopping the motion quickly at any point.

The machine will cut No. 20 gage soft steel and will circle from a square blank 3½ to 42 in. The distance from throat of cutting head to frame is 18 in. and to the gage, 9 in. The throat of circle arm is 30 in. The weight is 430 lb.

More Readjustment Necessary

WASHINGTON, July 12.—Mid-year statistical study of financial conditions has convinced the Federal Reserve Board "there are many factors which seem to make it sure that still further work in the direction of readjustment must be accomplished before even approximate stability can be arrived at. "Encouragement is found in the statement that the board believes that the facts now available indicate that the main elements in business and the industrial recession have made their effects manifest, and that there have been in the majority of lines fairly extensive realinements of relationships. It believes the spring months of 1921 were a period of approach to equilibrium in certain lines of business and of preparation for recovery from the depressed conditions that have developed.

"The board stated that the year 1920-21 has been a period of reorganization." This reorganization, with its effects, has, like all other great business changes, been directly reflected in our banking position and the corresponding position of banking systems the world over."

As to financial and economic tendencies of the readjustment period, the board stated that on the banking side, the characteristics have been "reduction of loans and bills held, retirement of note circulation, gain in gold, and liquidation of investments; while on the business side they have been lowering of production, growth of unemployment, falling off of foreign trade and reaction of prices."

Rolling Mill Leased

The newly erected rolling mill of the Capital City Iron & Steel Co., Harrisburg, Pa., has been leased to Joseph K. White and A. Leigh Ensinger, who will operate it as the Harrisburg Bar Mill Co.

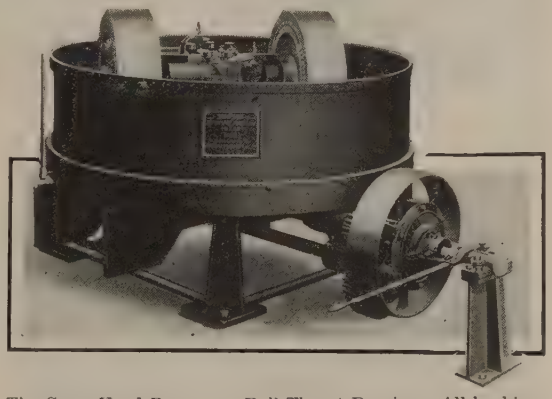
There are at present 9 and 12-in. Belgian mills in operation and a 16-in. mill is under way. The heating furnaces will be operated with oil for fuel and the power equipment is all electrical. The product will be rerolled iron and steel bars in all commercial shapes and sizes.

The purchases and sales will be in charge of Mr. White, who was formerly general sales agent of the Harrisburg Pipe & Pipe Bending Co. and retired at the time that the former owners withdrew. The operation of the plant will be in charge of Mr. Ensinger, also formerly connected with Harrisburg Pipe & Pipe Bending Co., lastly as chief engineer.

New Size Simpson Sand Mixer

The National Engineering Co., Chicago, is adding to its line of Simpson sand mixers a No. 3 size, with an 8 ft. diameter pan. The new machine is said to have been developed particularly for steel foundry purposes, although conveniently used where large capacities are required in gray-iron, malleable, brass and aluminum foundries.

The mixer will hold an average charge of 20 cu. ft., which, figuring 100 lb. of sand to the cubic foot, gives a capacity of 2000 lb. or 1 ton of sand. Smaller or larger batches may be mixed, depending on the particular mixture and the conditions of operation. The drive is from line shaft, or from counter shaft by an in-



The Cross Head Runs on a Ball Thrust Bearing. All bushings are removable

dividual motor or by direct-connected gearing to a motor. The power in all cases is 25 hp. excepting where a bucket loader is attached, in which case 30 hp. is necessary.

The parts subject to wear are of cast steel and the crosshead runs on a ball thrust bearing. The vertical shaft bushings are of bronze. All bushings are removable.

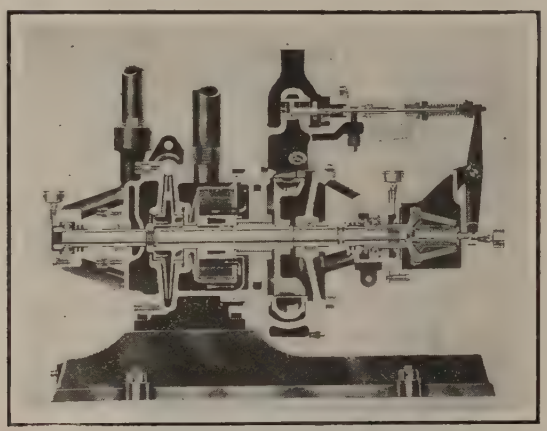
The microchanges which occur during the tempering of hardened steels is now under investigation by the Bureau of Standards, Washington, through its metallurgical division. It is necessary to take hardness measurements and make microscopic examination of all the specimens of each type of steel for each tempering treatment. Over 800 specimens are involved in the investigation and the time necessary for the mere polishing for examination is of course considerable.

Complaint has been filed with the Interstate Commerce Commission by the Brier Hill Steel Co., Youngstown Sheet & Tube Co. and Republic Iron & Steel Co. against the freight rates on limestone from quarries at Hillsville, Pa., to the companies' plants at Youngstown, Ohio. The complaint cites that the rate is discriminatory and unfair, not only to Youngstown, but to all iron and steel producers in the Mahoning and Shenango Valleys.

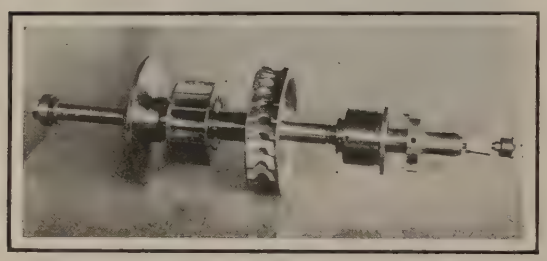
Turbine Driven Return Line Heating Pump

The Nash Engineering Co., South Norwalk, Conn., is placing on the market the Jennings steam turbine driven return line heating pump, a cross section view of which is shown in the accompanying illustration. This unit is designed for use with heating or drying systems where the pump is called upon to maintain both a vacuum on the heating system and to return the hot water and condensation against pressure.

The unit consists of two independent turbine pumps built in one casing; one pump handling the air, the other the condensation, the air and condensation being separated in a receiver under vacuum before entering the unit. This arrangement makes possible a saving in power, because the condensation, which is only one-eighth of the volume handled, is alone delivered against



Two Independent Turbine Pumps Are Built in One Casing. One pump handles air, the other condensation, the air and condensation being separated in a receiver under vacuum



The Three Rotors Are Mounted on One Shaft

discharge pressure, the air being delivered to the atmosphere.

The air end is a development of the Hytor vacuum pump in which the rotor, the only moving part, revolves in an elliptical casing filled with water. The water turns with the rotor, but follows the casing, due to centrifugal force. The water end of the machine is a centrifugal pump with an enclosed type impeller designed to give high efficiency when handling hot water. It unloads when not handling condensation, and is said to require little increased power when delivering against low heads. Provision has been made to vent the centrifugal inlet back to the receiving tank, which is under vacuum, to eliminate air binding.

All interior parts of the pump are of bronze excepting the steam turbine rotor. No lubricant is required in the interior of the pump and no oil or grease can be introduced by the pump into the condensate. The shaft upon which the impeller, rotor and steam turbine wheel are mounted is supported by annular ball bearings mounted outside of the casing, in an adjustable housing. The steam turbine rotating element consists of a solid steel forging with blades milled out of the rim. A centrifugal throttling governor is furnished to maintain a constant steam turbine speed, automatically shutting off steam if the steam pressure rises or if the pump unloads when not handling condensation, preventing increase in speed.

The turbines are designed to operate at 75 lb. steam pressure, although the turbine casing is suitable for pressures up to 200 lb. If it is desirable to operate at pressures lower than 75 lb., a satisfactory operation can be secured on pressures as low as 40 lb. The pumps are furnished in sizes up to 300,000 sq. ft., of equivalent direct radiation.

Fluorspar in 1920

The total quantity of fluorspar reported as shipped from domestic mines in 1920, according to figures compiled by Hubert W. Davis of the United States Geological Survey was 186,778 net tons, valued at $4,718,547, which shows an increase of 35 per cent in quantity and 34 per cent in value as compared with the figures for 1919. The general average price per ton f.o.b. mines or shipping points for all grades of spar in 1920 was $25.26; in 1919 it was $25.49.

The imports of flurospar into the United States in 1920 were 24,612 short tons, valued at $265,630, an increase over 1919 of 254 per cent in quantity and of 147 per cent in value. The exports of fluorspar from the United States in 1920 amounted to 2764 short tons, valued at $65,475. All the fluorspar exported was sent to Canada.

The imports of fluorspar during the first four months of 1921, the greater part of which was brought from Canada, amounted to 4049 short tons, valued at $39,990.

Figures furnished by steel manufacturers who produce about 75 per cent of the output of basic open-hearth steel show that the steel industry consumed about 117,000 short tons of fluorspar in 1920 and that the stocks on hand Jan. 1, 1921, at all steel plants were about 66,600 short tons. From Jan. 1 to April 30, 1921, about 22,600 tons was consumed by basic open-hearth steel plants. Figures showing the shipments of domestic fluorspar to steel plants during this four-month period are not available, but the total was evidently small, and of the 4000 tons imported practically all has been taken by steel manufacturers.

Statistics of shipments of fluorspar by States, by grades, and by uses are now available and may be had on application to the Director, United States Geological Survey, Washington.

New Steel Plant in New South Wales

WASHINGTON, July 12.—A new steel works is to be established at Port Kembla, New South Wales, a new port 60 miles south of Sydney, according to a report received by the Bureau of Foreign and Domestic Commerce. A large breakwater is nearing completion, which will considerably enhance the natural facilities of the port and provide the required accommodation for the largest vessels trading to Australia. The port is in the center of a large coal mining district, and it is believed that when the works are in operation, many subsidiary industries, depending upon the free supply of iron and steel, will be established. It is stated that the outlay on the works will be in the neighborhood of £2,000,000. The same company is now operating iron and steel works at Lithgow, which is 100 miles inland from Sydney.

Suits for the recovery of $75,000 and a reasonable attorney fee recently were instituted against James C. Davis, Federal director-general of railroads, by the Central Iron & Steel Co., Harrisburg, Pa., in Federal court at Scranton, Pa. It is alleged that while the Government was in control of the Philadelphia & Reading and the Pennsylvania railroads, the plaintiff was compelled to do considerable shifting of cars into and out of its plant at its own expense in connection with shipments made over the roads mentioned, and that the shifting complained of should have been done by the railroads without cost to the plaintiff. Because of this, the plaintiff seeks to recover $40,000 for the shifting done on the Pennsylvania and $35,000 for the shifting done on the Philadelphia & Reading.

Repeated Shut Downs of Coke Ovens

Twenty Years' Experience With By-Product Plant Near Wheeling, W. Va., With Floods and Stoppage for Other Reasons

BY J. M. HASTINGS, JR.

THE impression seems to have gained considerable credence that a by-product coke oven plant cannot be allowed to become cold without serious consequences and more or less complete rebuilding before it can be started again. Some owners are even going to heavy expense to keep their oven plants hot, or are selling coke at a serious loss to avoid a shut-down. A report recently received from a plant of by-product ovens near Wheeling, W. Va., shows that a correctly designed plant may be shut down completely without serious injury.

In 1898 a plant of 60 Semet-Solvay ovens was built for the Riverside Iron Works, now owned by the National Tube Co. at Benwood, W. Va., just outside of Wheeling. Two years later 60 more ovens were added. The plant was built on the flat land along the Ohio

Oven in Operation 17 Years and Out of Running 20 Times for a Total of 5 Years and Yet Requiring No Replacements of Lining

River, and although the records of high water were carefully studied for a long period, the progressive denudation of the forests made these records of little value, and three years after the first ovens were started the plant was put out of operation by high water. During the twenty years from April 24, 1901, when this first shut-down occurred, to March 16, 1921, the date of the most recent shut-down, the Benwood coke oven plant has been closed down and started up again twenty distinct times.

Seven times in that period the Ohio has flooded the district and effectively put the ovens out of commission. Most of these interruptions were for relatively short periods, although in each case the plant was kept in operation until water entered the waste heat flues. In March, 1907, however, flood water was high enough to enter the sole flues and reach the oven floors proper, causing an 18-day shut-down, and in April, 1913, the worst flood in the history of the river brought the water into the lower heating flues 15 in. above the floor of the ovens. On this latter occasion a shut-down of 25 days resulted, largely because natural gas for starting up again was not available for some time after the flood subsided.

In addition to interruptions caused by floods, the plant has been down four times on account of coal shortage, twice for repairs to the hydraulic mains and seven times on account of business conditions. Duration of shut-downs from this last cause has ranged from one month in 1914 to a year and seven months in 1907 to 1909.

During its entire twenty-two and a half years' existence, the Benwood plant has been shut down 1958 days, or a total of 5-1/3 years up to March 16 of this year, since which date it has again been cold. Several other Semet-Solvay plants have been shut down for varying periods, but none has approached this record and probably none ever will, due to the peculiar circumstances at Benwood.

Notwithstanding this rather remarkable record of shut-downs, the present condition of the plant shows that it has suffered no serious damage. Of course these extraordinary and repeated stresses on such a large amount of brickwork cannot be encountered without some injury and expense for repairs. But the constrution of this type of oven, with the well-known strong division wall between the ovens, was so substantial that any injury occasioned by these vicissitudes has been of a minor nature, as is shown by the following records.

Of all the ovens built in the United States, No. 30 oven in block No. 1 at Benwood, illustrated in the accompanying cut, holds the record for low repair costs. This oven has been in operation 17 years and out of running 20 times for a total of over five years, and to date has required no replacements whatever in its lining or brickwork. No. 60 oven in block No. 2 is a close second, having required less than $20 expense for brickwork repairs. It should be further noted that the two ovens mentioned at Benwood are both end ovens, which is the point where injury to the structure of the blocks often first appears. The repair records of these two ovens are of course exceptional, but the record of the entire plant has been remarkable, despite the numerous interruptions.

In addition to these repair records on the ovens, the yields obtained at the Benwood plant have been very satisfactory and compare favorably with those from the best modern plants. For the five-year period from Jan. 1, 1915, to Jan. 1, 1920, during which time the plant enjoyed fairly continuous operation, the average results were as follows:

Analysis of Coal Charged		*Yields Obtained*	
Volatile	29.9 per cent	Total coke	78.2 per cent
Fixed carbon	62.2 per cent	Sulphate of ammonia,	24.5 lb. per ton
Ash	7.9 per cent	Light oil	3.11 gal. per ton
		Tar	10.0 gal. per ton

These records show conclusively that that plant has not suffered by reason of its many shut-downs and the same should be true for any correctly designed oven plant. Of course it is necessary to exercise care and to take certain precautions when closing down a coke oven plant for an indefinite period. The process is, in general, just the reverse of that employed in starting up a block. The heats should be lowered gradually by a gradual reduction in the supply of fuel gas, so that the contraction of the block will take place slowly and regularly. As this contraction progresses, the tie rods should be readjusted and a close watch maintained to guard against cracks developing.

If the coke is left in the ovens, as is sometimes done when a long shut-down is not anticipated, the greatest care must be used in sealing the ovens as nearly airtight as possible. The door frames must be kept tight

against the brickwork, uptake pipes maintained in proper position and charging hole covers sealed tight. With an experienced operator in charge there is no reason why a block of ovens of correct design cannot be shut down for a longer or shorter period, without extraordinary labor or heavy repair expense on starting up.

Steel Works and Rolling Mills

Census Bureau's Summary Concerning the Industry, 1919 and 1914

WASHINGTON, July 7.—Figures of the 1919 census of manufactures, with respect to steel works and rolling mills prepared by the Bureau of the Census, are based upon the returns from 487 establishments with products for the year valued at $2,814,179,000. At the census of 1914 there were 427 establishments with products valued at $918,664,600, an increase of $1,895,514,400, or 206 per cent, due very largely to increased unit prices.

The output of finished rolled products and forgings aggregated 25,368,000 gross tons, valued at $1,852,128,100, as compared with 18,482,000 tons and $623,486,000 in 1914; an increase of 37.3 per cent in tonnage and 197 per cent in values, and an increase in average unit values from $33.20 per gross ton in 1914 to $73 in 1919, or 120 per cent. Tonnage figures reported differ from those of the American Iron and Steel Institute, as given at pages 925 and 985, THE IRON AGE, Oct. 7 and 14, 1920.

The increase in leading groups of products was reported as follows:

Plates and sheets. Output, 1919, 7,682,000 tons,

Summary	1919		1914	
Number of establishments	487		427	
Steel works and rolling mills	149		113	
Steel works, no hot rolling	99		96	
Rolling mills, no steel furnaces	239		218	
Principal Materials Used	Quantity, Gross Tons	Cost	Quantity, Gross Tons	Cost
Pig iron	23,868,000	$579,948,000	17,128,000	$232,132,000
Spiegeleisen and ferromanganese	343,800	41,083,000	301,600	16,499,000
Other alloys (ferro and nonferro)	94,700	31,894,000		
Scrap purchased	6,944,300	143,072,000	5,070,900	59,382,000
Scrap made and consumed	9,197,800	.....	5,585,300	.....
Steel, crude and unfinished	9,353,600	388,412,000	6,458,400	132,178,000
Steel Production				
Total	33,908,800		23,383,500	
Open-hearth:				
Basic	25,642,000		16,233,100	
Acid	968,200		830,200	
Bessemer	6,946,600		6,218,800	
Crucible	64,300		79,800	
Electric and all other	287,700		21,600	
Ingots	33,287,300		22,814,300	
Direct castings	619,500		569,200	
*Products**	Quantity Gross Tons	Value	Quantity Gross Tons	Value
Total		$2,814,179,000		$918,664,600
Steel works and rolling mills		1,884,159,500		593,874,700
Steel works, no hot rolling		126,152,300		39,783,000
Rolling mills, no steel furnaces		803,867,200		285,006,900
Finished rolled products and forgings	25,368,000	1,852,128,100	18,482,000	623,486,000
Plates and sheets:				
Plates (No. 12 and thicker)	4,307,200	290,293,900	2,183,800	62,768,600
Sheets (No. 13 and thinner):				
Black for tinning	1,084,200	94,456,200	1,011,900	43,147,000
Other	2,290,600	227,284,200	1,515,500	67,017,400
Skelp	2,589,000	150,157,900	1,960,800	52,443,300
Cotton ties	42,700	3,509,500		
Hoops, bands and strips	791,000	66,361,700	603,900	19,945,100
Nail and tack plate	34,600	2,573,000	50,300	2,008,300
Rails	2,088,800	92,849,500	1,842,000	54,009,900
Rails, rerolled	95,600	4,738,900	63,700	1,438,200
Rail joints and fastenings, tie, plates, etc.	462,700	27,596,700	349,300	11,527,000
Structural shapes	2,526,400	151,970,100	2,083,400	57,475,400
Steel bars, merchant, mill shafting, etc.	4,026,400	326,729,300	2,062,800	71,352,400
Iron bars, merchant, etc.	450,200	33,306,500	411,900	13,057,100
Reinforced concrete bars, iron and steel	301,400	18,426,800	269,700	7,751,500
Iron and steel rods:				
Wire rods to be drawn or rolled	2,484,400	126,738,100		
Cold-rolled, cold-drawn, etc.	145,700	17,676,700	2,377,700	61,578,100
Rolled wire rods in coils or bars, crucible, electric or cementation steel	15,300	4,463,300		
Bolt and nut, spike and chain, horseshoe nail rods and horseshoe bars	223,400	14,616,500	535,900	18,319,900
Axles, rolled or forged	97,800	9,753,000	89,400	3,407,300
Armor plate and ordnance	101,100	55,699,600	38,700	19,947,900
Car and locomotive wheels, rolled or forged	117,700	17,044,700		
Rolled, forged or other iron and steel products not otherwise enumerated	1,091,800	115,881,800	1,031,100	56,291,600
Partly finished rolled products (sold or transferred to other works of same company)	9,266,000	389,596,300	6,408,000	130,674,900
Blooms, billets and slabs:				
Rolled for forging purposes	186,500	10,669,800	65,900	1,695,600
Hammered charcoal	17,800	920,700	.....	.....
All other (steel)	6,024,100	249,394,100	3,991,900	80,638,700
Sheet and tin-plate bars	2,864,600	117,855,800	2,241,700	45,372,800
Muck and scrap bar	173,000	10,755,900	108,500	2,967,800
Unrolled steel (sold or transferred to other works of same company):				
Ingots	713,000	33,315,200	63,400	1,383,500
Direct steel castings	585,000	112,153,600	569,200	44,733,700
Scrap iron or steel (for sale or transfer to other works of same company)	2,112,000	37,381,400	1,446,200	16,334,800
All other iron and steel products, including value added to rolling-mill products by further manufacture	.....	361,084,300	.....	85,239,000
All products other than steel or iron, including custom work and repairing	.....	28,520,100	.....	16,812,700

*In addition, steel castings and rolled steel valued at $5,419,600 was produced by 7 establishments in 1919; and to the value of $2,831,964 by 13 establishments in 1914, not classed as "Steel works and rolling mills."

valued at $612,034,300, an increase with respect to 1914 of 63 per cent in tonnage, 254 per cent in value, and in average unit value from $36.77 to $79.67 per ton.

Skelp. 2,589,000 tons, valued at $150,157,900, an increase of 58 per cent in tonnage and 186 per cent in value, and in average ton value from $26.75 to $58.

Rails. 2,088,800 tons, valued at $92,849,500, an increase of 13.4 per cent in tonnage and 71.9 per cent in value, and in average ton value from $29.32 to $44.45.

Structural shapes. 2,526,400 tons, valued at $151,970,100, an increase of 21.2 per cent in tonnage and 165 per cent in value, and in average ton value from $27.60 to $60.

Merchant bars, etc., iron and steel, 4,476,600 tons, valued at $360,035,800, an increase of 81 per cent in tonnage and 327 per cent in value, and in average ton value from $34.51 to $80.43, and

Wire rods, 2,645,400 tons, valued at $148,878,300, an increase of 11.2 per cent in tonnage and 142 per cent in value and in average ton value from $25.90 to $56.28.

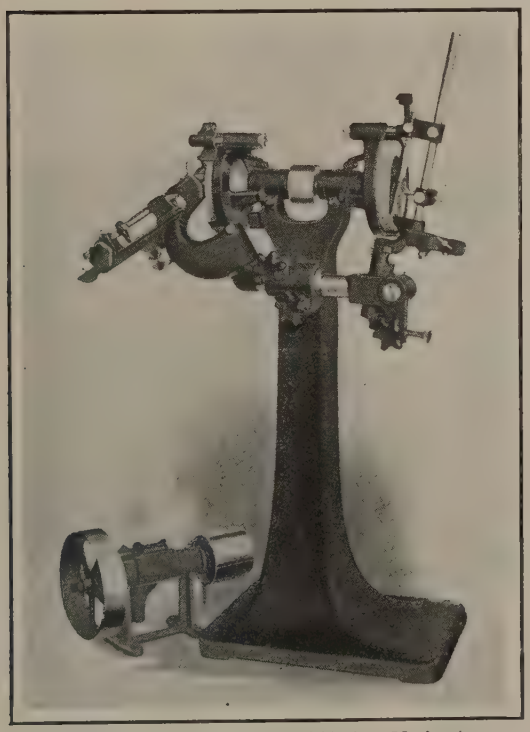
There was manufactured 33,908,800 tons of steel in 1919, compared with 23,383,500 tons in 1914, an increase of 45 per cent, chiefly in open-hearth steel. The plants consumed 23,868,000 tons of pig iron in 1919, or 78.14 per cent of the pig iron production for the year.

The per cent ratios of increase in average unit values, 1914 to 1919, for the different classes of products are quite uniform for all other than railroad steel, viz: 113 per cent for reinforced concrete bars; 117 for plates and sheets, skelp, or structural shapes and wire rods; 133 for merchant bars; 154 for cotton ties, hoops or bands, and 162 for axles; for steel rails the increase in average unit value was but 51.6 per cent.

Combination Tap and Drill Grinder

A combination tap and drill grinder intended for shops not having enough work to justify the installation of separate single purpose machines has been placed on the market by the Grand Rapids Grinding Machine Co., Grand Rapids, Mich. It is said to incorporate the features of the single purpose machines previously introduced and automatically grinds the same taper and clearance on every flute.

The machine is made in two styles of two sizes



Both Wheels Carry a Wheel-Truing Mechanism with Diamond

each. In the first style, taps No. 6 to 1½ in., and drills ⅛ to 1½ in., and No. 52 to ¾ in. can be ground, taper on taps being limited to width of the wheel which is regularly 1½ in. In the other style, taps ⅜ to 3 in., and drills ¼ to 2½ in. and ⅛ to 1½ in. can be handled. The latter combination can be furnished for wet grinding.

The drill grinding side is equipped with a holder stop, which, working in connection with the base of the diamond truing device, automatically places the drill holder in proper relationship with the face of the grinding wheel. This is said to be an exclusive feature. Both wheels carry a wheel-truing mechanism with diamond, machines of the first style having two types one of which is for truing the periphery of the tap grinding wheel and the other for truing the face of the drill grinding wheel. In machines of the second style both wheels are cup shaped and the diamond truing device is arranged for keeping the face of the wheel in proper shape. Diamonds of approximately ½ carat are furnished for each wheel.

The floor space occupied is 2 x 3½ ft., height to center of spindle, 44 in., and net weight 385 and 400 lbs. The specifications give the grinding wheels as 8½ x 10 in. in diameter; the spindle speed 1600 r.p.m.; the main frame studs 2¼ in. in diameter, and the swivel bearings 1½ x 4½ in.

Lower Prices in Refractories Expected

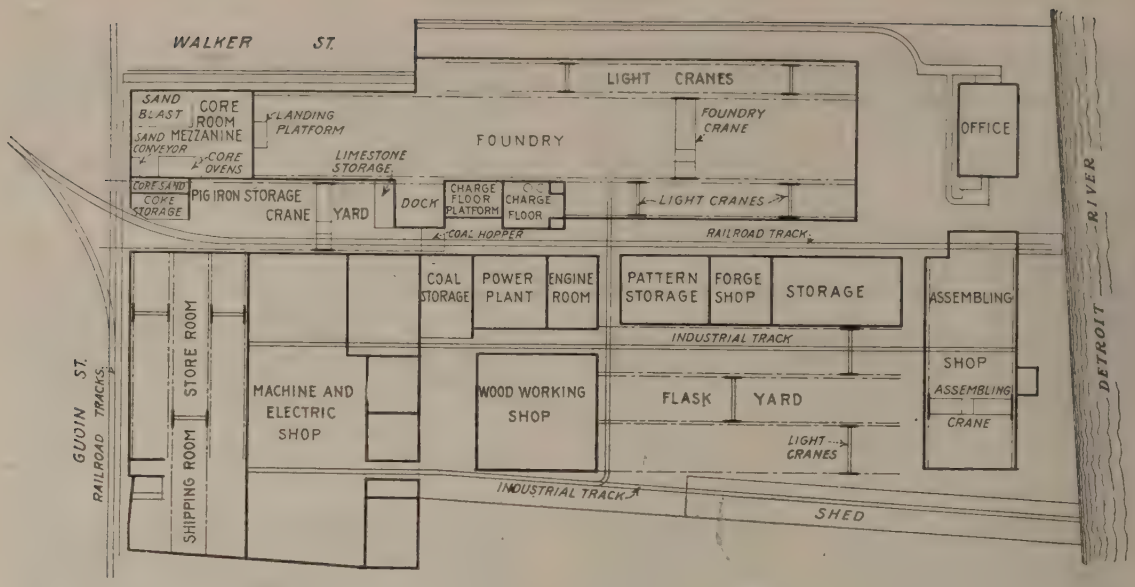
PITTSBURGH, July 11.—Prices of fire clay brick and other refractories are holding at the quotation established more than a month ago, but there is almost no business on account of the exceedingly limited activities of the iron and steel industry. It is more than probable that the appearance of attractive orders would lead to price concessions; in fact, it is currently reported that quietly there has been more or less shading of the public quotations on the small orders which have come out recently. In view of the recent public announcement of lower prices on steel, it is possible that the refractories industry, at an early date, may contribute to this step in the readjustment movement by making a voluntary reduction in prices as it did following the announcement by the Steel Corporation in April. Current operations of the refractories plants are running between 15 and 20 per cent of capacity. A good many plants in various parts of the country are shut down, and most of those which are running are producing special sizes and shapes. On standard sizes and shapes, most of the manufacturers are easily meeting current demands from their stocks.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$36.00 to $43.00	$30.00 to $36.00
Ohio	36.00 to 40.00	30.00 to 35.00
Kentucky	36.00 to 40.00	34.00 to 38.00
Illinois	40.00 to 45.00	30.00 to 40.00
Missouri	45.00 to 50.00	35.00 to 40.00
Silica Brick:		
Pennsylvania		35.00 to 40.00
Chicago		42.00 to 45.00
Birmingham		46.00 to 50.00
Magnesite Brick:		
Standard size, per net ton		70.00 to 75.00
Chrome Brick:		
Standard size, per net ton		60.00 to 65.00

Ferromanganese Hearing Postponed

WASHINGTON, July 12.—Proceedings in the so-called ferromanganese anti-dumping case have again been postponed by the Federal Trade Commission, this time for one week, or until July 19, on account of the illness of Attorney Joseph E. Davies, representing respondents in the case. Mr. Davies is in a hospital in New York. The case is to be heard in that city at the offices of the commission when the hearings are resumed and at which time the respondents will submit their defense.



Handling Materials in a Remodeled Foundry

But Few Carrying Units Used at Murphy Iron Works, Detroit—New Crane Installations Saved in a Year Over Double Their Cost

MAKING over a foundry to an efficient and harmonious whole out of a series of disconnected units where the area was limited because of city streets was the problem faced by the engineers who remodeled the Murphy Iron Works, Detroit, maker of Murphy automatic furnaces and Riley underfeed stokers. The various buildings of the Murphy plant were constructed at widely separated intervals with no idea of co-ordination. The extension of the foundry, the installation of the yard crane and the present systems of handling were completed about a year ago.

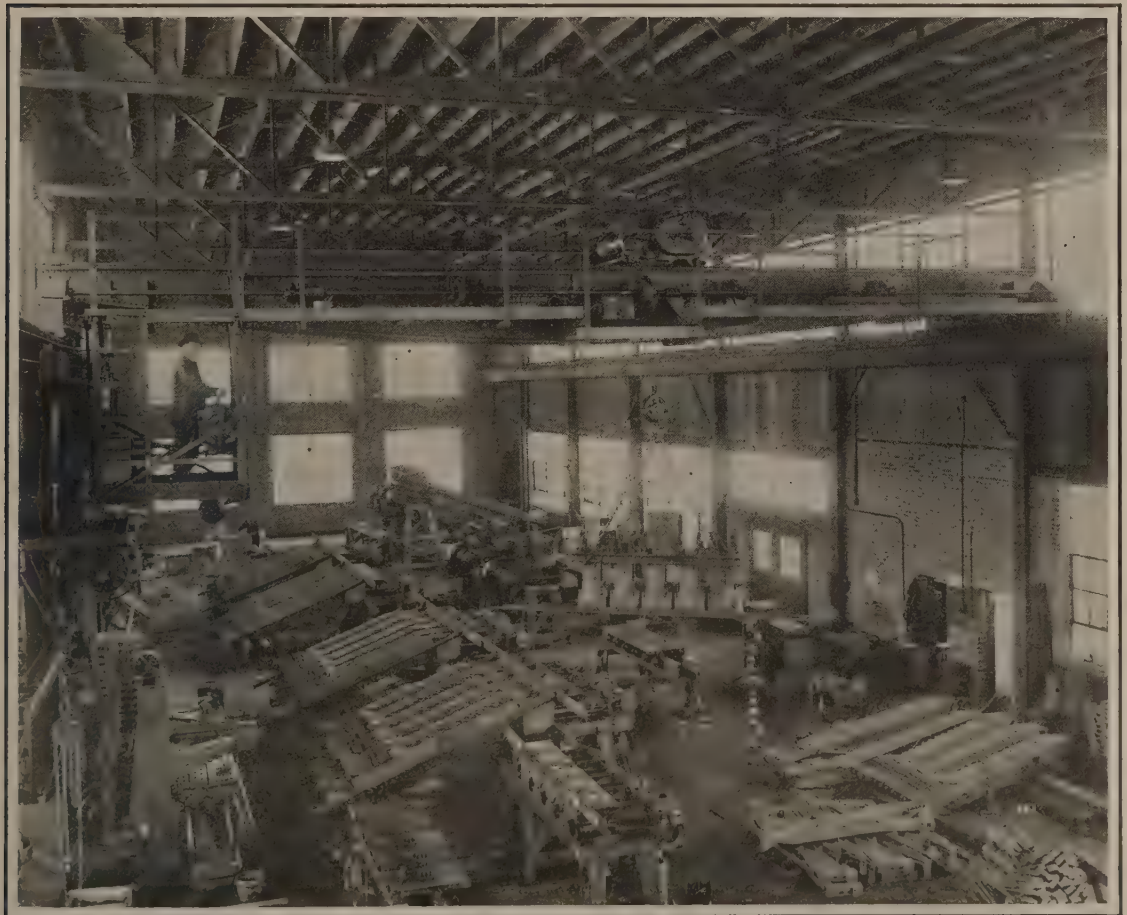
In the remodeled plant comparatively few handling units are used, the great bulk of the material being moved by two electric traveling cranes only, one in the yard and one in the foundry. According to Frank B. Bigelow, general manager, and George I. Bouton, chief engineer, both of whom were responsible for the changes, in one year from the installation of the yard crane alone the company had saved more than twice the cost of the crane, the runways and the entire expense of installation.

Coke, coal, pig iron, sand, etc., are switched in on cars on the spur track between the foundry and machine shop buildings. This open space is covered by a 10-ton 3-motor Northern type E crane, 51 ft. span, designed with high speed to handle a clam shell bucket, a lifting magnet, and to be used for general handling purposes. The bucket is electric-driven with a motor

This Material Storage Openway Separates the Foundry from the Machine Shop and Other Units. The platform in the background holds raw material for near-future use in the cupolas beyond

The Crane Ladles Are Deposited on Floor Ladle Trucks, by Which the Molten Iron Is Distributed

in the bucket, 1 cu. yd. capacity, made by the Hayward Co., New York. The lifting magnet, 45 in. diameter, was manufactured by the Electric Controller & Mfg. Co., Cleveland. The crane runway extends in one direction as far as the angle of the foundry containing the cupolas, and in the other direction it cantilevers over the street, permitting the crane to handle material from the street railroad track at right angles to the yard track. An open landing platform, or dock, is at one end at the same level as the charging platform. This dock has a several days' storage capacity of raw material for the cupolas. A car of coke is



Underfeed Stokers and Automatic Furnaces Are Assembled in This Well-Lighted Bay, Served by a 7½-Ton Crane

switched in and unloaded by the crane and bucket in 60 to 90 min. The coke for immediate consumption is placed on the dock and the remainder deposited in the coke storage bin whence it may be transferred to the dock as required. The core sand and limestone are handled in like manner, the former being placed in the core sand storage bin, and the latter carried either directly to the dock or to the storage bin in the yard. For handling pig iron, the lifting magnet is substituted for the bucket, the change requiring only two minutes. The iron is unloaded from the car 1200 lb. at a lift. An average car can be unloaded in 30 min. The pig iron is placed in various piles in the yard until the analysis can be checked, whence it is transferred as required to the dock. Scrap for melting is handled in a like manner. The coal for the power plant is moved by the crane and bucket, being discharged into a steel hopper located over the railroad track from which it descends by gravity to the coal storage pile contiguous to the boiler house. A car of coal can be unloaded in 45 to 60 min.

From the dock the material is fed to the cupolas by industrial cars and charging boxes, and as each load passes through the door opening from the dock to the charging floor it is weighed by the scales at that point. An Otis electric elevator is located in one corner of the charging room, to be used as an auxiliary for carrying material in case of any interruption to the service of the yard crane, or in case that crane is being used on other service.

The foundry, with a capacity of 50 to 60 tons per day, is 500 ft. long, with the main bay 56 ft. in width and the side bays 25 ft. wide. The main bay is served by a Northern 10-ton 4-motor type E electric crane with a 5-ton auxiliary hoist, and in the side bays over the molding floors are several single girder cranes with electric hoists of 1 and 2-ton capacity. Two 84-in. Newten cupolas, made by the Northern Engineering Works, Detroit, melt the iron, and can be used together or alternately. The foundry is exceptionally light and airy and is provided with an efficient heating and ventilating system for which the Green Economizer Co. furnished the blower and the heating unit. A locker room for employees is under the docks and is provided with shower baths and other lavatory equipment.

At the north end of the foundry, is a mezzanine floor upon which are located the core room and the core ovens. The core sand is carried from the outside storage bin to mezzanine level by an electric-driven conveyor built to a special design by the Murphy Iron Works. The mezzanine floor is furnished with a landing platform so that the foundry crane can place on or remove any material from the mezzanine floor to the foundry floor.

Below the mezzanine on the main floor level is located a battery of electric-driven steel tumbling mills built by the Sly Mfg. Co., and also Mott sand blast equipment with its ventilating system, overhead tracks, etc.

The cores are baked on racks moved about on the core room floor by Barrett lifting trucks. When removed from the ovens, the racks are wheeled to the landing platform where they are picked up by the foundry crane and distributed to various parts of the foundry.

The iron is poured from the cupolas into a reservoir ladle on wheels suitable for being moved back and forth between the two cupola spouts. From the reservoir ladle it is received by the crane in a crane ladle and carried to a certain station in the foundry where the crane ladle is deposited in a special floor ladle truck with flat wheels which makes it possible to move the floor ladle from place to place. There are several of these floor ladle trucks at different points in the foundry, and the function of the crane, while pouring, is to deposit full ladles on the trucks at various points and take back the empty ladles for refilling. From the floor ladles the iron is distributed to the molds by hand ladles although in the case of large molds it is sometimes poured direct from the crane. With this system the one crane can take care of the entire foundry while pouring, as its function is principally to keep the floor ladles supplied with hot metal. The use of a standard overhead traveling crane for primary distribution to small ladles is interesting as compared with the usual monorail distributions.

In shaking out, the castings are collected in boxes and carried by the crane directly to the tumbling mills at the north end of the foundry. Sprues and risers are also carefully tumbled to free from sand before being returned to the cupola.

After the castings are tumbled or treated by the sand blast, they are carried in trucks on an industrial track to the machine shop, where they are handled by small cranes or overhead tracks. The small units are assembled in a shop adjacent to the machine shop but the large units are carried through various stages to the main assembling shop where they are handled by a 7½-ton Northern 3-motor crane, 44 ft. span. The railroad track also runs into this shop and the large units are loaded by the crane and shipped from this shop.

British Steel Exports at Low Point in May—Imports Declining

British steel exports in May this year, excluding iron ore and including scrap, were 101,202 gross tons as compared with 161,508 tons in April, 149,847 tons in March, 167,158 tons in February and with 233,114 tons in January. The May exports last year were 332,869 tons. The average per month in 1920 was 274,881 tons per month, while in 1913 it was 420,757 tons per month. The 1919 rate was 188,519 tons per month. The May outgo is therefore less than even the 1919 monthly average and close to the smallest in the war years. Imports in May were 89,348 tons, which contrast with 196,945 tons in January, 181,565 tons in February, 179,610 tons in March, 111,536 tons in April, and with 128,685 tons per month in 1920. The 1913 imports were 195,264 tons per month.

Expressed as a table the exports and imports this year and in previous years were as follows in gross tons:

	Exports	Imports
January, 1921	233,114	196,945
February, 1921	167,158	181,565
March, 1921	149,847	179,610
Average per month, first quarter, 1921	183,373	186,040
April, 1921	161,508	111,536
May, 1921	101,202	89,348
Average per month, 1919	188,519	50,801
Average per month, 1920	274,881	128,685
Average per month, 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data in gross tons:

	Average per Month		May	May
	1913	1920	1920	1921
Pig iron	78,771	38,505	51,633	7,673
Steel rails	41,676	11,213	11,088	10,522
Steel plates	11,162	16,571	19,621	5,607
Galvanized sheets	63,506	34,244	41,761	10,679
Steel bars	20,921	30,322	36,898	4,851
Tin plates	41,208	29,418	36,480	12,350
Black plates	5,679	3,026	3,846	979
Steel sheets	....	....	19,266	3,078

The May exports of all products showed a marked decline from May, 1920, and in most cases are not up to the average per month in 1913.

Pig iron imports in May were 19,344 tons as compared with 15,744 tons in May, 1920. The monthly average imports in 1920 and 1913 were 12,705 tons and 18,059 tons respectively.

Iron ore imports in May were only 15,696 tons as compared with 541,742 tons per month in 1920. In May, 1920, they were 710,592 tons. The total for the first five months was 1,249,957 tons as compared with 2 784,329 tons in the first five months in 1920.

Manganese ore imports were 21,518 tons in May against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to June 1 this year was 133,704 tons against 140,387 tons for the same five months last year.

Automobile production in the Detroit district during April, 1921, is reported at 140,955 cars, as compared with 105,245 in March, 1921, and 119,213 in April, 1920. The Ford production alone was 90,125 automobiles and trucks. Ford recently reached an output of 4000 a day.

Orders have been issued recalling 250 men to the shops of the Pennsylvania railroad at Logansport, Ind. They were laid off last December.

Cutting Overhead Cost Instead of Wages

A Large Detroit Automobile Company Paid War Time Wages, Ran Half Time and in the Same Period Made Profits

BY DON F. KENNEDY*

LAST December the automotive industry was at its lowest ebb. Cancellations had wiped out unfilled orders and shipments had eaten up the balance. Few, if any, new orders came in from day to day.

Employment in Detroit, the center of the industry, was at a crisis. The city poor commission was swamped with demands it could not fill. Clerks and stenographers from other city departments volunteered to work after hours to help the poor commission get caught up with the appeals of frantic fathers and mothers. All the chain grocery stores carried signs announcing that poor commission vouchers would be honored.

Factory after factory laid off men by the thousands. Some were running three days a week, some two days a week and many were closed tight, including some of the very largest.

At this time the writer interviewed the heads of representative manufacturing concerns to get their ideas toward labor in general, with particular reference to their intentions toward reducing wages, to obtain information for an article which appeared in the Dec. 9 issue of THE IRON AGE, entitled, "What will Employers Do About Labor?" Some were more or less open in their remarks, some were afraid to talk on the subject, and a few refused to be interviewed.

LAST December an automobile company cut the price of its car, but announced that it would not reduce the wages till the cost of living came down and justified it in doing so.

This article is written by the man who interviewed the factory manager. He now gives the results that have come from carrying out this policy.

The company has done as it said it would six months ago. The interesting part of the story is the ways in which it was actually able to make money through the bad times it experienced along with all the rest of the motor industry.

This was six months ago, before the attitude of labor had had time to adjust itself to the thought of lower wages which it has since accepted—and quite gracefully, too, for the most part. All these employers had reductions in mind, but only a few felt themselves quite justified, or had the moral courage to say so. They were not sure that they were morally warranted in reducing wage rates; that their attitude would be in line with public opinion; that their workmen were ready to accept wage cuts without protest, although they realized that with the unemployment situation such as it was, they could put into effect any kind of a cut, and get plenty of men, no matter what the wage.

I said that all the employers had reductions in mind. There was one exception. His ideas were different. His plant was running three days a week. Those readers who saw the article in question may recall that I quoted one man as saying that wages should not be reduced, and that his company for one would not reduce them until retail prices dropped sufficiently to warrant such a cut. His idea was that profits, overhead expense, manufacturing methods and material prices should be looked at closely, and reductions in expense made by cuts from these items rather than from the wages of the workmen.

Six months have elapsed and it should be interesting to find out how this theory has worked out in practice. I know that this attitude sounded more or less altruistic to me at the time. It was an admirable idea, but how practical? How would it work out in dollars and cents?

This company is one of the large automobile makers and a representative one. During the past winter it worked on an average of less than half time, which has about averaged up with the rest of the industry. It made a cut of more than $200 in the price of its car last fall. This represents more than the average automobile manufacturer's profit per car. The overhead expense of these enormous factories, filled as they are with expensive machinery, runs on day and night, whether the factory is running or closed. This company faced this situation; it was running less than half time, it had cut the price of its product as much or more than its normal profit, and it proposed to keep wages up to war-time standards.

How Has It Worked Out?

I called there again the other day and saw how it had worked out. I found that the first wage cut was being put into effect the day I called in the middle of May. It was almost six months from the time of the original interview. Comparison between the wages paid in that plant and those paid in other similar plants in the city showed that this company was paying higher rates than the average in every department. These figures are at the disposal of all members of the Employers' Association of that city.

Running less than half time and keeping up war-time wages, the company has actually made money every month! The seemingly altruistic general manager has actually put his plan into effect and made money while doing it.

"We are turning out a better car to-day," he said, "than we have ever turned out. Our standards of accuracy are higher. We, in common with all manufacturers, were inclined to let things slip a little during the great pressure that was brought to bear on the automotive industry during the past two years. We find, however, that everyone handling our cars is becoming more particular. The buyer now complains of little matters which formerly would have been overlooked. The dealer in the past would fix them up himself and say nothing. Now he complains to the distributor. The distributor collects all these instances together and brings them to the factory.

"Several months ago we brought to the factory in convention the service managers of our ten largest distributors, located in the principal cities all over the country. Together we went over the

*Sales engineer, Detroit.

praiseworthy idea that a system or a report will make things go better.

'So he starts one, without the supervision of the executive who has a better outlook on the relation of that idea to the whole situation. Sometimes reports grow out of the necessities of the time. They continue long after their usefulness has ceased. Some are started in error; they never had an adequate excuse for existence.

"Each individual has his own ideas. All want to improve on the work of their predecessors, which is quite natural. It is the fault of the executives that so many systems are allowed to develop.

"And the cost of all these systems and reports may be just the difference between profit and loss on the balance sheet. You start the memorandum system and it goes on indefinitely. A man writes a memorandum to a department with copies perhaps for several other departments. The memorandum gets attention, and the copies get attention, and they probably all get answered, which answers call for still further replies. These get interchanged, taking up the time of a lot of people, and the copies and answers clutter up the files so that you can't find what you do need. A virtual chain-letter system develops that keeps stenographers busy on unimportant work.

"There are not more than 100 memoranda in any one department in the course of a year that are useful three months after they are written."

"How did you happen to get started on this subject of eliminating reports?" I asked him. "Where did you commence?"

"The first thing I did," he replied, "was to lay out on my desk all the reports that came into this office. They more than covered it. I analyzed them all to see how much of this information was actually necessary for the running of this business. I came to the conclusion that it could all be condensed in very much smaller space. Every report represents considerable time of various people in compiling it.

Started on His Assistant First

"My first job was to show my assistant that our system had run away from us so that our men were working for the benefit of the system, rather than using the system for the benefit of the balance sheet. He was the hardest man to convince. He finally saw things my way and together we went through this report business.

"We looked into our welfare department. Like everyone else who has had the subject of labor to contend with the last few years, we found that we had to take more interest in the problem. We developed a welfare department, and had been recently considering some additions to it.

"Looking into the various records and reports we had gradually developed, I came to the conclusion that we, as well as other employers, were acting as though the workman was a child to be held in our lap. We decided that we were interesting ourselves in a lot of things that were none of our business. What records are actually needed in hiring and firing? We came to the conclusion that our one original employment card has all the necessary information. This tells us when a man applies for work whether he has worked for us before; if so, when; how much he was making, and why he left.

"Several years ago we decided to manufacture some of our units that we had formerly purchased. I made an extensive trip around the country investigating systems developed by other manufacturers. I found one in an Eastern shoe factory that had given desirable satisfaction and I decided that this or a modification of it was better adapted to the new work we were undertaking at our plant than any I had seen. I handed it over to our people to develop. They installed the system, and as is perfectly natural, 'improved' on it. The result was that we had to have a $5,000 man to run the system.

"Now I looked into the workings of our elaborate cost system. The first thing I found was that it didn't tell us our costs. None of these elaborate systems do. We made it both simpler and more accurate.

"Another system that had developed unnoticed to a point where it was costing us $12,500 a year was a cross index of the parts numbers of all the parts of each individual car. By means of it, knowing the number of the frame, the magneto and the clutch, we could tell the number of the car. You can see what a cumbersome thing this becomes when keeping track of cars by the 100,000.

"We have so simplified and condensed our records that our time study, stores and production systems are all under one head."

Many Inspectors Eliminated

"We went after our inspection system. The customary system is wrong end foremost. You pay a mechanic $1 an hour to produce accurate parts, and then pay a non-mechanic 50 cents an hour to watch the mechanic. The mechanic who knows an inspector will catch his errors won't try very hard to get the work right in the first place.

"We now hold the department foremen responsible for the work. The foreman of each operation is held responsible for his part of the work until it gets to the assembly line, where the first inspectors are stationed. We have almost entirely eliminated the use of inspectors on minor operations but use them to catch any work not up to standard at the various assembly points. In return for this responsibility we are paying most of our foremen a little more money than we did.

"We find that when the workmen know that it is up to them to turn the work out right with no inspector except their foremen to catch it if it isn't, they will do it properly in the first place. This change has given us better results at a lower cost.

"During the war times we hired a number of outside factories in which to make parts of our car. The cost of trucking materials to and from the branch factories and the main plant was a large item of the expense. This has been eliminated."

I asked him what they had done about contracts for raw materials, that is, about canceling them. "We have never tried to evade our obligations under a signed contract. I instructed our purchasing department to act under the theory that we made the contracts in good faith, and to act accordingly. We have made requests for reductions from most of our sources of supply with whom we had contracts, and have had very satisfactory co-operation from most of them.

Decided Stock Chasers Are Unnecessary

"Another thing we have done is to eliminate all stock chasers. I came to the conclusion that we did not give our suppliers sufficient credit for being good business men, for wanting our business, and being just as anxious to ship their stuff to steady customers who always pay their bills on the 10th, as we were to get them. We have eliminated all of this expense."

"But what about your whole production line being held up for lack of some one part? Do you

not consider a stock chaser needed for such emergencies?" I asked him.

"Why chase one temporary item?" he replied. "As soon as that is found some other item is missing, and so on. No, we have stopped them all. We have also eliminated this local stock chasing around town which is peculiar to Detroit. In other cities supply dealers deliver their material. Here in Detroit we send out pick-up cars and collect our various purchases here and there. We have stopped them all, and their salaries and traveling expenses.

"We have consolidated departments. The simplification of our system has rendered unnecessary certain high-salaried department heads. It has cut out useless effort on the part of a lot of clerks, stenographers and department heads. We combined the functions of several departments under one head, instead of three or four. We have cut out straw bosses and inspectors. Our workmen are contented. They are producing more per man. They have a most kindly feeling toward our company which I know will last for a long time, and we have the satisfaction of knowing that we followed a policy we felt to be right, and made money for our stockholders while doing it."

I admit that this is a feat, one worthy of study and thought. This man's experience goes a long way toward answering the question so often asked when such questions as upholding wages arise: "We know it sounds ideal, but is it practical?"

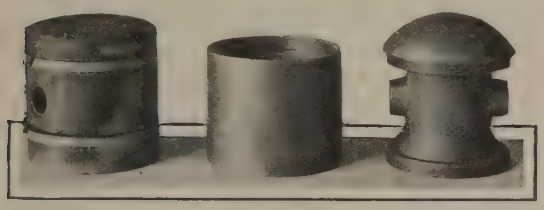
A Gas-Engine Piston Without Rings

Importance of the Continuous Oil Film in Lubrication Stressed—Avoidance of Uneven Expansion

BY STERLING H. BUNNELL*

BY theory and many tests it has been shown that two surfaces, such as a shaft and its bearing, are kept apart by the surface-tension of a film of oil or grease. By loading the bearing, the oil film is forced to become thinner in the direction of the greatest strain. As the shaft revolves, oil entering the bearing at an opening, generally at the top, travels around the shaft in a film of gradually decreasing thickness until at the bottom of the bearing the minimum is reached. Passing on around the bearing in the direction of motion the oil film becomes thicker toward the unloaded portion of the bearing surface, at which point the pressure is sufficiently low to permit the introduction of the lubricating supply.

If the load in the bearing is gradually increased, under test conditions, it is observed that the oil film becomes thinner at the line of greatest strain; until finally under excessive pressure the film is broken and the shaft comes in contact with the bearing surface and seizes. Evidently anything which tends to disturb



At Left Is a Ringed Piston Just as Removed from the Cylinder, with a Heavy Carbon Deposit. At right is the new Tismer piston center, upon which the thin barrel (center) is screwed

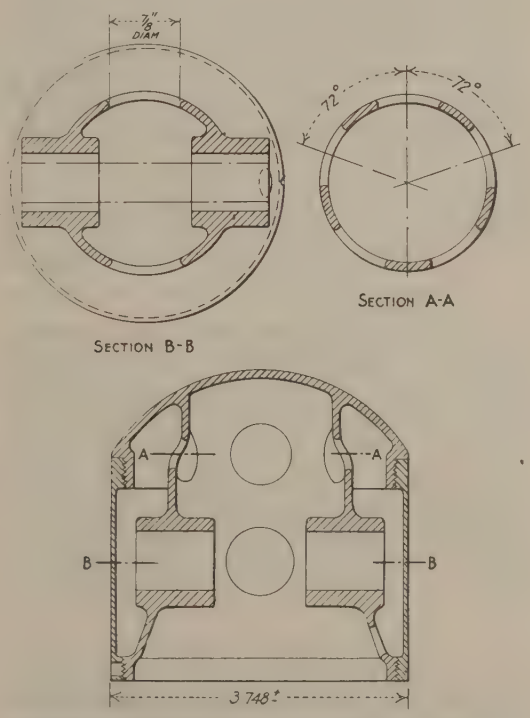
the film of oil, or to decrease its thickness, reduces the load which can be successfully carried by the bearing.

This reasoning applies equally well to reciprocating motion. A cross-head, sliding back and forth in a guide, tends to work out the oil film between the slide and guide surfaces, and the tendency is opposed by the surface tension of the oil film. The best form of slide is a perfectly smooth surface, with the ends slightly rounded to prevent cutting into the film of oil. The bearing qualities of the surface would be very much reduced by cross grooves or other openings which would release the pressure on the oil film and allow it to be reduced in thickness by the escape of oil at the edges of the openings.

More than one builder of machinery has learned that an unbroken oil film is necessary for the best results in lubrication, and has accordingly made shaft bearings with solid boxes meeting accurately at the necessary joint between the box and cap, instead of being separated by the usual shims. Such a bearing will withstand a heavier load and take less oil than a bearing with gaps between the cap and box. Probably the worst form of bearing devised is the four-part box bearing common on steam engines, as it provides not less than four openings through which the oil film may be forced out by the revolution of the shaft.

Development of the Ringless Piston

Study of the action of the film of lubricating oil was the factor which led to the invention of the ring-



Longitudinal Section and Two Transverse Sections Showing How the New Piston Is Made

less piston, recently brought out by Paul G. Tismer. In the ordinary vertical gasoline motor a copious supply of oil is thrown up by the splash system into the cylinder bore, which ought to insure thorough lubrication. However, the piston is invariably provided with two or more sharp edged piston rings, bearing tightly

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against the cylinder wall and operating effectively to scrape off the oil as fast as put on.

As a result, some of the oil is thrown up into the cylinder, and depositing on the walls and piston head, causes carbon trouble; while some of the oil is forced down into the crankcase, and with it more or less of the fuel, causing gradual thinning of the crank case oil by wasted gasoline which has passed by the piston rings. It is evident that the piston rings interfere greatly with the maintenance of a satisfactory oil film on the cylinder walls. If they are left off, and the grooves omitted, the piston trunk would slide indefinitely over the lubricating film without disturbing it, and there would not be a tendency to flip the oil upward and thus to cause carbon above the piston.

The only difficulty was to make a piston round and smooth with a reasonable uniform clearance between the piston diameter and the cylinder diameter. Engine pistons, however, have always been made with the sides thickened at the piston pin bosses, and a flat head cast integrally with the shell. As the piston frequently heats up suddenly in advance of the heating of the cylinder, it has been necessary to reduce the diameter of the upper end of the piston. The same sort of relieving had to be done around the piston barrel, where the piston pin bosses are located. Accordingly, no gas engine piston is round or of uniform diameter, either when it is new and cold, or when it is old or hot. It is necessary to separate the outer shell of the piston from the interior portion which holds the piston pin, and to have neither flanges nor flat head connected to the shell, if it is to remain round under the varying conditions of heat.

The Tismer ringless piston was accordingly worked out by carefully observing these principles. It consists of a piston center in which the piston pin is secured, provided with either a domed or a concave head, as required for different classes of engines. A thin shell of cast iron or other metal, threaded at the end only, is slipped over the piston center and screwed to it. The shell is truly cylindrical, and made with the customary difference of 0.002 or 0.003 in. between its diameter and the diameter of the cylinder. This working clearance space is, of course, occupied by the oil film.

So universal has been the use of piston rings that it is difficult for an experienced designer to imagine an engine operating without them. The first impulse is always to declare that the oil film will be blown out by the pressure of the exploding fuel. But the time element is so short that it is impossible for the oil film to move in the least under the momentary excessive pressure. Next is the thought that the piston will wear rapidly or cut. This is not the case in practice. There is, in fact, no reason to expect trouble, as is proved by the fact that marine engine slides run for thousands of miles without wear, and usually have no adjustment at all, and that the ringless piston in a gas engine is a similar slide running in a similar guide. Ringed pistons do wear and cut excessively, due to the scraping action of the rings in destroying the oil film, and to the relieving of the middle portion of the shell around the piston pins, so that the oil can escape, and the rapid collection of carbon in the ring spaces and between the piston and the cylinder wall as the engine operates. The ringless piston does not permit the formation of carbon, and does not cut.

The Tismer piston has been carefully tried and found satisfactory, to the extent of about one-third more mileage, less oil and no observable wear whatever. The inventor and associates, as the Ringless Piston Co., Inc., 103 Park Avenue, New York, are now adapting the design to the most popular types of automobiles, and will shortly enter the stationary engine field.

Novel Employment Scheme

To take care of men who otherwise would be out of work, a measure was inaugurated last fall by W. & I. Avery, Ltd., Soho Foundry, Birmingham, England, which gave partial employment to both skilled and semi-skilled men. This scheme involved continuing the work of the shop in certain departments after the usual hours, this late work being performed by the extra men.

Schedules of four or five hours per turn were prepared, the work being carried on from 6 to 10 p. m. the first four days of the week, from 5.30 to 10 p. m. on Friday and from 7 a. m. to noon on Saturday, making a total of 25½ hours. Payment for this work was based on the rates for night shift work and ex-service men received priority.

The owners report that the partial employment scheme was found very satisfactory, due largely to the fact that men of high skill, unable otherwise to find work, were willing to take on semi-skilled jobs at corresponding wages. It happened, however, in this particular case, where the work included the manufacture of automatic weighing and testing machines, that it was impossible to find enough skilled men for the final finishing operations to keep the enlarged force supplied with the preliminary work. This condition, of course, would not militate against the scheme as such, but did put a stop to it eventually in the Soho Foundry.

K. S. Magnet Steel

Remarkable for its high coercive force and strong residual magnetism, an alloy steel discovered in Japan in 1917 was named "K. S." after Baron K. Sumitomo, who liberally endowed the university where the discovery was made. The composition of this steel, which has undergone certain improvements since first discovered, includes from 0.4 to 0.8 per cent carbon, from 5 to 9 per cent tungsten, from 1.5 to 3 per cent chromium and from 30 to 40 per cent of cobalt.

As the alloy is brittle, it can be forged only with difficulty and after considerable practice. It is best quenched in oil at about 1750 deg. Fahr., and requires no heat treatment when used for permanent magnets. Its coercive force is reported at about three times that of the best tungsten steel, whose residual magnetism it also surpasses. This residual magnetism was not diminished after prolonged heating in boiling water. Its hysteresis loop has a very large area.

Quenching increases the hardness of the annealed steel—the Brinnell figure being thus raised from 444 to 652, and the Shore figure from 38 to 55. It is reported that the microstructure of the quenched and very hard steel is exceptionally fine. Specimens dropped on a concrete floor from a height of a yard or more lost magnetization only about 6 per cent. The steel is said to be suited for short magnets.

Coal Wages and Profits in England

In a written Parliamentary reply, the British Secretary of Mines has stated that the total amounts of wages and profits in the coal industry for the years 1913 and 1920 were estimated to be the following:

	1913	1920	Increase
Wages	£91,000,000	£264,721,000	190.9%
Profits	21,000,000	27,000,000	28.6%
Per cent of total:			
Wages	81.25	90.75	.....
Profits	18.75	9.25	.....
£ wages to each £ profits.	4.33	9.80	126.3%

During June, the Bessemer Limestone & Cement Co. shipped 95,100 bbl. of cement from its plant at Bessemer, Pa., establishing a new monthly record for shipments. The June production was at the annual rate of 1,140,000 bbl. Officials state that the company is well booked ahead and expects to sell capacity production this year.

The American Bridge Co., Ambridge, Pa., has been awarded the contract for the steel frame and other structural steel work on a six-story building at Youngstown, Ohio, to be erected by the Youngstown Terminal Building Co., the ground floor of which will be devoted to a passenger station for the Erie Railroad. The structure will require 420 tons of steel.

PIG IRON FROM BLACK SANDS

Results of Recent Experimental Work on the Pacific Coast

Some details are available of experimental work done on the Pacific Coast in the reduction of the iron sands which are found along the coast and on the banks and bottoms of most of the rivers flowing into the Pacific Ocean from Alaska to Southern California. The work was carried on by William Tyrrell, for the New Era Iron & Steel Corporation, at Sedro Woolley, Wash., and the description given below is furnished by James L. Avis, Jr., consulting engineer, Seattle, Wash.:

"In 1920 Mr. Tyrrell built a small blast furnace at Sedro Woolley of about 10 tons capacity. The furnace is 35 ft. high and 30 in. at the hearth inside. A 16-pipe hot blast stove and Root blower, operated by 20 hp. motor, furnish the blast. The top is closed by usual cone and bell. The shell is ½-in. plate; the bosh jacket above the tuyeres is 4 ft. 4 in. high of 1-in. cast steel and is spray cooled. There are four bronze tuyeres and water coolers with 3-in. blowpipe. The hot-stove is 30 ft. high, 5 ft. 6 in. in diameter, lined with firebrick, and has four rows of 4 6-in. pipes. A 15-in. bleeder leads off the downcomer. Two burners lead the gas to the hot stove. The plant is operated by electric power. There has been no trouble whatever with briquettes made from black sand. The binder is not only a powerful binding agent but is also a purifier, or scavenger, and since the materials of which the binder is composed are abundant in nature and consequently can be produced at small cost, there is no apparent reason why this iron should not be produced in unlimited quantities at greatly reduced cost of production, as there is no expensive and troublesome sintering or nodulizing. Chromium and titanium are eliminated by the use of this binder, which not only gives entirely satisfactory results in producing briquettes at a very small cost, with a yield of 1300 to 1400 lb. of iron to the ton of briquettes, but gives equally satisfactory results with any kind of fine ore, metals, concentrates or flue dust.

"It is highly probable this magnetic black sand was originally limonite, subsequently dehydrated. Of course, briquetting has been attempted before, covering various materials, but never with satisfactory results until the process as developed by Mr. Tyrrell of the New Era Iron & Steel Corporation had been given a thorough tryout. Typical charges in the experimental blast furnace at Sedro Woolley comprised approximately 47 per cent briquettes, 47 per cent fuel and 5 per cent flux.

"Average analyses of the briquettes show 54 per cent Fe., 11 per cent TiO_2, 7 per cent SiO_2 and 0.018 per cent phosphorus. The metal produced was run into pigs of approximately 4 x 2½ in. section. Chemically these contain 2.75 per cent graphitic carbon, 0.98 per cent combined carbon, 0.60 per cent phosphorus, 0.08 per cent sulphur and 1.25 per cent silicon, these results being the average of numerous casts. When specimens have been polished and etched and examined at 150 diameters a very dense and uniform structure is seen. The distribution of graphite is very regular and is nodular rather than in the form of plates. The continuity of the metal is therefore not broken up and it is much stronger than the general run of commercial irons. In fact, physically this pig iron is denser, stronger and more readily machinable than the usual run of gray iron machine castings. It is not only tough but possesses great ductility, sharp corners standing hammering down without signs of chipping or cracking. Specimens machine readily, having been subjected successfully to boring, milling, thread-cutting and planing operations.

"The New Era Iron & Steel Corporation is not content with producing pig iron from black sands, but is continuing further experiments. During January and February of this year steel and gray iron castings were produced using varying percentages of this pig iron. For example electric furnace steel castings have been produced containing roughly 39 per cent open-hearth scrap, 44 per cent foundry scrap and 16 per cent black sand pig iron. Castings produced from this mix were clean, homogeneous, and when annealed machined satisfactorily. The carbon content ran 0.28 per cent and specimens gave an average of 69,000 lb. tensile strength. Another melt of steel containing 50 per cent of this pig and showing a carbon content of 0.69 per cent was formed into a small ingot of approximately 4 in. diameter and 30 in. long. This was forged to 1¼ in. square. At high forging temperature metal was quite resilient. A shaper tool was made from this metal, hardened and tempered, and gave a very satisfactory service. The tensile strength of this material averaged approximately 120,000 lb. per sq. in.

"A mixture in the cupola approximated 30 per cent commercial No. 1 Northern pig and 70 per cent black sand pig. This metal entered a locomotive driving wheel and its machining qualities and dense structure received high praise at the hands of the purchaser. Test bars gave a modulus of rupture of 61,000 lb. per sq. in.

"Referring again to the briquettes made from this black sand, the average compressive strength of these is 255 lb. per sq. in. higher than the compressive strength of coke. Compressive strength of briquettes increases as temperature rises and does not start to decrease until closely approaching fusing point. The binder used in these briquettes is of such a nature that certain objectionable elements contained in some fine ores and sands are satisfactorily reduced by contact with the furnace gases."

AT LOW EBB

Operations of Iron and Steel Plants Show Much Idle Capacity

Wheeling, W. Va., July 11.—The schedule of operations of the Wheeling Steel Corporation for this week reflects the very low ebb of current steel business. Plants of the Whitaker-Glessner Co. here, in Martins Ferry, Ohio, and Beech Bottom, W. Va., are idle and at the Portsmouth, Ohio, plant of this subsidiary of the Wheeling Steel Corporation, only three open hearth furnaces are in operation. At the latter plant there are ten open hearth furnaces. One lap weld pipe furnace and one butt-weld pipe furnace constitute the only activities of the Wheeling Steel & Iron Co., another subsidiary. LaBelle Iron Works, the other subsidiary, has four open hearth furnaces out of 11 at its Steubenville, Ohio, plant in operation while at this plant the blooming mill and No. 3 plate mill are operating one turn. All eight sheet mills at this plant are on, as well as two jobbing mills. At its Wheeling works LaBelle Iron Works has 22 of 120 cut nail machines in operation.

Plant Operations

The American Locomotive Co., Dunkirk, N. Y., has resumed operations at its local plant for the construction of 30 locomotives, five of which will be for Western railroads, and the rest for eastern lines. The men have been asked to accept another 15 per cent wage reduction, making a total cut of 30 per cent in wage scale.

The last of the furnaces of the Sloss-Sheffield Steel & Iron Co. to go on the idle list was blown out on June 29. This is the first time in the history of the company and its predecessors—covering more than 35 years—that the entire pig iron producing capacity has been idle.

The property of the Penn Iron & Steel Corporation, Plum Street, Lancaster, Pa., bankrupt, will be sold by the receivers, including plant and adjoining land, and machinery, equipment and supplies. John M. Groff is trustee in bankruptcy.

The Bostick Stove Co., of Lapeer, Mich., which has been operating only four days a week, is again working full time and with a small night force. The company has received a large order for carburetor castings.

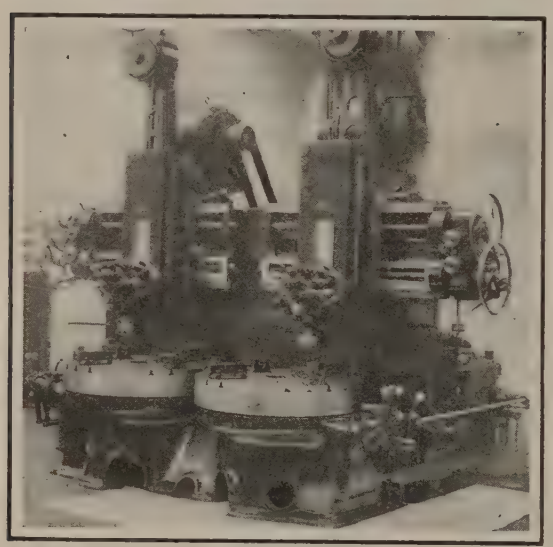
The Lansing Forge Co., Lansing, Mich., is now operating on a 60 per cent basis, and it is expected that this will be largely increased very shortly.

Duplex Boring and Turning Mill

A two-table, two-head boring and turning mill fitted with revolving turrets has been recently introduced by Webster & Bennett, Ltd., Coventry, England, and is said to supersede the single-table, two-head machine previously manufactured by that company.

The machines are furnished in two sizes with 20 in. and 42 in. tables. The drive is by means of single pulleys fitted with friction clutches and the speed change gears cannot be shifted until the clutch has been released. A patented reversing motion to the left hand table enables the operator when turning and surfacing, to work with the tool adjacent to the tool control levers. In the case of drilling, boring or reaming standard tools can be used and the table run in the reverse direction, a feature which is said to obviate the expense of left hand tools. Horizontal, vertical and angular feeds are provided and are positive reversible and interlocked. Rapid power traverse is immediately available.

A feed safety clutch is provided which is held in position by a spring and set to take the pressure exerted by the heaviest cut a tool will take. Pressure beyond this causes the clutch to slip preventing damage to the feed mechanism through accident or carelessness. Adjustable micrometer collars are provided, the position of which are controlled by spiral springs enabling the operator to readily make adjustment for setting tools and sizing the work by revolving the collars. Graduated trip dials are geared to the feed motion by means of friction clutches and are engaged or disengaged by knurled knobs at the front of the dial. When dial zero is opposite the pointer, the feed motion is automatically cut out.



The Left Hand Table Is Provided with a Patented Reversing Motion. Table runs clockwise for turning and anti-clockwise for boring

Ball thrusts are provided to all feed screws and worms. Turrets are balanced by compensating springs instead of weights and chains, tension being adjusted by revolving worm shaft on the top of the balance box. Other features include an improved tool binder for holding boring bars, etc., rigidly and without bruising; narrow guides to all slides; centralized control and reduction to two levers controlling the automatic feed and rapid traverse motion. Large bearing areas are provided to spindle and thrust ring, the down thrust being taken on a large diameter double-coned bearing. Filtered oil is supplied to gears and bearings by means of sight feed and other lubricators. For motor drive two motors are required each fitted with belt pulleys of size suitable to drive the 14 by 5½ in., machine pulleys at 400 r.p.m.

Alfred Herbert, Ltd., 50 Church Street, New York, is acting as sole distributer in the United States for the machines manufactured by Webster & Bennett, Ltd.

Course for Foremen

DETROIT, July 9.—The University of Michigan has opened a special conference course for factory foremen and superintendents, industrial executives and teachers, covering a four-weeks period between July 5 and 29. Only 20 students have been admitted. K. G. Smith, mechanical engineer, and Thomas Diamond, associate professor of industrial education, both practical shop men, are conducting the course. The main factors being considered are organization, capital, management and labor, to be studied from the viewpoints of relationships between foremen, management and workers; qualifications necessary for foremanship, basis upon which foremen should be selected, the factors of efficiency and contentment, the kind of training required, wages, problems of hiring and discharging men, and the advisability of shop committees. Under the head of materials and equipment, the class will study routing of materials, care of materials and equipment, working equipment to capacity, and recording machine efficiency.

New Ganister Crushing Plant in Pennsylvania

A ganister crushing plant has recently been completed by E. R. Baldridge & Co. at their Barree, Pa., quarries. This firm, with offices at Hollidaysburg, Pa., has been engaged in the ganister business since 1889. In addition to its use in the Bessemer, open-hearth electric ferrosilicon and silica brick practices, the ganister will be used for railroad ballast and road construction. The analysis shows 99 per cent silica, while tests made show crushing strength of 33,000 lb., or twice that of limestone and 50 per cent more than trap rock, both of which have been extensively used as railroad ballast.

The crusher installed is a special type, known as 5x, made by the Good Roads Machinery Co., Kennett Square, Pa. It has a return track elevator and a screen with four size screening surfaces, permitting the separation of the crushed ganister into commercial sizes for the various uses. The motive power is a fuel oil engine, of the Y type, made by the Fairbanks & Morse Co. Water is furnished by an automatic air pump, both for cooling and washing purposes.

The crude ganister is taken from near the top of an adjoining mountain and brought to the plant on a 2600 ft. inclined plane, with figure 8 sheaves for balancing or braking power. The quarry is about half a mile long and somewhat over 100 ft. high, showing a white ledge of silica which can be seen from a long distance. The cars used are of three tons capacity with end lift for use on an all-steel dumping table.

One of the Deposits of Crude Ganister near Barree, Pa.

The ganister is blasted from the ledge with dynamite and owing to the open seams, no drilling has been done as yet as the ledge opens up after each shot and permits dynamite to be inserted for further blasts. The capacity of the crushing plant is 300 tons daily, while 200 tons in addition can be shipped daily as crude rock, separate dumping tables being provided for each kind of material.

Racine Company Helps Unemployed Men

Plan to Prevent Suffering Among Those Formerly on Payroll Based on Definite Information as to Needs—Advance to Be Repaid

THE industrial depression has forced many manufacturers to curtail operations or to close their doors entirely, with the result that many employees have been thrown out of work. Reduced or suspended output is an expensive burden for any company. No fair-minded person could expect an industrial concern thus affected to add to its expenses by giving assistance to its idle employees, particularly in view of the fact that during the war and immediately after it, the wages of workmen in this country were the highest in history. Although it is generally true that the unemployed would not suffer if they had been provident during prosperity, the J. I. Case Threshing Machine Co., Racine, Wis., received reports early this year which seemed to indicate that many of its employees who had been laid off through no fault of theirs, and had family responsibilities, were in great need; in many instances, even of the necessities of life.

The company tried several methods of checking up the condition of these ex-employees, but without much success in ascertaining the actual facts. It was finally decided to send out a letter to every employee whose address the company possessed, who was on the payroll at August 1, 1920, cutting out the apparent transients. This letter requested each person to assist the company in locating the address and condition of any family man who was reported to be in need. Something over 2000 of these letters were mailed, and the result was very satisfactory, in that they produced fairly complete information on all men who had been laid off and were really in trouble. When the name of such a workman was reported, a competent, sympathetic investigation was made, and help was furnished by means of issuing to the family a local order for such things as were required from his regular grocer or source of supply. This local order authorizes the merchant to bill the company, attaching the local order, and to deliver the merchandise to the bearer. The local order is tied up with a signed memorandum whereby the man who gets this assistance agrees that the cost of the help given to him is an advance on future earnings and promises to pay back the amount of money involved in installments on each pay day, without interest.

The plan has been working out satisfactorily and the results of the company's investigations indicate that relatively few of its former employees were in particular need, although there were sufficient cases of want to justify having gone into the matter thoroughly. Up until June 20, approximately 75 families had received help under this plan. Below is the original letter which was sent out to employees, asking for assistance in locating family men who had been laid off, who were in need of help:

EMPLOYEES BENEFIT ASSOCIATION
OF THE
J. I. CASE THRESHING MACHINE CO.
INCORPORATED

Office of Superintendent

RACINE, WIS., Feb. 16, 1921.

Dear Sir:

Will you please help us locate any family man who has been laid off by the J. I. Case Threshing Machine Co. who is in need of help at this time? If you will send in any names and addresses and tell us what you know about the case, we will investigate promptly and see what can be done to relieve the situation. All information will be kept confidential.

This request is sent to you because your name appears on the August list of members of Employees Benefit Association.

Please used inclosed envelope.

J. I. CASE THRESHING MACHINE CO.

The following is the form which was filled out on the basis of an investigation of the reported case.

Date.....
Name ..... Address .....
Reported by .....
Nationality .....
Employed: From..... To..... Dept.....
Reason for leaving .....
Earnings when employed .....
Gross earnings at present.....
Other incomes .....
Other help: Source..... Amt. weekly.....
Family: Wife..... No. of children..... Sex.....
Ages.....
Disposition of case:
.....
.....
.....
.....
.....
Remarks:
.....
.....
.....

The ensuing form is the contract between the company and the employee, wherein the employee agrees to pay back the principal of advances made without interest:

RACINE, WIS., Feb. 16, 1921.

The J. I. Case Threshing Machine Co., on account of the previous creditable service of.....
.....
has this day issued to him Local Order No.....
on ..... and agrees to pay the said merchant for the goods to be delivered on such order; and in consideration thereof the said ..... agrees to repay to the company said advance as soon as he can obtain work at ..... dollars per pay day without interest, and until such advance is finally repaid he does authorize any future employer to make such payments for him and deduct the same from his wages.

.....
.....
.....
.....
.....

J. I. CASE THRESHING MACHINE CO.
By .....
And .....

Made in duplicate.

The following is the local order, in triplicate, which authorizes the employee to secure goods on the company's account from the local merchant:

Original
LOCAL ORDER
Date ....., 192..

To ..... No.....
.....
Please deliver to bearer .....
and charge to our account:
.....
.....
.....
.....

Itemized bill to cover must be sent to us at once with this order attached.

We shall issue no further orders on any merchant who shall charge for any item a price in excess of his regular price for such item on the day this order is filled.

EMPLOYEES BENEFIT ASSOCIATION OF
J. I. CASE THRESHING MACHINE CO.,
By .....

The Harvey Spring Co. and the Webster Electric Co., both of Racine, have adopted substantially the same plan which was introduced by the J. I. Case Threshing Machine Co. The J. I. Case Plow Works Co. has in operation a plan which is somewhat similar

LICENSING BUSINESS

To Embark on an Enterprise Involving Many People Should Require Knowledge of Economics

Urging that no man should be allowed to engage in business—at least, in business involving a capital larger than a certain fixed amount—without passing an examination and securing a license, as the doctor and the lawyer are now required to do, and that no one should be allowed to participate in making laws unless he has proved in some way his fitness to grasp conditions to meet which the laws are being made, Alvan T. Simonds, president Simonds Mfg. Co., Fitchburg, Mass., maker of saws, knives, files and steel, recently contributed a notable article to the *Boot and Shoe Recorder.*

Parallel in Medicine and Law

"The state," he wrote, "does not allow men to practice law or medicine without a license, but it allows any man who can secure the proper amount of capital or credit to enter upon a business venture involving not only himself and his future, but also the future welfare of thousands of others. When a company employing thirty thousand men and women fails because of poor management due to an ignorance of fundamental economic laws, something has happened that society should not allow."

He likened a great business enterprise to a great ship at sea. "The welfare of those on the ship is, to a large extent, determined by the skill and education of the captain and his assistants. If the ship meets stormy weather or unforeseen conditions, if accidents occur, the education and experience of those in charge must make it reasonably certain that the ship with its cargo and its passengers will come safely through.

"A great business carries the responsibility of the welfare and happiness of thousands of men, women and children in many homes. It seems almost criminal to allow such an organization to exist under the direction of those who know little or nothing of the laws which make for its safety. The number of failures occurring annually proves that this is a real and constantly recurring danger. One hundred and twenty thousand corporations in the United States in 1917 produced no profit. There were 1641 commercial failures in the United States in February, 1921, representing an indebtedness of over sixty million dollars."

What Is Required of Law Makers

As to lawmakers, he asks: "Is it not a rather curious attitude on the part of the public that requires all those who are to practise law to go through a long term of study and to pass difficult examinations before they are admitted to the bar and at the same time will send to our legislatures and to Congress to make laws men who have little or no knowledge of the great fundamental principles that underlie the prosperity of the country?"

It must be required that our business men and our law-makers shall have studied and have a fairly good knowledge of the laws of economics which deal with the material things which satisfy human desires. They must prove by examination or certification by some accepted school that they are prepared to undertake business without more than ordinary risk of misfortune to others, and therefore to society in general.

FOR THE OPEN SHOP

Manufacturers' Association of Northern Ohio Is Organized

Manufacturers of 12 central Ohio counties, at a meeting held recently at Bucyrus, formed an association to be known as the Manufacturers' Association of Northern Ohio. One of the main objects of the association is to co-operate in the open shop movement under the American plan of operating their plants. C. F. Michael, president Ohio Crane Co., Bucyrus, and of the Bucyrus Employers' Association, presided at the meeting and 60 companies in the district were represented and joined the association.

The objects of the new organization as outlined in the constitution are to promote the principles of fidelity among members, to promote and improve the opportunity of personal contact, to foster among the members the spirit of friendliness and good-will, to discuss the plans, ways and means of giving larger and better service to the customers of the members, to promote the use and sale of worthy merchandise manufactured by fellow members, to discuss questions of interest pertaining to the operation of manufacturing plants, to assist fellow members to dispose of surplus stocks, to provide the best possible working and living conditions for all employees, to promote principles of honesty, competent and efficient services for wages paid and to pay honest wages for such services rendered, to discountenance conditions which are not just or which will not allow a workman to earn a wage proportionate to his productive ability or capacity, to prevent interference with those who desire to work and give faithful service, to promote fair dealings between its members in the improvement of each other's employees, to assist fellow members in securing competent, loyal and desirable employees, to assist whenever possible to adjust industrial disturbances in the plants of fellow members, to obtain the open shop principle, to uphold the majesty of the morale and to increase the love for America's institutions and to promote the love and prosperity of humanity, and loyalty to God, home and country.

Officers were elected as follows: President, C. B. King, Marion Steam Shovel Co., Marion, Ohio; first vice-president, C. F. Michael; second vice-president, F. B. McMillen, Hydraulic Pressed Mfg. Co., Mt. Gilead, Ohio; third vice-president, T. R. Barnes, Barnes Mfg. Co., Mansfield; fourth vice-president, J. L. Clark, Hess-Clark Co., Ashland; secretary-treasurer, Fred B. Scherff, Marion. These officers and the following constitute the board of directors: J. L. Morrow, Burch Plow Works, Crestline; Z. E. Taylor, C. & G. Cooper Co., Mt. Vernon; H. C. France, Tiffin Wagon Works, Tiffin; A. B. Whitney, Whitney Tractor Co., Plymouth; E. B. Phillips, Champion Engineering Co., Kenton; J. S. Boyd, Galion Iron Works, Galion.

The next meeting will be held at the Westbrook Country Club, Mansfield, July 27.

Business Prospects at Seattle

SEATTLE, July 5.—During April, the brightest outlook of the year appeared from Manila. The jobbing and exporting trade looked for a brisk summer inquiry. That inquiry is still here, but the weakness in Philippine exchange and the extreme difficulty of financing exports caused exporters to withdraw in part from the contemporaneous selling market. Manila, it is known, needs heavy duty tools and machinery, but financial conditions have arisen which compel caution in closing on contracts. Japan is getting into better position to buy, and is to-day regarded as the strongest of the Oriental buyers. A rather brisk fall inquiry is expected from Japan.

The weakness in sheets, plates and pipe is due largely to the expected decline in transcontinental rail rates. Through devious sources jobbers have been advised that the Eastern or initial carriers on this haul have consented to reductions from $1.66 to $1.05, Pittsburgh, to Puget Sound common points. Buyers have learned of this attitude of mind of Eastern carriers who have stood out against any reductions in freight although transcontinental lines have taken the opposite view of conditions.

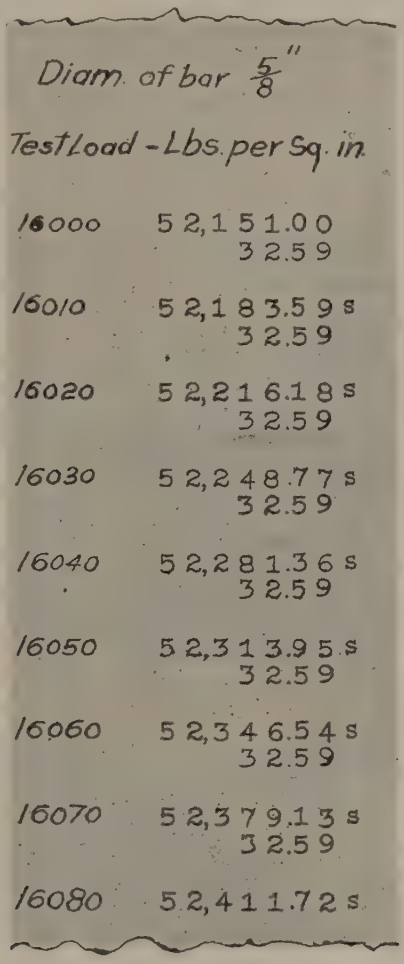
The Dravo-Doyle Co., Pittsburgh, has been awarded a contract for a new turbine engine for the municipal waterworks plant at Youngstown, Ohio, on its bid of $52,000.

TESTING MACHINE HELPS

Compiling Table to Translate Pounds on Test Bar into Pounds per Square Inch

BY R. W. ALLARD*

When a great number of bars of the same diameter are to be tested, as a part of routine work, a table relating machine-bar readings to unit stress is of particular value. The first step is the solving for pounds per square inch by computation for the even 1000 lb. both above and below the average range at which the particular bars break. Then determine the smallest increment that the testing machine will read. (This is commonly 10 lb.) Determine the value of this increment in lb. per sq. in. for the diameter of bar under test.



Mechanical Calculation of Pounds per Square Inch for Given Test Loads

Then with a recording adding machine put down the lb. per sq. in. for the whole thousands of pounds actual bar test load with which the table is to be started. Add in the value of the testing machine increment in lb. per sq. in. by means of the *sub total* key. The sub total sum is the value in lb. per sq. in. of the testing load for the thousands of pounds testing load with which the table was started, plus the smallest reading of the testing machine.

Repeat the adding of the increment value in lb. per sq. in. with the *sub total* key until tables have been made covering the range the bars commonly fall under. Print with drawing ink before the sub total figures the proper values of pounds of actual testing load. Cut the strips of paper from the adding machine and paste on a heavy piece of cardboard. Paint with white shellac.

If the smallest reading of the testing machine is 10 lb., the value of this reading in lb. per sq. in. must be added 100 times by means of the *sub total* key to make a table covering 1000 lb. test load. Insure the accuracy of the table by noting if the values of the even 1000 lb. of test load obtained by the use of the adding machine agree with the computed values for the even 1000 lb. test load.

Following is an example for test bars ⅝ in. in diameter. The value of a 1000-lb. test load in terms of lb. per sq. in. is 3259. The increment or smallest reading of the machine is 10 lb. There are then 100 increments for every 1000 lb. test load. The value of each increment is 32.59 lb. per sq. in.

To start the table with 16,000 lb. test load, the fiber stress is calculated at 52,151 lb. per sq. in. On the recording adding machine put down 52 151, and by means of the *sub total* key add 32.59 and get 52,183, which is the value in lb. per sq. in. for 16,010 lb. of test load. Continue adding 32.59 by means of the *sub total* key and note that after one hundred additions the answer is 55,410, which checks with the computed value for 17,000 lb. test load.

Example of computation:

Area of ⅝-in. round bar = 0.3068 square inch.

0.3068 : 1 (sq. in.) : : 16,000 (test load) : x (lb. per sq. in.)

$$x = \frac{16{,}000}{0.3068} = 52{,}151.$$

The slip of paper illustrates the use of the adding machine.

*Metallurgical engineer Northern Malleable Iron Co., St. Paul, Minn.

Lower Wages Expected

Mid-western bar iron makers who are members of the Western Bar Iron Association look for further declines in the price of bar iron from the average price of 2.30c. per lb. disclosed at the last settlement with the Amalgamated Association of Iron, Steel and Tin Workers to determine the tonnage rates to be paid boilers and finishers in the July-August period. Bar iron is reported offered in the East at 1.85c., Pittsburgh. Additional decline will mean, of course, further reductions in the rates paid workers in affected mills. At 2.30c, puddlers' wages dropped to $12.52 per ton from $13.76, paid in the May-June bi-monthly period. The current rate compares with a post-war peak of $18.76. At 1.85c, the puddling rate would be $10.26, on the old scale. In view of the possible downward revision of the base rates and the price of iron falling below 2c, a puddling rate of $9 per ton is predicted.

Active bar iron mills are still operating under the 1920-1921 agreement, under a clause which provides for its automatic continuance for 30 days following expiration of the old scale, upon failure to negotiate a new agreement.

Unemployment Increasing

Unemployment in Pennsylvania still is increasing according to the latest report of the State Department of Labor and Industry, despite the fact that a good many men are finding employment on the farms and in the construction of highways. Reports from the district offices of the departments give the number of unemployed in the different centers as follows: Altoona, 22,050; Erie, 14,635; Harrisburg, 14,245; Johnstown, 17,090; McKeesport, 5,850; New Kensington, 9,820; Philadelphia, 105,000; Philadelphia (women's office), 11,150; Pittsburgh, 48,100; Scranton, 20,250; Williamsport, 5,950.

The unorganized employees of the Mullins Body Corporation, Salem, Ohio, have called off the strike at the Mullins plant which was declared nearly four months ago, when the men refused to accept a 9-hr. working day. Although the union machinists at the plant have not called off the strike, the action of the unorganized employees has virtually ended the strike, as only about 25 machinists are still out.

RAILROAD FINANCES

Time Will Be Required to Work Out Plans for Relief of the Carriers

WASHINGTON, July 12.—The iron and steel trade, as well as financial circles, is greatly interested in tentative plans of the Secretary of the Treasury to advance funds to the railroads at an early date as a partial settlement of money owed by the Government to the carriers. This proposal has been miscalled a "loan," and has been estimated at $500,000,000. In point of fact, it is merely a furtherance of plans taken up recently by the Administration, looking to the expediting of payments in order that the railroads may settle obligations they owe and be in a position to make purchases of steel and other requirements which they need. Probably several weeks will be required before a conclusion of the plans can be brought about, although the misleading belief has been prevalent that it would be reached within a few days.

The financial relations between the carriers and the Government were set forth in THE IRON AGE of June 30, but in view of subsequent developments looking to the making of settlements with the railroads, they will be restated in a brief form.

The railroads owe the Government approximately $800,000,000 for expenditures made by the Railroad Administration in improving railroad property during Federal control. At the outset, there was a total of about $1,200,000,000 due the Government from the railroads because of the improvements and by reason of the purchase of car equipment. Something like $400,000,000 of that sum was funded by the Railroad Administration, which took notes of the railroads at 6 per cent for a period of 10 years, leaving about $800,000,000 due and unfunded.

Under the transportation act, it lies within the discretion of the President to fund part or all of this indebtedness. The suggestion that the $800,000,000 be funded for 10 or 15 years was made before the Senate Committee on Interstate Commerce at the railroad inquiry by President Samuel Rea of the Pennsylvania Railroad. Objection was made by him to the Railroad Administration deducting sums owed by the railroads to the Government in making final settlements. The point was made that this method of procedure deprived the carriers of cash which would aid them greatly in paying their bills for materials and supplies and in doing required maintenance work.

The matter was taken up with President Harding, who in turn referred it to Director-General Davis of the Railroad Administration, Secretary of the Treasury Mellon and Secretary of Commerce Hoover and in consequence negotiations were started with the railroad executives to work out a plan for funding part or all of the $800,000,000. If this is funded, it would mean that whatever amount the Government owes the railroads will be paid in cash as soon as settlement can be effected between each individual railroad and the Railroad Administration. It is roughly estimated that there is approximately $400,000,000 due the railroads from the Railroad Administration without taking into consideration the dispute involving the demand of the railroads for allowance for alleged inefficiency of labor during Federal control. There is also due the railroads approximately $200,000,000 under the guaranty during the six months following Federal control, making a total of practically $600,000,000 which may be paid to the railroads as soon as settlements are effected between the carriers and the Government.

It is explained that even though the $800,000,000 of railroad indebtedness to the Government is funded, it will still remain for each railroad and the Railroad Administration to agree on the amount due the given carriers. A number of railroads have not yet filed their claims for use of their property during Federal control, but in view of the desire of President Harding to expedite the settlement of claims as much as possible, it is hoped those which have not as yet been filed will be presented soon. The feeling is prevalent in the Administration, however, that some claims which have been filed are unduly high and should be scaled down.

Whatever may be done with regard to making sizable funds available to the railroads, it will, as indicated, require several weeks in all probability. The problem is no easy one, for the Railroad Administration in funding railroad indebtedness will have to obtain more cash than it has available, and it is not believed it will seek further appropriations than the estimate of $200,000,000 presented before the House Committee on Appropriations. It might, however, borrow the additional sum necessary from the War Finance Corporation, giving in return car trust certificates.

STILL STUDYING

Federal Trade Commission Examining Pittsburgh-Plus Case—An Interesting Possibility

WASHINGTON, July 12.—While no definite date has been set by the Federal Trade Commission to begin hearings in the so-called Pittsburgh-plus case, it is expected that they will start early in September. The commission continues study of the case and has had a conference with an attorney representing the United States Steel Corporation, with regard to the procedure to be followed and the more important points to be taken up. Chairman Houston Thompson, and Harle Steinhauer, who has been assigned as trial attorney for the commission, have gone to Duluth, Minn., in connection with gathering data, although the trip of the chairman is not entirely of an official character, inasmuch as he has gone on a vacation of two months which will end the first of September.

It is interesting to observe that hearings in the case hardly will be before the term of one of the members of the commission, John Garland Pollard, expires. He goes out of office on Sept. 20. With Commissioners Thompson and Nugent he voted for the issuance of a complaint as against the opposing votes of Commissioners Gaskill and Murdock. Naturally, there now is speculation as to who will be appointed as a successor to Mr. Pollard and what his attitude on the case may be. It is assumed that, like others who preceded him but who were not members when previous hearings were held, he will go over the voluminous records before passing upon the case. If another vote should be taken and the new appointee oppose the complaint apparently the commission would reverse itself for the second time and in this instance the case would be dropped, granting that the remaining members of the commission are unchanged as to their views. There is, of course, no assurance that another vote will be taken, but the possibilities of the situation have created interest.

Reports are heard that Judge Vernon Van Fleet of Elkhart, Ind., now associated with the Department of Justice in connection with work looking to its more economical operation, will be appointed as the successor to Commissioner Pollard. Judge Van Fleet was in charge of the Harding campaign in Indiana, before the Republican convention.

Railroads Add to Their Forces

CHICAGO, July 9.—The Chicago, Burlington & Quincy has added 600 men to its rip track forces during the past week. The Minneapolis, St. Paul & Sault Ste. Marie has put 3600 men back to work in the bridge, carpenter and other shops. The first deviation from the policy of reducing forces to a minimum, under which the Atchison, Topeka & Santa Fe has been operating for months, was the return of 100 employees in the road's car repair shops at Topeka, Kan., last Monday.

The United Engineering & Foundry Co., Pittsburgh, is about to begin publication of a plant paper for its employees, the first issue to appear in July.

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ESTABLISHED 1855

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Steel As An Index

It is just as true now as it was one year ago that the steel industry cannot long maintain a rate of operation either far above or far below the general percentage of business activity in the country. One year ago, when signs of reaction in other lines were increasing, steel producers were straining every nerve to meet the demands upon them and were quite willing to believe that for many months they would be called on to deliver all the steel they could turn out. Three months later, when the inflow of iron and steel orders was suddenly checked, almost overnight, the interdependence of all members of the industrial body was recognized again.

That demand upon the country's steel mills should have fallen to the starveling rate of 20 to 25 per cent is the feature of the industrial situation upon which the attention of both producers and consumers has been riveted of late. It is well known that the country's consumption has not fallen to such a low rate. All other measurements ordinarily applied to business—bank clearings, car loadings and the like—indicate general activity in manufacture and trade far above that which is the rule at blast furnaces, steel plants and rolling mills. The interchange of rolled steel by jobbers, in the liquidation of their stocks, the resale of rolling-mill products by manufacturing consumers of such steel, and the shipment of material from one plant to another, in the case of large corporations, to avoid sending fresh orders to the mill, are examples of the policy followed out in every quarter. The outcome of it all will be, one day, a country bare of steel to a degree that has not been paralleled.

Underlying all this effort to use up every pound of steel in sight, or to turn it into money, is the palpable intention to replace it at an indefinite later day, when the process of deflation has run its course. And such replacement, together with new buying that will not be for stock replacement, may actually start at a time when in the opinion of many any real improvement is far in the future. Over against the time needed for further readjustments that must precede the return of health to business, there must be a reckoning sooner or later with the fact that steel mill operations, as was the case for nearly half of 1920, are quite at variance with other indices of trade.

Past and Present Steel Prices

Recent reductions having placed steel prices within easily measurable distance of their pre-war levels, there is more disposition to make comparisons. Using as a basis the prices formally announced within the past ten days, the advances over the ten-year pre-war average are as follows in representative products:

	Per Cent
Billets	33
Merchant bars	34
Plates	34
Shapes	33
Black sheets	57
Galvanized sheets	35
Wire nails	52

The advances over pre-war averages in billets and the three heavy rolled products, bars, shapes and plates, are remarkably close, the increase being almost precisely one-third. Black sheets stand out with a heavier advance, and for this divergence several influences may be assigned. The sheet market before the war was an especially competitive one, and wage advances have fallen with particular heaviness upon sheets. That galvanized sheets show a smaller percentage advance is partly a matter of arithmetic. The average spread between black and galvanized sheets before the war was about 1.05 cents, while the present spread, with black quoted at 3.50 cents and galvanized at 4.50 cents, is 1 cent. Wage rates in galvanizing shops are much higher than before the war, but zinc is much cheaper, its present price of 4.35 cents comparing with an average of 5.64 cents in the ten pre-war years, showing a decline of 23 per cent.

Of all the familiar steel mill products wire nails have been most often mentioned of late as the victim of high labor costs. The new $2.75 price is regarded by producers as a very low one, yet it is 52 per cent above the average price quoted

in THE IRON AGE from 1904 to 1913. This comparison, moreover, being simply of the base price, does not take into account the change in the card of extras. Making allowance for that, the advance on a typical specification would be between 55 and 60 per cent.

There are those who regard pre-war averages as useful only for comparisons in a very general sense. It is pointed out that mills did not necessarily receive the average prices commonly cited, since as a matter of fact these are simply averages of open market quotations from week to week for comparatively early deliveries. The mills did not sell much at the lowest prices, but on the other hand they did not sell much at the top prices. It may be cited in favor of pre-war averages that if any steel commodity be taken it will be found that the ten-year average, 1904 to 1913 inclusive, the five-year average, 1909 to 1913 inclusive, and the average for the single year 1913 all hang pretty well together, and that is suggestive that "there must be something in it."

On the other hand it may be argued that we are in a period of depression, when rules do not always work. In the spring of 1909, in the depression following the panic of 1907, the mills might have demanded the average prices of the preceding ten years, but they did not get them within 20 per cent, for a time, and as to the ten-year pre-war average now often cited for comparison, at the end of 1914 the mills were not getting that average within 25 per cent.

If comparison be sought with pre-war low points in steel prices, allowances must certainly be made for ineradicable increases in cost, and in that list wages and freight rates will necessarily be prominent for a long time.

"Cancelitis" Then and Now

With the customers of the steel mills calling for deliveries of steel at a rate equal to no more than about 20 per cent of the mill capacity, the generally accepted view is that the customers are afflicted with stocks, either of steel or of commodities they have made from steel. It is insisted that the actual requirements of the country cannot be at as low an ebb as are mill operations. In such conditions the question is asked, how or when did these stocks accumulate? Steel was so scarce until the fall of 1920 that no one was in position to accumulate stocks, whether or not he had the desire. The stocks must have been accumulated after steel ceased being scarce.

One readily recalls that at just about the time that steel ceased being scarce there was in industry and business generally much canceling of contracts or holding up of deliveries. It was much talked about and financial and other writers discoursed upon it. They cried out about the epidemic of a new disease, which they called "cancelitis." Everything was being ruined by this blight, and the inference was that if only people would not cancel, business would go right along. Serious losses in prospective profits, in other words, might be averted.

Now we have a new aspect of affairs, that of the steel industry suffering from a lack of orders, because the customers have stocks. In other words, they did not cancel enough tonnage or did not cancel soon enough.

What would have been the condition to-day if in industry generally there had been none of this canceling? On general principles, it is a bad thing to cancel a contract. A contract should be lived up to. But it is certainly an accepted adage that two wrongs do not make a right. Why was not the outcry against the making of these contracts instead of against their being canceled? Undoubtedly if everything were placed under contract for a stated period all would be well, the people to contract with their bakers for bread a year ahead (having at the same time contracts for steady employment), the bakers to contract with the millers, the millers with the farmers, the farmers with the agricultural implement dealers, the dealers with the implement factories, the factories with the steel mills, the steel mills with their employees, and so clear around the circle.

That, however, was not done. There were missing links in the chain. There are different practices in different lines of business. Sometimes there are different practices among the members of the same line of trade, and sometimes a whole trade makes a mistake in judgment. Some business men contract for their raw materials farther ahead than the period for which they sell their products, some for the same period, some for less. There is no uniform practice. Nearly always there is a time when somebody is getting caught, either with obligations to take more material than he needs or with greater needs than he has covered.

It was notable that the steel makers did not complain as loudly about "cancelitis" as did many others. It has been more or less of a custom with steel manufacturers to adjust matters with their customers. The practice has not been universal, but it has been common. Some of the steel trade practices have been described as extremely unbusinesslike, yet an outstanding fact has been that in the long run both the steel manufacturers and their customers succeed. It is not clear that if, say in the past quarter century, there had been no accommodation of this sort either party would have been more successful. Contract cancellation, in the abstract, is absolutely wrong, but the spirit of the contract, the history of the relations of the parties to the contract, and the surrounding circumstances are entitled to some consideration.

Not a little has been said since the war about high sulphur cast-iron scrap and its menace to the iron foundry. Advocacy of the use of the basic electric furnace in conjunction with the cupola as a refiner of such iron has been frequent. This method has demonstrated its success in more than one case. The principal objection is its cost and the fact that not many foundries can avail themselves of the use of such a furnace. The employment of lime, however, in the regular cupola charge as a successful eliminator of a certain amount of sulphur is recommended by A. C. Porter in an article in the *Foundry*. By basing the lime charge somewhat on the practice followed in burdening a blast furnace, the author claims that

he has demonstrated by experimental runs that a sulphur content of 0.139 per cent in the original metal charged was reduced to 0.093 per cent, the manganese at the same time increasing from 0.54 per cent to 0.71 per cent. The suggestion is valuable and may prove by further experimentation to be worthy of general adoption. The author holds that the high sulphur menace can be overcome by this practice or at least be held under sufficient control to prevent the troubles that would be apt to come.

Shipbuilding and Steel

In the first half of 1919 there were under construction in American shipyards 4,185,523 gross tons of vessels, mostly cargo. This year the figure is 1,102,672 gross tons. While it is not possible to assign accurately any definite ratio between the tonnage measurement of a ship and the quantity of steel and iron going into its make-up, yet a figure of one ton of such materials to each two tons of measurement will provide an approximate index of the shipbuilding demand upon the iron and steel industry. And perhaps three-fourths of this demand, expressed in tons, will be represented in plates and shapes.

Hence a loss of 3,000,000 tons measurement of shipping being built may be translated into 1,500,000 tons of iron and steel, including more than 1,100,000 tons of plates and shapes. This represents, to a certain degree of approximation, the loss which the steel industry is sustaining through the drastic decline in shipbuilding following the completion of the Shipping Board's abridged program. More than half of the tonnage now building consists of tankers for the conveyance of oil, and considerably less than 500,000 tons will carry the miscellaneous cargo of the liner or tramp. With the approaching completion of the tanker program, still further curtailment may be anticipated.

Concerning Cupola "Semi-Steel"

An effort is being made by the American Society for Testing Materials, through its committee on cast iron, to do away with the use of the term "semi-steel." The definite recommendation was made by this committee at the society's convention two weeks ago that the name "high test" iron be substituted. Gray-iron castings in which steel scrap has been used in the charge do not approach steel in character or properties, and the name "semi-steel" is held to be misleading. The committee states that the steel scrap additions result in an iron higher in strength, but points out that the improvement is one of degree only, and cites other objections. The society's committee is now formulating specifications to fit the term "high test" iron or whatever is finally decided upon.

Those in the foundry industry who have been disposed to regard "semi-steel" as already established in commercial nomenclature have contended that steel scrap is the best medium through which to give to cast iron increased transverse and tensile strength, as well as toughness, along with machinability. They hold that the manufacture of semi-steel castings has been carried on for so long that producers and users are alike thoroughly familiar with the real character of the metal and that there is no misunderstanding concerning it. The proposal has been made, indeed, that the American Foundrymen's Association make the status of such castings more definite by laying down requirements for castings produced by using steel in the cupola mixture. For light castings, 15 to 20 per cent of steel has been proposed, giving tensile strength of 32,000 pounds as a minimum, and for heavy castings a range of 30 to 40 per cent steel and 37,000 pounds tensile strength. A certain sanction, it is contended, was given the term which the Testing Society's committee seeks to abolish, by the issuance of a Government specification for "semi-steel" shells during the war, and it will be recalled that one important company manufactured thousands of tons of such shells for the American Army.

In whatever action is taken toward clearing up the status of semi-steel castings the committee of the American Society for Testing Materials might well proceed in coöperation with a committee from the American Foundrymen's Association, since it would rest largely with the latter organization to give practical effect to any decision that might be reached.

CORRESPONDENCE

Efficient Journal Bearings

To the Editor: Careful reading of the article under the above title, in your issue of June 16, page 1605, thoroughly convinces me that a great injustice is done to all manufacturers of ball and roller bearings, excepting possibly the one responsible for the "monograph."

For a number of years ball and roller bearing manufacturers have been conducting an educational campaign in the use of anti-friction bearings in general. One phase of this campaign has caused thousands of dollars to be expended in the trade papers to acquaint engineers, designers, equipment users and others with facts—not theory—with engineering standards established upon practical applications and experience. An article of the nature appearing in your June 16 issue does little except to contradict many established facts and practices. Furthermore, manufacturers of recognized anti-friction bearing designs are discredited.

Many of the statements appearing in this article are absolutely unfounded and are directly critical of features employed in the design of roller bearings manufactured by the writer's company. Other statements are in direct contradiction of established characteristics of the Hyatt bearing, manufactured by the Hyatt Roller Bearing Co., and proved successful by reason of its wide application.

Furthermore, this so-called "monograph" does a great injustice to manufacturers of ball bearings, as many statements seriously reflect upon standards established and proved correct by years of experience and millions of applications. C. F. SUCCOP,

General manager American Roller Bearing Co.
Pittsburgh, June 20.

Will Sell Black Sheets

WASHINGTON, July 12.—The Bureau of Supplies and Accounts, Navy Department, has issued specifications calling for bids on approximately 1200 tons of black sheets of various dimensions for its different navy yards. The bids are to be received up to August 5.

Extent of Liquidation in Finished Steel Products

In bars, plates, shapes and sheets, from 80 to 95 per cent of the excess of 1917 peak prices over the 10-year pre-war average has been wiped out. In beams, for instance, where the excess was 3.00c., it is now only 0.50c., a reduction of 83 1/3 per cent. The "Composite" is the simple average of the seven products quoted. These products represent approximately 85 per cent of the annual output of finished steel in the United States.

	Cents Per Pound				1917 Peak Exceeded	July 12, 1921, Exceeds	Extent of Liquidation
	10-Year Pre-War	Peak July, 1917	Industrial Board Mar., 1919	July 12, 1921	10-Year Pre-War by	10-Year Pre-War by	from 1917 Peak
Bars	1.42	4.50	2.35	1.90	217%	34%	84½%
Plates	1.488	9.00	2.65	1.90	505%	28%	94½%
Beams	1.50	4.50	2.45	2.00	200%	33%	83%
Rails	1.34	1.79*	2.10	2.10	34%	57%	....
Sheets	2.226	8.50	4.35	3.50	282%	57%	80%
Wire	1.62	3.95	3.00	2.50	144%	54%	62%
Pipe	2.194	5.10	4.25	3.55	132%	71%	46½%
Composite	1.684	5.334	3.021	2.493	217%	48%	82%

*Reached 2.545c., which was maintained all through 1918; again in 1920.

New Secretary of Mining and Metallurgical Engineers

Frederick Fraley Sharpless, who has been selected by the directors of the American Institute of Mining and Metallurgical Engineers to succeed Bradley Stoughton as secretary of the institute, was for several years secretary of the Mining and Metallurgical Society of America. He graduated in chemistry from the University of Michigan and from 1888 to 1892 was instructor in metallurgy in the Michigan School of Mines at Houghton. Later he opened a chemical laboratory in Minneapolis in association with Horace V. Winchell, and then followed some years of valuable experience at Western mines, one engagement being as manager of the California Copper Co. From 1900 to 1912 Mr. Sharpless's work was varied, including much exploring, reporting and operating in British Columbia, Alaska, Mexico and South America, chiefly for English investors. The past eight years have been occupied with consulting work, with offices in New York. Mr. Sharpless is a native of West Chester, Pa., coming of Quaker stock, and is 55 years of age. His membership in the mining institute dates from 1889.

F. F. SHARPLESS

Electric Furnace Sales

The Electric Furnace Co., Alliance, Ohio, reports more orders for its Baily electric furnaces in June than in any single month in the last two years. These orders include standard brass melting units, car furnaces for steel plant purposes and a special electric enameling equipment. Most of the sales were made to concerns not particularly busy at the present time, but who purchased this equipment with a belief that by the time the furnaces were installed and ready for operation business would be such as to justify the present expenditure. The Empire Brass Mfg. Co., Ltd., London, Ont., bought the fifth Baily furnace sold in Canada during the past year. The Mueller Metals Co., Decatur, Ill., ordered three 105-kw. furnaces each with 1500-2000-lb. hearth capacity. The Ingram Richardson Mfg. Co., Beaver Falls, Pa., bought a 600-kw. electric enameling furnace, a rotating car type furnace arranged to travel on a circular platform 60 ft. in diameter. The equipment will have a heating capacity of 44 tons of material per day.

Not a Common Carrier

WASHINGTON, July 12.—In a decision handed down last Friday the Interstate Commerce Commission held that the Allegheny & South Side Railway Co., the stock of which is owned by the Oliver Iron & Steel Co., is not a common carrier and directed it to cancel its tariffs on file with the commission.

The Blair Engineering Co. announces that Arthur G. McKee & Co., 2422 Euclid Avenue, Cleveland, will hereafter have the exclusive right to manufacture and sell all special open-hearth equipment previously handled by the Blair company. This includes Blair valves, ports and slag-pockets, all of which are well known to operators of open-hearth furnaces. Arthur G. McKee & Co. will also have the exclusive right to manufacture and sell the new Eglar type furnace which has recently been put into operation. Results already obtained in this furnace are said to prove that this development will greatly increase the output of open-hearth furnaces, with a considerable increase in fuel economy.

The Iron Age and Its Readers

Figures from the United States Census Office afford the means of determining how largely THE IRON AGE covers the manufacturing interests of the United States. The 34,536 plants in those machinery and allied fields which are served by THE IRON AGE turned out, during 1919, products to a total value of $19,516,888,000, or an average per plant of $565,000. The remaining plants of all descriptions and sizes, more than 250,000 in number, showed an average product of only $170,000 per plant. Thus the average plant in our field is 3 1/3 times as large in its operations as the average plant outside our field.

Leaving out the plants employing fewer than 50 men, the remaining manufacturing establishments in all branches of industry in the country number about 25.200. These include the whole range—textile mills and candy factories as well as factories using iron and steel in producing their product. More than half of the entire 25,200 large plants in American industry, however, are reached by THE IRON AGE.

GOVERNMENT BUYING

General Dawes Planning for Co-ordination in Buying—Selling Surplus Steel

WASHINGTON, July 12.—Steps looking to the co-ordination of all Government purchases, wherever practical, are believed to be in the mind of Director of the Budget Charles G. Dawes, as the result of an order he issued last Friday. The order itself primarily deals with sales and purchases of material held by the different Government departments, but it is thought ultimately the plan will be expanded to as to include all purchases. In his order to heads of Government departments and independent establishments, General Dawes said:

In order to conserve to the utmost the expenditure of Government funds and to save loss by deterioration in storage of surplus property now available for disposal by the several executive departments of the Government, it is directed that whenever advertisements for bids are contemplated, before such advertisements are made public, copies of the same in the exact form in which it is intended they shall be published be sent to the surplus property division, or corresponding agency, of each of the executive departments.

Each department advertising material for sale shall in like manner inform every other department prior to the advertisement of the exact nature of the advertisement which it is proposed to publish.

In both cases, copies will be sent to the chairman of the Interdepartmental Board, which is hereby charged with co-ordinating these activities.

In substance, this order itself requires that the different Government departments make known to each other the surplus property they have on hand with a view to disposing of it to Government sources which may need such requirements as are already on hand without going outside to purchase the material. It will remain for the chairman of the Interdepartmental Board to co-ordinate the necessary activities after getting the information requested by the Director of the Budget. The proposal also is looked upon as a means of preventing Government departments from bidding against each other in the purchase of supplies and to give more uniformity to prices of materials bought by the Government. It is doubted that steel and machinery supplies on hand as surplus will figure much in the order, although the setting up of a co-ordinated buying agency for the Government would do so.

Should a centralized system for purchases be organized it is pointed out that it could be helpful to the steel trade, as well as to the Government, by standardization of specifications, perhaps adopting those of the American Society for Testing Materials, on the more ordinary steel products; of forms as to liquidated damages, and requirements for giving bonds, certified checks, etc. It is recognized by Government authorities that there are limits of a definite character to the idea of standardization and some steel supplies, such as many required by the War and Navy Departments, would not yield to such a system, but on the more common products such a plan could be devised and bidders annoyed by less red tape. Moreover, they would know readily where to go for information. Under present conditions the latter is often impossible, for small producers who do not maintain close connection with Government sources in the way of getting information as to activities for purchases.

All Sales Stopped

All sales of surplus material, including steel, have been stopped by the United States Shipping Board and it has begun a physical inventory of its surplus property under the direction of Col. R. H. Montgomery, of the New York accounting firm of Lybrand, Ross & Montgomery. In the meantime, the board has rejected all bids that were received recently on 26,270 tons of steel, and while it is understood bids will be received on the 110,000 tons at Hog Island, Pa., up to July 26, it is apparent that none of these tenders will be accepted, at least not in the near future.

The board is undecided as to what policy will be followed in disposing of its surplus property and will not know until the inventory under way has been completed and the results studied. Altogether, it is estimated that the board has practically 300,000 tons of surplus steel on hand. There is a sentiment in favor of selling it at once in view of the fact that it is exposed to the weather and deteriorating and represents considerable cost on the investment. There also is another opinion to the effect that if material is held until the iron and steel market resumes activity and strength, the surplus could be sold at a better figure than could be obtained under existing conditions.

TARIFF DISCUSSION

Congressman Tilson Refers to Steel Industry—Valuation Plan Explained

WASHINGTON, July 12.—Defense of the metal schedule carried in the permanent tariff bill was made in the course of general debate in the House yesterday afternoon by Representative John Q. Tilson, chairman of the subcommittee who has charge of that schedule. While his speech largely consisted of the points made in his report, Mr. Tilson took occasion to answer criticisms made in the minority report on the bill with regard to sinister influence exerted by business or business men toward preparation of the measure.

"Of course no member signing the minority views believes for a moment that any sinister or undue influences were exerted by either big or little business or business men or had any effect whatever upon the preparation of this bill, but they had to say something," declared Mr. Tilson. "No one who signed these views would say, and attempt to keep a straight face, that he believed any member of the majority of the committee was any less honest or patriotic than himself, but something had to be said. It speaks volumes for the merits of this bill that it was found necessary to indulge in such insincere accusations of dishonesty against honorable colleagues in order to be able to say something derogatory to the bill."

It was stated by Mr. Tilson that what the Ways and Means Committee had in mind in preparation of the bill was not the rates carried in the Payne-Aldrich or the Underwood-Simmons or any other bill, but what rates are needed to preserve and cause the continuance of the industries of this country.

Non-ferrous Products

It is understood that one of the principal amendments will relate to paragraph 378, which covers copper and brass wire and other non-ferrous products. It is proposed to eliminate all reference to wire and in removing these classes of wire from this special classification to allow them automatically to be covered in the basket clause, paragraph 393, which assesses ad valorem duties of 45 and 35 per cent as compared with specific duties ranging from 1½c. to 12c. per lb. contained in paragraph 378.

The latter paragraph, if the proposed amendment is made, will read as follows:

Copper in rolls, rods, or sheets, 2½c. per lb.; copper engravers' plates, not ground, and seamless copper tubes and tubes, 7c. per lb.; copper engravers' plates, ground, and brazed copper tubes, 11c. per lb.; brass rods, sheet brass, brass plates, bars and strips, Muntz or yellow metal sheets, sheathing, bolts, piston rods, and shafting, 4c. per lb.; seamless brass tubes and tubing, 8c. per lb.; brazed brass tubes, brass angles and channels, 12c. per lb.; bronze rods and sheets, 4c. per lb.; bronze tubes, 8c. per lb.

Chairman Fordney's Address

Reports formally made on the House bill contained nothing of a particularly illuminating character over and above what had been said previously by different members. They indicate, however, as do speeches in the House, that the American valuation plan is one of the chief features of the measure causing discussion. Chairman Fordney in an address last Thursday in supporting this plan gave several examples of how it would work, first pointing out its necessity because of the wide difference in international exchange.

Unions Make Important Concessions

Agreement Reached at Columbus Conference of Sheet and Tin Plate Manufacturers and Representatives of Amalgamated Association

YOUNGSTOWN, OHIO, July 12.—The Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers will meet the last week in July at an adjourned conference to negotiate the 1921-1922 wage agreement. The place of meeting is still undetermined. At the annual conference held early in June at Atlantic City, representatives of both associations failed to agree. The 1920-21 agreement expired June 30, but mills are operating under a clause which provides for their automatic continuance for 30 days.

An agreement was reached July 9 at Columbus, Ohio, between sheet and tinplate manufacturers subscribing to the Amalgamated scale and representatives of the employees, following sessions which began on July 6. At times it appeared as if the conference would result in disagreement. Union sheet and tinplate mills suspended June 30 upon expiration of the old contract.

Manufacturers insisted upon reductions and changes in working conditions which would effect economies in production so as to enable them to compete with other makers operating independently of the Amalgamated Association. It was pointed out to representatives of the employees that unless such economies could be effected in the agreement, manufacturers would be forced, of necessity, to take other steps to reduce production costs.

Reduction of 10 Per Cent

An average saving of approximately 10 per cent in production costs is effected under the terms of the new contract, though the economy in particular divisions varies.

Employees attempted to retain the gains which they had made during the war and conceded reductions and changes only after bitter contest.

The most important concession gained by manufacturers was in the tin mill scale. At the conference last year, employers granted an increase in the rate of advance in the tonnage rate from 1 per cent to 1⅛ per cent for each member of the crew on each five cents advance in the selling price of tinplate above the base of $3.50 per box of 100-lb. of coke prime sheets. The rate of increase was again restored to 1 per cent in the new contract.

Similarly, in the tin house scale, the rate of advance for tinners, redippers and risers was last year advanced to three-fourths of 1 per cent for each 5c. increase in the selling price above the $3.50 base, from one-half of 1 per cent. This year the old rate was restored.

During the May-June period, the tonnage rate for tin mill employees was based on a selling price of $6.50 per base box of plates, or $3 above base. In consequence of the reduction in the rate of advance from 1⅛ per cent to 1 per cent, tin mill workers would sustain an actual reduction in the current tonnage rate of 7½ per cent. The actual loss to workers will, of course, vary with the selling price of tin plate.

Charges Pared Down

A number of extra charges in the tin plate scale were also pared down. For instance, the old agreement provided that "all sheets or black plate 14½ ft. square or over, when finished in six or more sheets to the pack, should be paid for at the following rates above the tinplate scale—10 per cent extra on No. 26 gage and heavier and 20 per cent for all lighter gages, up to and including No. 32 gage; and for all sheets or black plate 15½ sq. ft. and over, finished in fours, the same percentage shall apply." In the new scale, this is reduced to 10 per cent instead of 20.

Manufacturers conceded an extra hand on tin mill crews, with a revision of work and distribution of it among the various members of the crew, subject to local agreement.

The sheet mill base scale is not materially different in the new agreement than in the old, though changes have been brought about in working conditions which manufacturers say will produce savings in costs. Employers contended for the elimination of an extra man added to sheet mill crews during the war, and a lively contest developed over this issue. It was finally compromised, by eliminating the extra helper six months in the year and providing for his employment during the six war months from April to October.

In both the sheet and tinplate agreements, the catcher is reduced to the status of the rougher, the change having previously been made under the stress of war conditions. Both are on a par in the new wage scale.

New Classification

Manufacturers secured the consent of the Amalgamated Association for another classification on jobbing mills, the purpose being to rearrange positions to bring about reductions in costs. This reclassification will be made sometime between the middle of July and Sept. 1.

When due to shortage of men, the limit of time for sheet, jobbing mill or tin mill crews to remain in the mill without working was extended from one hour to 1½ hours. Employers contended that the extra man on sheet mill crews increased the cost of production from $1.50 to $2 per ton above that of non-union competitors.

President M. F. Tighe of the Amalgamated Association presided over the adjourned conference. Many representatives of the manufacturers left Friday evening with the understanding that the employers would offer compromises on Saturday that would break the deadlock.

The original conference at Atlantic City started June 6 and terminated June 13, without agreement.

The bimonthly examination of sales sheets in the sheet and tinplate divisions, ordinarily held on the tenth of every second month, was delayed this month on account of the Columbus conference. However, sales sheets have been sent in by a majority of the mills and the settlement will probably be effected this week. Average sales prices are sent by the subscribing mills to James H. Nutt, secretary of the Western Sheet and Tin Plate Manufacturers' Association, who tabulates them and represents employers at the settlements.

A number of companies affected by the agreement started sheet or tinplate units this week, after a shutdown since June 30. In the Mahoning Valley, however, the accumulation of orders during the suspension, was small.

Seventeen makers were represented at the Columbus conference.

The Steubenville, Ohio, plant of LaBelle Iron Works, idle much of the time since the first of the year, started up last week. All of the eight sheet mills of this works went on July 5, while 4 of the 11 open hearth furnaces were started up July 7.

Due to lack of business, the Masury plant of the Pennsylvania Tank Car Co. has closed for an indefinite period, affecting several hundred workers.

The Mercer works of the American Sheet & Tin Plate Co. at Farrell, Pa., resumed in full this week.

Iron and Steel Markets

WAGE REDUCTIONS

Little Market Response to New Steel Prices

Better Railroad Buying and More Activity in Pig Iron—Export Competition Sharper

Less rather than more buying has followed the formal posting of new steel price lists last week, and steel works operations have not improved. Buyers do not question that prices are generally below cost, but they need little steel and await the effect of labor and freight adjustments.

Further wage reductions by independent steel companies will go into effect July 16. The rate for common labor is reduced from 37 to 30 cents per hour, making the total reduction from the peak about 35 per cent. The Steel Corporation, by abolishing the eight-hour basic day, comes to 37 cents per hour for common labor. There are predictions of a 25-cent rate before the downward movement is stopped, as against 19 cents before the war. In one Eastern mill town as low as 20 cents is now being paid.

The independent sheet and tinplate mills made a settlement at Columbus, Ohio, on July 9, with the union workers which means a 10 per cent lower labor cost. The Western bar iron scale is yet to be fixed. Two independent sheet makers who signed the scale last year are expected to operate on the open shop plan in future.

The hopeful developments of the week are the certainty of Government action releasing many millions to the railroads, the continued award of car repair orders, greater activity at automobile works than was counted on last month, and an appreciable increase in pig iron buying.

The Steel Corporation followed the Bethlehem Steel Co. in announcing 1.90c. as its price for bars, with other prices the same as in the Bethlehem schedule. In addition, the Steel Corporation issued new cards reducing prices on standard pipe $2 to $4 per ton on butt weld and $4 to $6 per ton on lap weld, while oil country goods were reduced by $4 to $7 per ton. A $5 reduction in wire was also made, bringing nails down to $2.75 per keg and plain wire to $2.50 per 100 lb. On wire rods the price has gravitated to $42.

Market prices of some products, including hot and cold rolled strip steel, are not well defined. Irregularity appears also in seamless tubes. While 2.60c. is regarded as the Steel Corporation price on hot rolled strip, sales by other makers are reported at 2.50c. and lower.

The season's business on cotton ties has opened at a price of $1.35, Pittsburgh, per bundle of 45 lb. and a carrying charge of 1c. per bundle per month, as compared with $2 in 1920 and $1.70 in 1919. It is reported that German cotton ties have been offered as low as $1.36 at Gulf port, but no sales have been made in view of the uncertainty of deliveries.

New structural projects total 11,000 tons, nearly half of which is for a building in the Grand Central area in New York. Contracts awarded involve about 7000 tons in sizable jobs, while the capacity of the country's fabricating shops exceeds 40,000 tons per week.

Marked increase in interest on the part of pig iron buyers in several important centers, with sales of fair tonnages, has caused a more cheerful sentiment, but business is being taken at further price concessions. Southern iron has declined 50c. and at Chicago charcoal has been marked down $1.50, while other grades have declined $1 in that market and lower prices are also noted at Pittsburgh, where an offer to buy 1500 tons of basic at $18, or $1.50 below the prevailing quotation, is considered to represent the views of buyers.

Rails are the chief item in the export trade. The Pekin & Mukden Railway inquiry has been increased from 11,000 to 17,000 tons, and the award is expected this month. On 9500 tons for Argentina the Belgian mill which took the order bid 469 francs or close to $36 per ton, c.i.f. Santa Fe, while the lowest bid from the United States was $62.15. A 5000-ton girder rail order for a Toronto car line, taken this week, will be rolled at Bethlehem.

A bridge over the Yellow River, China, requiring 40,000 tons of steel, which has been bid on by several American builders, would probably go to Europe on the score of price, but financial problems threaten long postponement.

While offers of Belgian and German steel in the United States at low prices are still reported, sales do not result, all buying being at so low an ebb. In Canada likewise offers of Continental steel have been ignored, though at $10 per ton below American prices.

Continental pressure has forced another downward revision of 10s. and £1 in British steel prices, with rails now quoted at £10 against £13 a week ago. Urgent need of pig iron has put in some blast furnaces, but others are waiting on stabilization of fuel prices.

Pittsburgh

PITTSBURGH, July 12.

The general report of steel manufacturers here is that the reaction following the new prices has been extremely poor. It usually happens that on price revisions such as that of last week, it takes some little time to complete the readjustments and during such periods very little business is done. The latest revision, however, with the possible exception of wire products, merely gave public affirmation to prices which previously had been current, and since there was no actual reduction, buyers seem to be expecting still further concessions and are holding off. In this attitude they are encouraged by the wage reduction from 37c. to 30c. per hour in the common labor wage rate by Valley steel makers and the expectation that this action will be followed by independents in the Pittsburgh district.

Abrogation by the Steel Corporation of the basic eight-hour day will mean a reduction in producing costs but not nearly enough to offset the high overhead which current operations mean, nor as much as would be saved if the corporation subsidiaries were operating in normal fashion. The position of leading steel manufacturers is that the new prices are as low as they should be on to-day's producing cost, and some go so far as to say that even if common labor was obtainable at 25c. an hour no excuse would exist for further concession until the industry obtained the benefit of lower

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 12, 1921	July 5, 1921	June 14, 1921	July 13, 1920
No. 2X, Philadelphia‡	$25.50	$25.50	$25.50	$48.15
No. 2, Valley furnace†	*20.50*	21.00	22.50	45.00
No. 2 Southern, Cin'ti†	*24.50*	25.50	26.50	45.60
No. 2, Birmingham, Ala.†	*20.00*	21.00	22.00	42.00
No. 2 foundry, Chicago*	*19.00*	20.00	21.00	45.00
Basic, del'd, eastern Pa.	23.50	23.50	25.00	43.00
Basic, Valley furnace	*19.50*	20.00	21.00	46.00
Bessemer, Pittsburgh	*22.96*	23.46	24.96	47.40
Malleable, Chicago*	*19.00*	20.00	21.00	43.50
Malleable, Valley	*21.00*	21.50	23.00	45.00
Gray forge, Pittsburgh	*21.46*	21.96	23.46	44.40
L. S. charcoal, Chicago	*36.00*	37.50	37.50	57.50
Ferromanganese, del'd	70.00	70.00	75.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	33.00	33.00	37.00	60.00
O.-h. billets, Pittsburgh	33.00	33.00	37.00	65.00
O.-h. sheet bars, P'gh	35.00	35.00	39.00	70.00
Forging billets, base, P'gh.	38.00	38.00	42.00	85.00
O.-h. billets, Phila.	38.74	38.74	42.74	69.10
Wire rods, Pittsburgh	*43.00*	45.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	2.00	2.00	2.20	2.75
Skelp, sh. steel, P'gh., lb.	2.00	2.00	2.20	3.00
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.15*	2.25	2.25	4.75
Iron bars, Chicago	*2.00*	2.10	2.25	3.75
Steel bars, Pittsburgh	1.90	1.90	2.10	3.50
Steel bars, New York	2.28	2.28	2.48	4.02
Tank plates, Pittsburgh	1.90	1.90	2.00	3.50
Tank plates, New York	2.28	2.28	2.38	3.77
Beams, etc., Pittsburgh	2.00	2.00	2.20	3.10
Beams, etc., New York	2.38	2.38	2.58	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.75	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 12, 1921 Cents	July 5, 1921 Cents	June 14, 1921 Cents	July 13, 1920 Cents
Sheets, black, No. 28, P'gh.	3.50	3.50	3.85	6.50
Sheets, galv., No. 28, P'gh	4.50	4.50	5.00	8.00
Sheets, blue an'l'd, 9 & 10.	2.65	2.65	2.90	5.00
Wire nails, Pittsburgh	*2.75*	3.00	3.00	4.00
Plain wire, P'gh	*2.50*	2.75	2.75	3.50
Barbed wire, galv., P'gh	*3.40*	3.65	3.85	4.45
Tin plate, 100-lb. box, P'gh.	$5.75	$5.75	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.25	$13.25	$13.25	$35.50
Carwheels, Philadelphia	*16.00*	18.00	18.00	38.00
Heavy steel scrap, P'gh	12.00	12.00	13.00	26.00
Heavy steel scrap, Phila.	11.00	11.00	11.50	22.50
Heavy steel scrap, Ch'go	10.00	10.00	11.00	23.50
No. 1 cast, Pittsburgh	16.00	16.00	17.00	40.00
No. 1 cast, Philadelphia	16.00	16.00	17.50	37.00
No. 1 cast, Ch'go (net ton)	12.50	12.50	13.00	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	15.00	33.00
No. 1 RR. wrot, Ch'go (net)	*9.25*	9.50	9.50	25.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	*$2.75*	$3.00	$3.00	$17.00
Furnace coke, future	3.25	3.25	3.25	11.50
Foundry coke, prompt	*4.00*	4.25	4.50	18.00
Foundry coke, future	4.75	4.75	5.00	14.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.75	12.75	13.00	19.00
Electrolytic copper, N. Y.	12.62½	12.62½	13.00	19.00
Zinc, St. Louis	*4.30*	4.35	4.45	7.85
Zinc, New York	*4.80*	4.85	4.95	8.20
Lead, St. Louis	*4.35*	4.25	4.25	8.15
Lead, New York	4.40	4.40	4.50	8.40
Tin, New York	*28.50*	29.87½	29.25	50.25
Antimony (Asiatic), N. Y.	4.75	4.75	5.20	7.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 12, 1921, Finished Steel, 2.493c. per Lb.

Based on steel bars, beams, tank plates, open-hearth rails, plain wire, black pipe and No. 28 gage black sheets

July 5, 1921,	2.557c.
June 14, 1921,	2.679c.
July 13, 1920,	3.867c.
10-year pre-war average,	1.684c.

freight rates. It is asserted that every ton of steel produced by the Pittsburgh district to-day carries freight charges of more than $7.50. It remains to be seen, however, whether the deadlock will be broken by the latest price changes. The industry continues to look forward hopefully to the railroads as a Moses. Thus far, outside of the car repair orders which have been placed, in which Pittsburgh district shops have not shared, there has been no tangible evidence of increased railroad buying, but a good many expect results in the next 30 or 60 days from the economies the railroads will be able to effect through lower wage rates and the abrogation of war-time labor agreements, while the attitude of the Administration toward the carriers also is looked upon as a hopeful sign.

The most promising development of the recent past indicating that a turn is not far distant is to be found in the pig iron market where there has been one inquiry for 1500 tons of basic iron carrying a firm offer of $18 furnace, while there also has been some activity on the part of sellers to get melters to make bids.

Some confusion has attended the reaching of official prices on some of the minor steel products, the market not being very clearly defined in this respect on hoops and bands or hot-rolled strip steel. The Steel Corporation price on these products is 2.60c., base, Pittsburgh, but some of the independents are quoting 2.50c. and it is known that some business was done even as low as 2.40c. It is probable, though, that the official quotation will be 2.60c. The new quotation on cold-finished steel bars has been set at 2.80c., base, Pittsburgh, but this is above what previously had been possible and shading is likely on the appearance of attractive orders. As a matter of fact, the new prices of the latter product and a number of others are regarded as maximum rather than minimum.

We note no increase in steel plant activities in the past week, indeed the tendency still is in the other direction, and the fact that an agreement has been reached between the Amalgamated Association of Iron, Steel and Tin Workers and the sheet and tin plate manufacturers, on the question of a wage scale, has not yet found reflection in the activities of the plants involved. Indications are that at least two and probably more sheet and tin plate makers will not sign up with the Amalgamated Association this year.

The coke market has been enlivened by an inquiry from the Wickwire-Spencer Steel Corporation, Buffalo, for 30,000 tons for August and September delivery, this company figuring on starting up some of its idle furnaces Aug. 1.

Ferroalloys.—There is an utter dearth of inquiries and in the absence of important sales prices are purely conjectural. The proposed import duties on ferromanganese and manganese ore have been without effect upon the demand for the former because consumers uniformly regard them as improbable of enactment and some of the larger independent steel makers are figuring on making their own ferromanganese in the event of the passage of the bill as introduced. These companies figure that they could save almost $20 per ton by making their own ferromanganese, even with a duty of 1c. per lb. on the metallic content of the ore. Generally domestic makers of ferromanganese are holding to $80 delivered for 76 to 80 per cent material, but there has been no recent basis in sales for a price of more than $70. There are reports here that English makers would consider contract business around $60 f.o.b. New York. Makers of spiegeleisen are quoting $30 to $31, furnace, for average 20 per cent alloy, but this is about $3 per ton above what could be done to-day even on small tonnages. We note the sale of a carload of 50 per cent ferrosilicon of domestic origin at $62.50

delivered. This sale, however, was surrounded by some unusual conditions and the real minimum is $65.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Pig Iron.—We note another sale of 2000 tons of standard basic iron but at a further recession of 50c. per ton, the iron moving from a Valley steel works at $19.50, furnace. This is as low as any sales of this grade are reported, although there are rumors that small lots have changed hands at $19, Valley furnace, or its equivalent. It is also reported that a price of less than $18.50, figuring on a Valley furnace basis, has been quoted against an inquiry for a round tonnage recently put out by a Pittsburgh district melter. A steel foundry interest which recently bought 100 tons of basic at $20.80 delivered, equal to $20.10 at the furnace from which it was shipped, is reported to have duplicated that purchase. An inquiry for 1500 tons of basic carrying a firm offer of $18, Valley furnace, has been before a number of producers, but has not been placed. Bessemer iron has been offered at $21, Valley furnace, without takers, and a higher price is no longer justified. It is probable that this grade could be bought at $20.50, Valley furnace. Only small sales of foundry iron are being made and on these the common base is $20.50, Valley furnace, for No. 2 grade. A radiator company with plants in Johnstown and New Castle, Pa., and Trenton, N. J., is reported to be in the market for 1200 tons of foundry iron. Since only the latter plant of the company is busy, it is probable that the business will be placed in the East.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.50
Bessemer	21.00
Gray forge	19.50
No. 2 foundry	20.50
No. 3 foundry	20.00
Malleable	21.00

Billets, Sheet Bars and Slabs.—So little is going on that actual prices are quite as indefinite as they were prior to the Bethlehem Steel Co. announcement as of July 5. So much finishing capacity is idle that both demands and specifications are exceedingly light. In the absence of inquiries which would provide a test, quotations must be regarded as entirely nominal.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $33; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $34; forging billets, ordinary carbons, $38, all f.o.b. Youngstown or Pittsburgh mills

Wire Rods.—The recent reduction of $5 per ton in wire products has been accompanied by a like reduction in prices of wire rods. Information as to price of the American Steel & Wire Co. on rods is lacking, but independent companies have assumed that the reduction in finished products by this company carried with it the same cut in rods. Little is going and not much publicity is being given prices, but there is no question that all independent makers would take business at $43 for the base size of soft rods. Prices are given on page 112.

Plates.—Inquiry still is very light and buyers look upon the new base of 2c., Pittsburgh, as merely a nominal figure, and likely to be shaded on sizable orders. The Pittsburgh-Des Moines Steel Co., which was awarded 14 55,000-bbl. storage tanks by the Shipping Board, has not yet bought the 2800 tons of plates which will be required.

Structural Material.—Structural inquiries have been much fewer since the holiday than they were previously and awards, except of tonnages of less than 100 tons, have been few. The building trade situation seems to be clearing up slowly and the decline in business seems to be ascribable chiefly to the unsettlement of the latest price revision in plain material. The new base of 2c. for structural beams is rather nominal, at least in the minds of fabricating interests, some of which report bids on fabricated steel that would indicate a plain material base of around 1.65c. The Bureau of Yards and Docks, Navy Department, has awarded the McClintic-Marshall Co. 175 tons for a machine shop at San Diego, Cal., and 230 tons for a machine shop and a carpenter shop at Hampton Roads, Va. The McClintic-Marshall Co. also has taken 500 tons for a 350-ft. arch span bridge over the Willamette River, Oregon City, Ore. The Pittsburgh Bureau of Building Inspection, after a considerable controversy, has issued a permit for the reconstruction of the Empire Building, Liberty Avenue and Stanwix Street, Pittsburgh, whereby this building will be raised from a 12-story to a 30-story structure. The permit also allows the construction of a 30-story building on an adjoining site by the owners of the Empire Building. Plain material prices are given on page 112.

Wire Products.—Last week's cut of $5 per ton, which includes everything in this classification and is the second of like size made since the April effort at stabilization, has not been productive of any appreciable increase in business. Since there was no important cutting of $3 for nails and $2.75 for plain wire, the price changes made last week constitute practically the only actual price reduction that has been made in steel. Cement coated nails go to $2.35 per count keg, Pittsburgh, in the latest revision and there has been a 2½ per cent increase in the discount on woven wire fencing. The latter now is quoted at 68 per cent off list for carload lots, to retailers, while an additional 2½ per cent is made by manufacturers who distribute solely to jobbers.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Steel Rails.—As indicated in THE IRON AGE of last week, the new "official" quotation on light rails rolled from new steel, is 2c. Very little demand is developing except for small lots from the coal companies and these are being supplied to a large extent from mills rerolling old sections. A price as low as $40 per gross ton is reported to have been made by the latter.

We quote 25 to 45-lb. sections, rolled from new steel, 2.10c. to 2.20c.; rolled from old rails, 1.80c. to 2c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—No improvement yet is observed in the demand for bolts and nuts by makers in this district who, to a large extent, are dependent on the railroads for the bulk of their orders. The railroads are recalling a good many of their furloughed shop workmen, however, and it is believed that the next 30 to 60 days will bring some increase in the demand.

Spikes.—The new quotation on railroad spikes is $3 base, a cut of $5 per ton. Bolt and barge spikes, however, were lowered only $1 per ton in the latest revision, the new price being $3.20 per 100 lb.

Iron and Steel Bars.—The new base of 1.90c. for soft steel bars has brought out no increase in the demand, presumably because it is above the price which some makers prior to July 5 were willing to accept. It is now said that a quotation as low as 1.80c., Pittsburgh, was made before the holiday by some of the independent makers. Very little demand is noted for reinforcing bars and those rolling them from new steel still are encountering stiff competition from those making from old rails. Refined iron bars nominally are held at 2.50c. base, but it is believed attractive orders would develop lower figures.

We quote steel bars rolled from billets at 1.90c.; reinforcing bars, rolled from billets, 1.90c. base; reinforcing bars rolled from old rails, 1.75c. to 1.85c.; refined iron bars, 2.50c., in carloads f.o.b. mills, Pittsburgh.

Cold-Finished Steel Bars.—The "official" base growing out of the recent price revision is 2.80c. Pittsburgh, for carloads and 3.05c. for less than carloads. These prices, however, are at least $1 per ton above the going price prior to July 5, and are generally regarded as maximum, which would be shaded substantially on the appearance of anything like an attractive order. Small sales are known to have been done at 2.75c. base and consequently we quote the carload base at 2.75c. to 2.80c. Business shows no material increase.

Hoops and Bands.—There is some uncertainty as to the new base. The Steel Corporation is quoting 2.60c.,

a drop of $3 per ton from its last previous official price, while independents are quoting 2.55c. and 2.50c. Since the latter price had been named prior to the Bethlehem Steel Co. announcement, and it is even said to have been shaded, it probably measures the present possibilities better than the higher figures. Business still is slack.

Iron and Steel Pipe.—Effective July 7, the National Tube Co. issued new cards cutting prices on standard pipe, ¼-in. and over, $2 to $4 per ton on butt weld and $4 to $6 per ton on lap weld pipe. Effective the same day, prices of oil country pipe were reduced from $4 to $7 per ton. Independent makers have followed these reductions. Price cuts also have been made in wrought iron pipe, the cut being $2 per ton in ¼-in. and ⅜-in., the same as that in the same size of steel pipe, while in the sizes from ½-in. and up the reduction in iron pipe is $8 to $12 per ton, or double that in steel pipe of like sizes. Lower materials and labor costs have permitted this narrowing of the gap between steel and iron pipe, which, up to the latest change, was a matter of $48 to $50 per ton on lap weld, and $54 to $58 in butt weld pipe. The new prices for iron pipe are $44 to $46 per ton above those for steel pipe, in lap weld, while butt weld iron pipe is $50 to $54 per ton higher than steel pipe, size for size. Business has not benefited much from the reduction, possibly because the change has not yet been digested by the consuming trade. New discounts are given on page 112.

Sheets.—A fair number of orders is being received for small lots for quick shipment, but these are coming chiefly from the automobile industry and general business still is light. The new prices are fairly well observed, but it is too early to say the market is firm, since there is so little going on. It is reported that galvanized sheets have been offered as low as 4c., but these sheets have been in stock for some little time. Sheet mill operations are at the lowest point of the year, due to the fact that practically all of the so-called union mills are down. Prices are given on page 112.

Tin Plate.—Orders for small lots are fairly numerous with those companies operating their plants on an open shop basis. Evidently container manufacturers still are inclined to take on supplies only as and when needed and manufacturers are not able to make up schedules very far ahead. A good deal of stock has been made up and the danger of a pinch in the supply over the remainder of the year is considered to be slight. All makers are quoting production plate at $5.75 per base box, Pittsburgh, and stock items no longer are available much below that price. Roofing ternes have been reduced $1 per package on all weights, in keeping with the recent price revisions.

Cotton Ties.—The season was opened last week by the Carnegie Steel Co. which announced a price of $1.35 per bundle of 45-lb. and a carrying charge of 1c. per bundle per month. The Carnegie Steel Co. opening price last year was $2, in 1919 $1.70 and $2.10 in 1918 and 1917. The carrying charge last year was 1½c. per bundle per month. The Pittsburgh Steel Co. also is quoting $1.35 per bundle as compared with its opening price last year of $2.45. Rollings against this season's requirements, although sharply curtailed in keeping with estimates of the cotton crop, are understood to be in excess of probable needs. German competition is being encountered, and a price as low as $1.36 per bundle, delivered, is reported to have been made. German makers do not seem to have succeeded in getting any business, however, because of the uncertainty as to deliveries.

Steel Skelp.—The reaction in the demand to the reduction in steel skelp from 2.20c. to 2c. has been extremely poor. Demands upon the mills for finished tubular goods still are light and the nonintegrated makers have not been tempted by the official reduction recently announced.

Boiler Tubes.—The National Tube Co. has issued a card dated July 7 cutting prices of steel lap-weld boiler tubes from $4 to $12 per ton and the new schedule has been adopted by independent makers. The National Tube Co. has not yet made public the new discounts on seamless tubes, and makers of charcoal iron boiler tubes here are waiting on Eastern producers to take the first step in a revision of prices. Business in all kinds of boiler tubes has been extremely slack for some time and there has been no noticeable increase in the demand since the revision. Discounts are given on page 112.

Hot-Rolled and Cold-Rolled Strips.—The American Steel & Wire Co. has announced a price of 4.25c., base, for cold-rolled strips which compares with 5.50c., its last previous official price, and 5c., at which it was accepting orders prior to the holiday. The new price, therefore, constitutes a cut of $25 a ton from the April 13 price and of $15 per ton from its recent actual selling base. Independent makers are expected to adopt the new price. Hot-rolled strips are variously quoted from 2.50c. to 2.60c., the latter being the price of the Steel Corporation. Business is reflected in mill operations, which are about 25 per cent of capacity.

Steel Chain.—Recent price cuts in steel bars and wire rods have not yet been reflected in steel chain, which still is quoted at 6.25c. per 100 lb. for 1-in. proof coil. There are rumors that this price is being shaded.

Coal and Coke.—The market is an extremely limited affair as regards both the demand and supply, but if there is a definite tendency to prices, it is down. Important operators are not inclined to consider less than $3 per net ton, oven, for spot freshly drawn furnace coke, but it happens from time to time that they have surplus supplies which they are not able to dispose of at more than $2.75. Uniform wage scales are lacking in the Connellsville district and some of the smaller operators are able to obtain workmen at such low rates that they are willing to sell furnace coke right from the oven at $2.75 per net ton. The Wickwire-Spencer Steel Corporation, Buffalo, is figuring on starting up a furnace on Aug. 1, and has sent broadcast an inquiry for 30,000 tons of furnace coke running less than 1 per cent in sulphur, for delivery at the rate of 500 tons a day over August and September. Competition for this business is likely to be sharp, and a price of below $3 is thought possible. Choice brands of foundry coke are held as high as $4.50, but the more common range is from $4 to $4.25 and there are reports that some loaded cars of this grade have gone as low as $3.75. The difference between the wage scales in union and non-union coal fields is beginning to be a factor in the demand.

Old Material.—The market remains extremely dull and prices merely are an appraisal arrived at on bids and offers. Quotations show no marked changes except that on the basis of bids and offers cast iron borings are not quotable above $8 per ton delivered or about 50c. per ton below last week's quotation. Sheet bar crops and heavy breakable cast scrap also are quoted 50c. down from last week's prices. There is an inquiry out from a dealer against a sale of a few hundred tons of mixed borings and turnings carrying a price of about $8.50 delivered Dunbar, Pa. Dealers report much difficulty in getting a bid of more than $7 per ton delivered for machine shop turnings.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to	$12.50
No. 1 cast cupola size	16.00 to	16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to	14.00
Compressed sheet steel	9.50 to	10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to	8.25
Railroad knuckles and couplers	12.50 to	13.00
Railroad coil and leaf springs	12.50 to	13.00
Railroad grate bars	10.00 to	10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to	16.50
Railroad malleable	12.00 to	13.00
Iron car axles	18.00 to	19.00
Locomotive axles, steel	17.50 to	18.00
Steel car axles	14.50 to	15.00
Cast iron wheels	13.00 to	13.50
Rolled steel whee'ls	12.50 to	13.00
Machine shop turnings	7.00 to	7.50
Sheet bar crop ends at origin	12.00 to	12.50
Heavy steel axle turnings	8.50 to	9.00
Short shoveling turnings	8.00 to	8.50
Heavy breakable cast	13.50 to	14.00
Stove plate	12.00 to	12.50
Cast iron borings	7.50 to	8.00
No. 1 railroad wrought	12.00 to	12.50

Chicago

CHICAGO, July 12.

The new prices on steel products announced by the Bethlehem Steel Co. last week have been generally adopted, but it is too early to ascertain whether they will hold, as most current business is covered by protections granted under former quotations. The railroads continue to show interest in car repairs, although they are not yet letting work on the scale expected in some quarters. The automobile industry is more active than was anticipated a month ago. The Ford Motor Co. continues to maintain a normal output and some other makers are doing well. The Dodge company is turning out 400 to 500 cars a day, the Buick company is manufacturing cars at the rate of 9000 a month, and the Studebaker plants at Detroit and South Bend are reported to be on a 75 per cent basis. Generally speaking, however, the demand for steel continues light.

Pig iron has taken another slump of $1 a ton, and bolts and nuts are weak.

Mill and furnace operation in this district is substantially unchanged except for further curtailment by the Inland Steel Co. This producer has blown out a furnace which has been operating on merchant iron, leaving only one of the company's three furnaces in blast. Its steel output has dropped to between 20 and 25 per cent of normal.

Pig Iron.—Output in this district was further curtailed when on Monday the Inland Steel Co. blew out one of its blast furnaces which had been producing merchant iron. This action leaves only one furnace, a Mayville stack, operating on merchant iron exclusively, while a second furnace, an Iroquois stack, is employed chiefly on Bessemer for an allied company, only occasionally making a few casts of malleable or foundry. Buying is still limited, purchases of carload lots being notably fewer. A local purchaser has bought 100 tons of malleable for Indianapolis delivery at $19, local furnace, while a Chicago plant has closed for 300 tons of foundry averaging 3 per cent silicon at $20, furnace, or figuring silicon differentials at 50c., $19 base, furnace. A carload of charcoal for Eastern delivery has been sold at $32.50 base, furnace, or $1.50 under the previously prevailing market. New inquiries include one for 350 tons of foundry for the United States Radiator Co. at Edwardsville, Ill., and another from a Wisconsin smelter for 150 tons of 3 per cent foundry and 75 tons of charcoal. Coke buying is light, but we note a sale of seven carloads of high-grade beehive foundry to an Indiana buyer at the price ruling at time of delivery.

Quotations on Northern foundry, high phosphorous, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumer's yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.00 to $36.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.00 to 20.00
Northern coke foundry, No. 2, sil. 1.75 to 2.25	19.00 to 19.50
Northern high phos.	19.00 to 19.50
Southern foundry, sil. 1.75 to 2.25	27.67
Malleable, not over 2.25 sil.	19.00 to 19.50
Basic	19.00 to 19.50
Low phos., Valley furnace, siil. 1 to 2 per cent, copper free	35.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—A local buyer has purchased 100 tons of resale spiegeleisen at $34 delivered.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $36 delivered.

Structural Material.—Most mills are quoting the new price of 2c., Pittsburgh, on plain material, announced by the Bethlehem Steel Co. July 4. No new business, however, has developed to test the stability of the quotation. A number of fabricating jobs on which protections had been previously secured have been awarded within the past week, two of them involving over 1000 tons each. The successful bid on one of these was the low figure of approximately $72 delivered. Among pending projects the largest is for repairs to the Armour Grain Co. elevator, Chicago, requiring 1500 tons. Bids were taken last week on the fabrication of the substructure of the Federal Reserve Bank Building, Minneapolis, amounting to 800 tons. Recent lettings include:

U. S. Window Glass Co., plant at Shreveport, La., 2500 tons, Decatur Bridge Co.

Mechanical repair shop, Motor Transport Division, Army, Fort Leavenworth, Kan., 1100 tons, to Missouri Valley Bridge & Iron Co.

Atlas Life Building, Tulsa, Okla., 400 tons, to Kansas City Structural Steel Co.

Selwyn & Harris Theater, Chicago, 348 tons, to Vatnerkloot Iron Works.

Miller Theater and Office Building, Wichita, Kan., 285 tons, to Fort Pitt Bridge Works.

Main building for West Hills School, Salt Lake City, Utah, 217 tons, to Minneapolis Steel & Machinery Co.

Masonic Temple, Kokomo, Ind., 220 tons, reinforced concrete substituted for structural steel.

Rosary College, River Forest, Ill., steel for the roofs of three buildings and a swimming pool, 160 tons, to Lackawanna Bridge Co.

Five highway spans, Taylorville, Ill., 157 tons, to Decatur Bridge Co.

Beams for Twelfth Street bridge, Boulder, Colo., 123 tons, to American Bridge Co.

Government river terminal, St. Louis, 150 tons, to St. Louis Structural Steel Co.

Pending business includes:

Lake Shore Trust & Savings Bank, Chicago, 325 tons, bids in, award expected this week.

The mill quotation is 2c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.03c. for materials out of warehouse.

Plates.—The leading mills, the subsidiaries of the Steel Corporation included, have adopted the quotations announced by the Bethlehem Steel Co. last week. As the new price of 2c., Pittsburgh, on tank plates is higher than has been done in this section recently, it is a question whether it will bring out business or will merely cause buyers to withhold their orders in the hope that lower quotations will be named. The Standard Oil Co., which was in the market for 25 oil storage tanks for Baton Rouge, La., calling for 3500 tons of plates, has withdrawn its inquiry and will erect old tanks taken from another of the company's properties.

The mill quotation is 2c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.03c. for plates out of stock.

Bolts and Nuts.—Prices lack stability, some makers quoting larger discounts than those recently published in this column and others billing material f.o.b. Chicago instead of Pittsburgh. The Rock Island Railroad is in the market for 200,000 bolts and has bought 31 tons of rivets. The Great Northern is inquiring for 136,000 bolts. Jobbers continue to buy sparingly.

Jobbers quote structural rivets, 4.03c.; boiler rivets, 4.13c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Although most mills are quoting 1.90c., Pittsburgh, on mild steel bars, lower prices are still being named by some makers. Business remains relatively light, although a number of good-sized reinforcing jobs are being figured on, principally at locations outside of this city. A high school at Janesville, Wis., will require 350 tons. Buying of bar iron is still confined to small lots, purchases by railroads thus far having been exceedingly conservative. Prices on this product have again declined, the present ruling market being 2c. to 2.10c., Chicago. The hard steel bar situation remains unchanged both as to price and demand.

Mill prices are: Mild steel bars, 1.85c. to 1.90c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 2c. to 2.10c., Chicago; rail carbon, 1.90c. to 2c., mill or Chicago.

Jobbers quote 2.93c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.35c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—There seems to be little likelihood that the new prices announced by the Bethlehem Steel Co. and the leading interests will be generally adhered to. In fact, lower prices have already been named by some makers. There has been no change in the volume of demand.

Mill quotations are 3.50c. for No. 28 black; 2.65c. for No. 10 blue annealed and 4.50c. for No. 28 ga vanized. these all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Railroad Rolling Stock.—The Chicago Great Western is in the market for repairs on 175 to 200 box cars. The Northern Pacific is asking for alternate figures on 1000 steel center constructions and 1000 underframes. The American Refrigerator Transit Co. has ordered 100 steel underframes from the General American Car Co. The Illinois Central, which recently placed an order for the repair of 600 gondola cars, has let repairs on 400 more to the Haskell & Barker Car Co. The same road was generally reported to be in the market for 100 to 130 engines, but instead is asking for figures on the conversion of 100 to 130 consolidation-type locomotives into Mikado-type engines. The Mississippi Central has bought three locomotives and the Pittsburgh & West Virginia has bought two from the American Locomotive Co. The Western Steel Car & Foundry Co., which was awarded repairs on 300 hopper cars by the Wabash, as noted last week, has placed the steel, amounting to about 1500 tons, with a local mill under a protection granted before the new prices became effective.

Warehouse Prices.—Following the recent announcement of reductions in prices by the mills, local jobbers have cut their quotations on plates, shapes and bars, 20c. per 100 lb. Structural rivets and boiler rivets also have been reduced 50c. a 100 lb., while cold-rolled bars have been marked down 28c. A reduction in warehouse prices on sheets was announced last week and reductions in bolts and nuts have been published in recent issues. Local jobbers have also reduced their quotations on wire products, wire and wire nails having been marked down 25c. per 100 lb. and cement coated nails 15c. per keg. Lap-weld boiler tubes have been reduced from 3c. to 3¼c. per foot, depending on the size. Four-inch is now quoted at 40c. per foot.

Rails and Track Supplies.—Prices on track spikes and bolts have been reduced to 3c. and 4c., Pittsburgh, respectively, while light rails rolled from billets have been marked down to 1.90c., mill. No action has yet been taken on the prices of tie plates and angle bars, but reductions are expected to be made. The Mobile & Ohio has bought 550 kegs of spikes from a local mill.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.90c. f.o.b. makers' mills.

Standard railroad spikes, 3c., Pittsburgh; track bolts with square nuts, 4c., Pittsburgh; steel tie plates, 2.50c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.50c., f.o.b. makers' mills.

Cast Iron Pipe.—The Detroit Board of Water Commissioners has awarded 8000 tons, or about one-half the tonnage it took figures on, to the Lynchburg Foundry Co. Akron, Ohio, will take bids for a third time July 18 on 6500 tons of 48-in. On July 15 it will receive figures on 1000 tons of 4 to 16-in. Fort Wayne, Ind., which recently rejected bids on 470 tons, will take figures a second time on July 15. Minneapolis has let 140 tons to the National Cast Iron Pipe Co. and 60 tons to the United States Cast Iron Pipe & Foundry Co. Although there have been fewer municipal lettings of late, private business has been of fair proportions. The ruling price on 6-in. and larger appears to be $40, Birmingham, although some business is reported as having been taken at a few dollars higher.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $52.10 to $55.10; 6-in. and above, $49.10 to $52.10; class A and gas pipe, $3 extra.

Wire Products.—The leading maker has announced substantial reductions which have been adopted by its competitors. The new prices are as follows:

Wire nails, $2.75 base per keg; plain wire, $2.50 per 100 lb.; galvanized wire, $3 per 100 lb.; barbed wire, $2.90 per 100 lb.; galvanized barbed wire, $3.40; staples, $2.90; galvanized staples, $3.40.

There has not yet been any noticeable change in the demand. Although the railroads are looked to as a source of business, their purchases thus far have been small. Jobbers continue to order from hand to mouth but with the approach of fall they are expected to lay in stocks.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Old Material.—Consumers are almost totally absent from the market and prices have undergone few changes. Present quotations are regarded as exceedingly low and it is felt that even a slight revival in demand would cause an advance. Railroad lists are heavy. The Baltimore & Ohio and the Southern are advertising 15,000 tons each, the Northern Pacific 2500 tons, the Pere Marquette and the Great Northern 1500 tons each, the Soo Line 900 tons and the Pullman Co. 500 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.50 to $16.00
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.00
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.50 to 14.00
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	9.00 to 9.50
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.25 to 9.75
No. 2 railroad wrought	8.75 to 9.25
Steel knuckles and couplers	10.50 to 11.00
Coil springs	11.75 to 12.25
No. 1 machinery cast	12.50 to 13.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	10.00 to 10.50
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75
Country mixed	7.00 to 7.50

Philadelphia

PHILADELPHIA, July 12.

Notwithstanding the announcements only last week of new prices on steel products further weakness has appeared. In reality there are today no "regular" prices for steel. Some of the mills are determined to get what business they can and price seems not to be a factor, the only consideration being to get the order, if possible, at the best price obtainable. In structural shapes, for example, concessions of $2 a ton have been freely made, while it is reported that some fabricators have been quoted as low as 1.80c., Pittsburgh. There has been at no time recently any difficulty in obtaining plates at 1.90c., but on attractive tonnage a better figure would be quoted. Bar iron has been sold at 1.80c., Pittsburgh, a reduction of $2 a ton, while one or two orders have been placed at 1.70c. Large bolts and nuts have been reduced about 12½ per cent.

New prices have been named on steel pipe, boiler tubes and wire products. Discounts now effective on pipe and tubes are given under the heading Pittsburgh f.o.b. prices in this issue. The reduction on wire products amounts to $5 a ton and is made by all of the mills, following the lead of the American Steel & Wire Co. Warehouse prices have also been reduced to conform to lower mill prices.

Little new business is in sight, two railroad car inquiries and a few sizable structural jobs being about the only signs of real life in the market. Mill operations continue at a very low rate. The only renewed activity is that the Midvale Steel & Ordnance Co. has started up one plate mill at Coatesville, this plant having been idle since early December, except for one week's rolling in the spring.

Pig Iron.—The local pig iron market continues dull and featureless. A spotty improvement in inquiry is noted, one local office having received several inquiries totaling 2800 tons of foundry iron in one day's mail last week. All of the inquiries, however, were from New England and New York districts, the immediate Philadelphia district offering scarcely any business larger than carload lots. Prices quoted for this dis-

trict on foundry iron range from $23 to $24, furnace, for No. 2 plain, $24 to $25, furnace, on No. 2X and $25 to $26, furnace, on No. 1X, the furnace quoting the lower prices having a freight rate of $1.54 to Philadelphia. In meeting Buffalo competition in New England and in the vicinity of New York, the eastern Pennsylvania furnaces have been obliged, however, to quote lower furnace prices than those above named. In grades of iron other than foundry, there is pronounced dullness, with prices easy but unchanged. Some sales agents of Eastern furnaces point to the fact that shipments of iron are now exceeding the quantity that is being made in this district.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$24.50 to $25.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	25.50 to 26.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	31.74
Virginia No. 2X, 2.25 to 2.75 sil.	32.99
Basic deliv. eastern Pa.	23.50 to 24.00
Gray forge	23.00 to 23.50
Malleable	26.00 to 27.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—The possibility of the imposition of a high tariff on imported ferromanganese and manganese ore has not stimulated any buying interest among consumers, the market continuing as dull as it has been for some time. Ferromanganese is available at $70 to $80, delivered, and spiegeleisen at $28 to $30, furnace. Some low-grade ferromanganese is offered at $1 per unit.

Semi-Finished Steel.—No inquiry of importance has come out for semi-finished steel since the announcement of new prices $4 a ton lower. Open-hearth rerolling billets are to be had at $33 and forging billets at $38, Pittsburgh.

Plates.—The Midvale Steel & Ordnance Co. has started one plate mill at Coatesville to roll an order for 1200 tons of locomotive plates. Otherwise there is no change in plate mill operations in the East, most of the mills being idle or operating only intermittently on small orders. Several shipyards, which are bidding on one or two boats for the Red D Line, have inquired for 2600 or 5200 tons of plates and shapes. Plate mills are somewhat encouraged by the belief that considerable car repair work will come out within the next few months. The Bangor & Aroostook Railroad is inquiring for 200 flat cars and 300 composite gondolas and the Western Maryland asks bids on 500 steel car bodies. We quote sheared plates at 1.90c. to 2c., Pittsburgh.

Structural Shapes.—Eastern fabricating shops are quoting on a fair quantity of work, but difficulty is experienced in getting builders to go ahead. Several projects on which the general contracts have been let are still held up so far as the steel is concerned. Some of the mills are making every effort to assist the fabricators with whom they work to close business by naming low prices. In one instance 1.80c., Pittsburgh, is reported to have been named by an Eastern mill, while 1.90c. is freely quoted. We quote plain material at 1.90c. to 2c., Pittsburgh.

Bars.—Some makers of bar iron have made price concessions of $2 a ton from the recent quotation of 1.90c., Pittsburgh, but this has been done only on desirable specifications. In at least one instance, 1.70c., Pittsburgh, has been named. There is no improvement in the demand for steel bars. While 1.90c., Pittsburgh, is the nominal quotation, a good specification would undoubtedly command a lower figure. A few large inquiries for concrete bars, which have been in the market for some weeks, are still pending. We quote bar iron at 1.80c. and soft steel bars at 1.90c., Pittsburgh.

Wire Products.—Independent mills have met the prices adopted by the American Steel & Wire Co. Wire nails are now quoted at $2.75 per keg, plain wire at $2.50 per 100 lb., cement coated nails, $2.35, and galvanized barbed wire at $3.40.

Bolts and Nuts.—Lag screws, nuts and large-size bolts have been reduced in price about 12½ per cent. Large machine bolts are now 65 and 10 per cent off list, lag screws, 70 and 5 per cent off and hot pressed nuts, square and hexagon, c.p.c. and t., blank, 5c. off list, tapped, 4.50c. off list.

Warehouse Business.—Reductions of several dollars a ton have been made by local warehouses in line with the lower mill prices on steel products. We quote the new warehouse prices for local delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ in. x ½ in., 3.20c.; round edge steel, planished, 3.95c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.50c.; galvanized sheets, No. 28 gage, 5.50c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.75c.; 3/16-in., 4.95c.; ⅛-in., 5.05c.; spring steel, 4.40c.; round cold-rolled steel, 4.50c.; squares and hexagons, cold-rolled steel, 5c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.60c.; iron bands, 4.20c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 6.50c.; toe steel, 4.50c.

Old Material.—The scrap market is stagnant and prices are almost stationary. We quote carwheels $2 a ton lower. The following are prices for delivery at consuming points in this district:

No. 1 heavy melting steel	$11.00
Scrap rail	$10.00 to 10.50
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	8.50 to 9.00
Cast borings (for chemical plants)	No market
No. 1 cast	16.00 to 17.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	11.50 to 12.00
Iron car axles	No market
Steel car axles	No market

Boston

BOSTON, July 12.

Pig Iron.—Estimated sales for the week are not more than 1500 tons, mostly eastern Pennsylvania, and at private terms. The largest sale was one of 600 tons No. 2X Northern to the Saco-Lowell Shops, Boston, at an indicated price of $21 furnace, which would bring the furnace base price down to at least $20.50. A Framingham, Mass., melter took 200 tons No. 1X eastern Pennsylvania at a price of around $20 furnace for No. 2 plain. In both instances it is believed iron was purchased on a delivered basis of about $25. The other extreme is a sale of 200 tons eastern Pennsylvania No. 2X to a Massachusetts consumer at $29.81 delivered, which figures out $24.75 furnace for No. 2 plain. Another Massachusetts foundry bought 200 tons eastern Pennsylvania resale at private terms and some half dozen car lots, largely eastern Pennsylvania, silicons 2.25 to 2.75 and 2.75 to 3.25, were purchased by various Massachusetts melters at $25 to $30 delivered. New Hampshire and Massachusetts melters took car lots of Buffalo No. 1X at $28.50 delivered. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$25.56 to $29.31
East. Penn., silicon 1.75 to 2.25	25.06 to 28.81
Buffalo, silicon 2.25 to 2.75	25.96 to 29.46
Buffalo, silicon 1.75 to 2.25	25.46 to 28.46
Virginia, silicon 2.25 to 2.75	33.08 to 34.58
Virginia, silicon 1.75 to 2.25	32.08 to 33.58
Alabama, silicon 2.25 to 2.75	33.16 to 33.66
Alabama, silicon 1.75 to 2.25	32.66 to 33.16

Warehouse Business.—Local prices on Wayne iron have been reduced 50c. per 100 lb.; on cold rolled steel, 30c.; best refined and Norway iron, 25c.; soft steel bars, steel flats, concrete bars, structural, plates, steel bands and refined iron, 20c.; on tire steel and steel hoops, 5c. Quotations on open-hearth and crucible spring steels, steel half rounds, ovals and bevels and toe calk steel remain unchanged. The demand for iron and steel, if anything, is quieter, and that for bolts and

nuts is decidedly so, buyers holding off for lower prices. The flurry of buying of horseshoes has dried up.

Jobbers now quote: Soft steel bars, $2.98 per 100 lb. base; flats, $3.98 to $4.08; concrete bars, $2.50 to $3.25¼; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.63 to $4.08; steel hoops, $4.33; toe calk steel, $5.25; cold rolled steel, $4.35 to $4.85; structural, $2.98 to $3.13; plates, $3.08 to $3.28; No. 10 blue annealed sheets, $3.83; No. 28 black sheets, $5.50; No. 28 galvanized sheets, $6.50; refined iron, $2.98 to $5; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Finished Material.—The Boston Structural Steel Co., Inc., Cambridge, Mass., was awarded 330 tons structural for a Boston municipal building. Original plans for the Lynn-Point of Pines, Mass., bridge, involving 650 tons, are abandoned, a wooden structure being substituted. Bids are being taken on 300 tons structural steel for an Allston, Boston, theater, and 300 tons for a Mystic, Conn., highway bridge. Bids are in on 600 tons for a Pawtucket, R. I., theater. Stone & Webster, within a month, will ask bids on about 300 tons for the Ford Motor Co.'s Green Island, N. Y., proposed plant. The Government has asked for re-bids on 200 tons boiler plates recently awarded by a shipyard. Mill representatives are getting more small orders than usual, but few large orders for plates. Contrary to earlier reports, 500 tons of girder rails wanted by the Eastern Massachusetts Street Railway Co. have not been placed. New prices on steel, publicly announced recently, are shaded more often than adhered to, 1.90c. Pittsburgh having been named on plates, shapes and bars. Inquiries on one 100-ton lot of reinforcing bars brought out 1.90c., Pittsburgh base from mills, and 2c., Pittsburgh, from local jobbers. The Amoskeag Mfg. Co., Boston, is in the market for 200 tons of deformed bars.

Coke.—New England foundry coke producers have eliminated the spread in spot and contract prices, now quoting both at $10.91 delivered, where the local freight rate does not exceed $3.40. This change is the first one reported since early in June and represents a drop of 50c. per ton on spot and 25c. on contract, and is equivalent to $4.57 f.o.b. Connellsville ovens. Both the New England Coal & Coke Co. and the Providence Gas Co. continue to give consumers the right to contract for last half fuel at prices ruling at date of shipment. Contracted coke as of July 1 approximated 50 per cent of that for the corresponding period last year, which is considerably better than the showing in normal years. The New England Coal & Coke Co. has reduced wages of plant employees about 10 per cent.

Old Material.—The market is practically at a standstill and quotations are largely nominal. The only sale of importance reported this week is one of 500 tons of heavy melting steel at $12 delivered to a Massachusetts melter. Steel mills, last month interested in heavy melting steel, etc., are operating on such a small scale they have ceased to be old material market factors. Purchases of machinery cast by New England foundries are confined to an occasional car lot on a basis of $17 to $17.50 delivered for No. 1. Stove plate generally is quoted at around $15 delivered, but no sales are reported this week. Stocks of old material in New England yards are much larger than they were Jan. 1, inasmuch as three-fourths of stock taken in since then could not be sold except at a loss. Many yard owners have reached a point where they are unwilling to commit themselves further.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $17.50
No. 2 machinery cast	15.50 to 16.00
Stove plate	15.00 to 16.00
Railroad malleable	14.00 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1-in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Buffalo

BUFFALO, July 12.

Pig Iron.—There is a decided picking up in inquiry with majority of producers, but it has not been reflected in orders. This increase brings no better or more optimistic feeling to the producers, as they are not hopeful of seeing much of it reduced to actual sales. With one furnace the total tonnage on which prices were asked last week was 7000 tons as compared with 3000 the preceding week, while their sales for the week were slightly less than 1000 tons. This company is quoting $21 on 2.25 to 2.75 silicon, but has sold a grade of iron containing extra high sulphur at less than $20. In the 7000 tons on which prices were asked were 25 individual inquiries. Sales of 500 tons at $22 and $23 base represent the week's business with a producer who is operating one furnace out of a group of three—but only from week to week. Operating in August depends on a pick up in orders the remainder of this month. An inquiry for 500 tons was abandoned by the prospective buyer before prices were quoted. The furnace interest was not inclined to regret the decision not to buy, as the delivery was for the last half of the year—a factor no more attractive than heretofore. A decided falling off in orders for the iron made by a steel company is noticed; sales of less than 500 tons have been recorded. The campaign conducted by brokers to sell this product has resulted in inquiry of 6000 tons reaching the maker. The price situation is the same—$21.50 the usual base, but $21 would be accepted on an order of 1000 tons or more. There is no verification to the report that the national user who has been the largest sole buyer, bought 3000 tons of Buffalo iron at $19.50 base.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$22.75 to $23.50
No. 2X foundry, 2.25 to 2.75 sil	21.75 to 22.50
No. 2 plain, 1.75 to 2.25 sil	21.00 to 21.50
Basic (nominal)	21.00 to 22.00
Malleable (nominal)	23.00 to 24.00
Lake Superior charcoal	37.00

Warehouse Business.—Coincident with new price schedule announcements by mills, local warehouses have adjusted their prices all along the line. Business has not improved since the announcement but executives attribute the general lull to the wait which preceded new schedules and say that sufficient time has not elapsed for anything to develop. Plate business seems to overshadow activity in other lines. In point of size, best orders come from customers who admit failure to get the same material at mills for immediate delivery.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.05c.; plates, 3.05c.; plates, No. 8 gage, 3.65c.; soft steel bars and shapes, 2.95c.; hoops, 3.65c.; blue annealed sheets, No. 10 gage, 3.70c.; galvanized steel sheets, No. 28 gage, 5.80c.; black sheets, No. 28 gage, 4.80c.; cold rolled strip steel, 7:15c.

Finished Iron and Steel.—Reopening of several railroad shops is a matter for vicinity encouragement. Altogether the mills are more hopeful and with the price situation cleared, for the present at least, better business seems nearer. One of the largest factors here—a branch of a Pittsburgh interest—has been advised to conform to the price scale announced by the mill first in the field last week to make public its cuts. Canadian business is quiet and is likely due to the customs ruling explained last week in THE IRON AGE. No price schedule will be published by the largest of independent mills here. The same policy which has been in existence for some time—of meeting competition as it develops—will continue. Several fair structural jobs have been awarded. The Van Dorn Iron Co., Cleveland, has booked the order for the cell work at the new penitentiary. The Buffalo Structural Steel Co. will fabricate 60 tons for the same job. The Lackawanna Bridge Co. will fabricate 375 tons for the new warehouse of the barge canal at Rochester. Better inquiry with one mill office is not attributed to new prices; its business in structural shapes and in plates is entirely a carload proposition. There is a goodly proportion of small orders in bars and sheets and pipe business consisting of one and two carload lots is regarded as satisfactory in view of general conditions.

Better business in piling has come to a mill—orders for 1000 tons having been booked in one week.

Old Material.—Increased shop operation with the railroads may throw considerable material on the market. Dealers cannot report any worth-while business and stocks in the yards have not been reduced to any appreciable extent. Prices, of course, are nominal, but dealers are quoting less now than a week ago.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$11.50 to $12 00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	15.00 to 16.00

St. Louis

ST. LOUIS, July 8.

Pig Iron.—One sale of consequence was reported here this week, and that was of 1000 tons of Northern No. 2 by a St. Louis manufacturer to an outside concern, the price for which was not given. Outside of that, there has been practically nothing done. The steel plant of the National Enameling & Stamping Co. closed on July 1 for two months. The only companies having open hearths running now are Scullin Steel Co., where one of 10 furnaces is operating, and American Steel Foundries, where four of the 10 are in operation. These and other consumers are fairly well stocked. The furnace of the St. Louis Coke & Chemical Co. is still in blast.

We quote delivered consumers' yards, St. Louis:

Northern malleable	$22.80 to $23.30
Basic	22.80 to 23.30
Southern foundry, sil. 1.75 to 2.25	26.24 to 26.74

Finished Iron and Steel.—The reduction in steel prices, effective last Tuesday, fell flat here, and did not result in the sale of one ton of material. While it is generally regarded that steel prices have been sufficiently reduced, the labor market is still up, and the building trades here have refused to reduce their wages. However, plans for some construction are going right ahead. The principal items in the structural field are 237 tons of rerolled bars for a hotel at Grand and Lindell boulevards, F. J. Cornwell, builder, and 1100 tons of structural steel for the Motor Transport division for the army at Fort Leavenworth, Murch Brothers, St. Louis, contractors. Steel requirements will soon be known for the new Federal Reserve Bank Building, Mauran, Russell & Crowell, architects. Approximately 1500 tons of structural steel will be used in the new Scottish Rite Cathedral, which also has not yet reached the contract stage. A close survey of the railroad situation revealed that the prospects for their buying are no better than they have been for the last few months. Warehouse business is slow, and further reductions have been made.

For stock out of warehouse, we quote: Soft steel bars, 3.02½c. per lb.; iron bars, 3.02½c.; structural shapes, 3.12½c.; tank plates, 3.12½c.; No. 10 blue annealed sheets, 3.77½c.; No. 28 black sheets, cold rolled, one pass, 5c.; No. 28 galvanized sheets, 6c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, $4.12½ per 100 lb.; boiler rivets, $4.22½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and, tapped, $3.00 off list

Coke.—With most of the foundries not melting, and it is problematical when there will be a general resumption, there is very little demand. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, which price is being met by Granite City by-product coke. Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered anywhere in the industrial district.

Old Material.—Outside of relaying rails there is no demand for old material. St. Louis dealers are interested in an inquiry for 1000 tons of 60 lb. from New Orleans, presumably for export. Railroads continue to submit lists, offering old material, those closing next week being the Mobile & Ohio, 1000 tons; Northern Pacific, 750 tons, and Great Northern, 500 tons, while the Big Four has an open list. Dealers here are well stocked, and are not interested in these offerings, nor are consumers, and it is believed that no reasonable offers will be made here on railroad lists.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

Per Gross Ton	
Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft	11.50 to 12.00
Relaying rails, standard section, subject to inspection	27.00 to 29.00
Cast-iron car wheels	12.00 to 12.50
No. 1 railroad heavy melting steel	11.00 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundled sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	5.00 to 5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	9.00 to 9.50
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 9.00
No. 1 dealers' forge	6.50 to 7.00
Cast iron borings	6.00 to 6.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	7.00 to 7.50
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.50 to 7.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.00 to 10.50
Railroad brake shoes	7.50 to 8.00

Birmingham

BIRMINGHAM, ALA., July 9.

Pig Iron.—From 4000 to 6000 tons of Birmingham iron was booked during the week. The new base seems to be $20.50 for 500 tons and over with $21 and $21.50 for car loads. The market may be said to be down another 50c. with probability that desirable business may now be booked at $20 base. Among other purchases was one of 500 tons by the Sanitary Mfg. Co. and one of like amount by the Southern Pacific Railroad. One maker sold lots of 200, 500 and 1000 tons and another did a week's business of about 1300 tons in relatively small lots. The tendency to buy seems to have increased owing to depleted state of stocks on consumers' yards. Stocks on furnace yards in Alabama July 1 and June 1 were as follows: foundry, 123,000 and 132,000; machine cast, 47,000 and 44,000; basic, 61,000 and 58,000; total 232,000 and 235,000. The total decrease of 3000 tons is not regarded with as much significance as the reduction of 9000 tons in merchant foundry, especially when it is borne in mind that only one merchant stack will be active after the close of this week, the Alabama Co. banking or blowing out on July 15. The Woodward Iron Co. will then be the only operating merchant furnace. Alabama operators seem determined not to take any more losses on iron hereafter made and will not resume unless costs or freights to competitive points go down. The district expects more pipe iron buying after the award of the Detroit and Akron contracts. The Tennessee company is down to four stacks, all on basic, but one banked stack is expected to resume in two weeks. Increased basic iron stocks will be carried for home purposes, it is presumed, and are not regarded as in the market.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$20.50 to $21.00
Basic	19.50 to 20.00
Charcoal	35.00

Cast Iron Pipe.—There was very little new in the high pressure pipe market last week, small orders from Middle Western cities being the principal business. The Akron award is expected this week. Nominal base is $45, but real base is nearer $40. The $40 base on soil pipe continues to be observed very generally with some under-cutting.

Finishing Mills.—Bridge and structural steel plants

in the Birmingham district report a business that keeps them fairly busy. The Tennessee company has been operating its structural mill steadily. Wire drawing mills are at about 30 per cent. The Tennessee company's rail mill is kept going at normal by foreign and domestic orders. Steel hoop, tie and band mills operate intermittently on order accumulations, working two weeks and then shutting down for as many more.

Old Material.—Users of steel scrap are slow in taking their ordered quota. The scrap market has been stagnant so long that there is apparently little interest in quotations.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	16.00 to 17.00
Car wheels	16.00 to 17.00
Tramcar wheels	15.00 to 16.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

New York

NEW YORK, July 12.

Pig Iron.—Increased inquiries and a fair number of sales of moderate tonnage have given a more cheerful aspect to the market. One firm has received inquiries amounting to about 4000 tons, all for small tonnages. Another firm has sold 900 tons of foundry grades in two lots for July delivery, 500 tons of No. 2X for delivery within three months and two lots of 250 tons each for spot delivery, also 1000 tons of basic for immediate delivery. The inquiry for 1000 tons of basic for the American Steel & Wire Co.'s Worcester plant is still pending. Another inquiry is for 500 to 600 tons of foundry grades for the remainder of the year. An inquiry for 1000 tons for export is not taken very seriously. As to prices, little is being said by sellers, as it is recognized that the market is weak. The most encouraging feature to them is that stocks of foundrymen are being so reduced that when sales are made they are almost invariably accompanied by requests for prompt delivery.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$25.52 to $26.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	24.52 to 25.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	23.52 to 24.52
Buffalo, sil. 1.75 to 2.25	25.46 to 26.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—With the exception of inquiries for a few carloads of ferromanganese, there is no activity. Domestic ferromanganese is obtainable at $70 to $75, delivered, while the nominal price for the British alloy is $75, seaboard, but there has been no real test of the market on either domestic or import iron. Spiegeleisen is dull and a variety of quotations, ranging from $26 to $30, furnace, have been made on the few small inquiries that have come to the attention of selling agents.

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$75.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$67.50 to $70.00
Manganese ore, foreign, per unit, seaboard	22.50c.

High Speed Steel.—The market continues unchanged and prices largely nominal. While most producers are quoting 90c. to $1 per lb. for 18 per cent tungsten high speed steel, sales are reported at 85c. per lb. and lower.

Cast-Iron Pipe.—Business continues satisfactory. An occasional foreign inquiry comes before the trade, but because of conditions of exchange and demands for long time credits, this business is not looked upon with favor. Quotations remain the same, or for carload lots, f.o.b. New York, as follows: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—All warehouses in this district, since July 8, have been quoting on a lower schedule. This is the second price revision in about two weeks and brings the spread between mill and warehouse down to about $13 per ton based on 1.90c. per lb., Pittsburgh, for bars. These are now quoted at 2.93c. per lb. for both iron and soft steel and structural material and tank plates are 3.03c. per lb. Hoops are 4.03c. per lb. and bands 3.63c. per lb. Tire steel, iron finish, is 2.93c. per lb. with smooth finish at 3.13c. per lb. Sheets have also undergone a reduction. Blue annealed, No. 10 gage are generally 3.68c. per lb., a drop of about 20c. per 100 lb. Black sheets are down about 25c. per 100 lb. to 4.50c. per lb. for No. 28 gage and galvanized sheets are consistently quoted at 5.50c. per lb. Brass and copper items have registered a slight drop of about ½c. per lb. on brass products and ¼c. per lb. on copper. Although mill prices on standard steel pipe and boiler tubes have been reduced from $4 to $6 per ton on the former and from $4 to $12 per ton on the latter, a new schedule of quotations on this basis has not yet been prepared by the warehouses. Orders, however, are now being booked at a proportionate reduction. We quote prices on page 124.

Old Material.—Although prices of finished steel are being reduced, the level of scrap prices has not changed to any extent. The only notable change is that of old car wheels, which have declined $2.50 a ton. One broker is paying 25c. a ton more for iron and steel shafting than a week ago, his other prices being the same.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$6.50 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3.50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Finished Iron and Steel.—About the only effect of the price announcements of July 4 seems to have been that a number of small orders were released, though not totaling much in the aggregate. These were mainly purchases which had been held up as long as possible waiting for some decided reduction. At present the market is exceedingly quiet with buyers very generally of the opinion that still lower quotations are likely, while railroad car repair work appears to be the most promising item in business betterment. Not much of this business is expected for two weeks. The number of bad order cars has now risen to 385,000, and there are many who feel that a car shortage may be experienced in the fall. The Wabash placed 300 steel hopper repairs with the Western Steel Car & Foundry Co. Bar iron makers are quoting 1.90c., Pittsburgh, although a 1.85c. quotation is noted. In fabricated steel lines the new outstanding proposition is a 5000-ton structure for the Central Square Realty Co., New York, on the Grand Central area, a building which is expected to develop keen competition. Manchester, N. H., is in the market for a 1000-ton highway bridge. The Central Railroad of New Jersey is readvertising for an 800-ton bridge, and other new work includes a training school at Cortland, N. Y., 1000 tons, and a telephone building at Stamford, Conn., 300 tons. Awards include the East Junior High School, Norfolk, 775 tons, to the Bethlehem Steel Fabricators, Inc.; two bridges for the Boston & Maine, 250 tons, to the Phoenix Bridge Co.; bridge work for the Philadelphia & Reading, 270 tons, to the Bethlehem Steel Bridge Corporation; a telephone building, Philadelphia, 250 tons, to the Montgomery

Steel Co., and a building in Washington Square, New York, 300 tons, to the Paterson Bridge Co. The concrete portion of the Cohoes-Troy bridge will require 360 tons of reinforcing bars.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.28c.; plates, 2.28c. to 2.38c.; structural shapes, 2.38c.; bar iron, 2.28c.

Cincinnati

CINCINNATI, July 11.

Pig Iron.—The feature of the market during the week was a further recession in prices of iron from all districts. On a sale of 1000 tons of Southern to a melter in this territory, $20, Birmingham, was done. The same melter is reported to have bought 500 tons of Northern iron at a price equivalent to $18.50, Chicago. A sale of 700 tons of southern Ohio iron, part of which was malleable, was made to a melter at $21, Ironton. Part of this tonnage was off grade material, however, and standard foundry iron from this district is quoted at $21.50, furnace. Valley and Lake Front furnaces are quoting $19.50 and $20 respectively. There is very little activity, and with the exception of the above reported sales, little buying is being done. Shipments from furnaces are showing a slight increase as compared with the month of June, but are still very light.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.00
Ohio silvery, 8 per cent sil	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	24.02
Basic, Northern	22.52
Malleable	24.02

Finished Material.—The price reductions announced during the week have not stimulated business to as great an extent as hoped for. There has been a little more activity, however, and several inquiries for 200 tons are reported. Some specifications have been received for small tonnages of various steel products, but in the main the attitude of the trade seems to be that the present prices may not hold for any considerable time, and that with conditions as they are at present, nothing would be gained by placing orders. Little new business has been placed. The general contract for the stadium for Ohio State University, Columbus, has been let to the E. H. Latham Co., Columbus, which was low bidder on the project. No award of the steel has been made. The Smallman-Brice Construction Co. has been awarded the general contract for the addition to the Masonic Temple at Birmingham, Ala., involving about 700 tons. Very few new projects are coming up. Some are in prospect, however, including a small bridge at Aurora, Ind., for the public works department and a new union station at Covington, Ky., for the L. & N. and C. & O. railroads. All the sheets mills in this territory are closed, the American Rolling Mill Co., Middletown, having closed on Thursday night after a week's run.

Warehouse Business.—Small orders for immediate shipment are the ruling activity. Local jobbers are expected to announce, some time next week, new prices with reductions corresponding to those made by the mills. It is not expected, however, that the prices on wire and wire nails will be changed for at least a couple of weeks. Jobbers continue to quote:

Iron and steel bars, 3.35c. base; hoops and bands, 4.05c. base; shapes, 3.45c. base; plates, 3.45c. base; reinforcing bars, 3.42½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 4.10c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 6.25c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.60 per 100 lb.

Coke.—Some activity is noted in the coke market. A local agency reports two sales of 2500 tons each, and another of 500 tons. One inquiry for 900 tons and two for 300 tons each, are being figured on. Prices have not materially changed, though one producer in the Connellsville field has cut foundry from $5 to $4.50.

Old Material.—There is practically no activity in the scrap market, one dealer stating that it is the quietest in the past 20 years. Most of the mills in this territory are closed, and those that are running are not taking in material. Prices are, if anything, tending to lower levels, but in the absence of trading are quotably unchanged.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$5.00 to	$7.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	3.50 to	4.00
Steel turnings	2.00 to	2.50
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	17.00 to	17.50
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	6.00 to	6.50

Cleveland

CLEVELAND, July 12.

Iron Ore.—The ore market is virtually at a standstill. Sellers have been working on an inquiry for 150,000 tons from St. Louis, but the consumer has decided not to purchase this ore, at least at present. The inquiry may be revived later. Ore shipments from Lake Erie docks during June were 2,028,548 gross tons, showing a gain over May, but only about one-half of the amount shipped during the same month last year, when dock shipments were 4,011,067 tons. Shipments from the docks during the season until July 1 were 3,746,667 tons as compared with 8,258,673 tons during the same period last year. The balance on Lake Erie docks July 1 increased over 300,000 tons as compared with June 1, being 8,417,725 tons as compared with 7,005,050 tons on July 1 last year. Receipts at Lake Erie ports during June were 2,774,580 tons, and for the season, 4,455,480 tons, as compared with 10,331,435 tons up to July 1 last year. Furnaces at Lake Erie ports received 423,384 tons, as compared with 1,600,593 tons during June last year. Receipts at other than Lake Erie ports until July 1 were 1,376,045 tons as compared with 4,477,636 tons during the same period in 1920. There is still talk of further wage reductions in mines. One company having a mine in an isolated location has resumed operations with the 1914 wage scale. In this case the mining company did not plan to operate this year but expressed its willingness to start up the mine and stock the ore if the men desired to go to work at the 1914 wage scale. The miners agreed to the plan. The mining company will not attempt to sell this ore for delivery this season.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The demand for pig iron has been better for the past week than for some time, but prices have again declined $1 a ton and there seems to be no bottom to the market. A number of sales of foundry iron in small lots were made at $20 to $20.50 for No. 2. However, $20 now seems to represent the top of the market, as lower quotations have been made and there are reports that a price as low as $19 has appeared in the Valley district. For Cleveland delivery, quotations have declined correspondingly. A Valley consumer is reported to have purchased 500 to 1000 tons of basic iron at $19. Two other basic inquiries have appeared, each for 5000 tons. The largest sale reported during the week was 2500 tons of No. 2 foundry iron taken by a Cleveland interest at $20, for shipment by an eastern New York furnace to New England over a period of three months. Another interest during the week sold 1500 tons of foundry iron and a third 1200 tons in lots of from carloads to 200 tons at $20 to $20.50. The American Radiator Co. again came in the market for about 1100 tons for its Detroit, Springfield and Titusville plants, and $20 is understood to have been shaded on this inquiry. Low phosphorus pig iron has further declined. We note the sale of two 100-ton lots, one at $36.50 and the other at $37. A carlot sale of electrolytic 10 per cent Bessemer ferrosilicon was

made at $38. Pickands, Mathers & Co. to-day blew out their Perry furnace at Erie, Pa.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3 36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96 to $21.96
Northern No. 2 fdy., sil. 1.75 to 2.25	21.00 to 21.50
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	36.50 to 37.00

Finished Iron and Steel.—The price reductions have not stimulated buying, but apparently have resulted in the holding up of some orders, particularly in the building field. Many buyers are not inclined to take the new prices seriously and the market is in about as unsettled a state as before the formal reductions. The volume of orders and inquiries continues light. Plates particularly are weak and inquiries from tank shops for 1400 tons for stills, 900 tons for the Standard Oil Co. and 500 tons for the Sinclair Oil Co. are reported to have brought out quotations below 1.80c. Only the 500-ton lot has so far been placed. For small lots of plates a 1.90c. quotation is fairly common, although some mills are adhering to the 2c. price. Various unconfirmed reports are that the 1.90c. price is still being quoted on structural material. An Ohio fabricating shop is inquiring for 2500 tons of plates, bars and structural material and is looking for a price of 1.80c. or lower. No formal price reduction is reported on strip steel and prices on both hot and cold-rolled strips are weak and irregular. The Ford Motor Co. is inquiring for 500 tons of cold-rolled strips and sellers admit that this business is likely to be placed at lower than 4.75c., which has been the prevailing market price. Leading bidders on fabricated steel have brought out unusually low quotations. A Toledo engineering firm has placed 2500 tons for a plant for the United States Sheet & Window Glass Co., Shreveport, La., with the Decatur Bridge Co., Decatur, Ill., at a reported price of $70 a ton, delivered, which is said to be about the pre-war price. The 600 tons for bridges for the Kanawha & Michigan Railroad Co. has been taken by the Mount Vernon Bridge Co. The Pittsburgh Bridge Co. and the Massillon Bridge & Structural Co. have taken two bridges for the Stowe-Fuller Co., requiring 160 tons. Bids have been taken for 700 tons for the Middletown Hotel, Middletown, Ohio. The price on wire rods has been reduced to $42. The reduction in prices has not resulted in any further decline in hard steel reinforced bars, but these had previously declined sharply and are quoted at 1.75c. to 1.80c. The Akron, Canton, Youngstown Railroad, which recently inquired for 600 tons of rails, has announced that it will await a price reduction before placing the order.

Jobbers quote steel bars 2.79c.; plates and structural shapes, 2.89c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.44c.; cold rolled rounds, 4c.; flats, squares and hexagons, 4.50c.

Sheets.—All the mills have adopted the reduced prices on sheets and so far these prices are apparently being maintained. However, as the demand is very light, there has been no real test of the new prices.

Warehouse Business.—Cleveland jobbers have reduced prices, the reductions corresponding to the cuts in mill prices on various items.

Coke.—One large producer has reduced its prices on standard Connellsville foundry coke from $5 to $4.50. Quotations on this grade range from $4 to $5. A few carlot sales are reported at the latter price.

Bolts, Nuts and Rivets.—There is a little better feeling in the bolt and nut trade owing to the expectation of more railroad buying and an improvement in inquiry from the automobile trade. Several new inquiries have come from the latter source including one from the Ford Motor Co. for 8,000,000 bolts and nuts. Prices have settled down to about the maximum discounts that have been quoted recently, but the cut in steel bar prices has apparently had little effect on the price situation, as this reduction in steel had been anticipated. Rivets are quiet and weak. General quotations now are 3.75c. for structural rivets and 3.85c. for boiler rivets and a reduction in steel bar prices may be reflected in further concessions on rivets.

Old Material.—There is virtually no activity in the market. Mills are not buying, and trading between dealers is limited to a few carlots, as they have very few orders except for material on which mills have held up shipments. There is a little demand for compressed steel for shipment to Weirton and as there is no local demand, this grade has declined 50c. a ton. Cast borings and mixed borings and turnings are also about 50c. a ton lower.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings (nominal)	7.00 to 7.50
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 casting	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

NOT INCREASED

Business at Youngstown Shows no Improvement Due to Lower Prices

YOUNGSTOWN, OHIO, July 12.—Both the Youngstown Sheet & Tube Co. and the Republic Iron & Steel Co. will meet the reductions made by the Steel Corporation of from $2 to $12 a ton on pipe and tubular products and $5 a ton on wire and wire nails. "This is a radical reduction," states President James A. Campbell of the Sheet & Tube company, "but we are compelled to meet the lower prices set by the Corporation or get out of business."

The new steel prices are now being openly quoted by all Valley independent interests, though tonnage had been accepted at the lower levels for some time.

That the concessions have failed to stimulate new business, however, is indicated by the low operating rate for the current week. But six of 46 blast furnaces in the Mahoning and Shenango Valleys are active—two at the Ohio Works of the Carnegie Steel Co., two in the East Youngstown group of the Sheet & Tube Co. and one each of the Republic Iron & Steel Co. and the Brier Hill Steel Co.

Nineteen of the 66 open-hearth furnaces are charged, including nine of the Carnegie Steel Co. units. But one of the three Bessemer plants in the Mahoning Valley—that of the Carnegie company—is active. One of the Valley's four plate mills is under power. The only active sheet mills are those operated by the Newton Steel Co., which has its full quota of 10 in production.

The Youngstown Steel Car Co. at Niles has been asked to bid on repairs to several thousand railroad cars, and the activity of the railways in this respect promises to react favorably on the plate market.

Some improvement is noted in the demand for common and galvanized sheets, especially with non-union interests. This is unquestionably due to the automatic elimination of makers subscribing to the Amalgamated association scale, through expiration of the 1920-21 wage agreement. Union mills accepted a number of orders during the period of suspension and will work off such accumulations when they resume. Reduced prices on sheets are being generally quoted. The full-finished market has dropped $5 per ton in line with other grades, bringing the base price on No. 22 gage auto body stock to 4.70c. Extras are unchanged.

There is little evidence that the plate market will stabilize at the 2c. level, inasmuch as tonnage is moving below this figure. Car repair interests, now the most active influence in the market, are holding off for lower quotations and declare that concessions are being offered for attractive tonnage.

British Iron and Steel Market

Fuel Uncertainty Still Unsettling to Pig Iron—Continental Steel Competition Disturbing

(*By Cable*)

LONDON, ENGLAND, July 12.

Pig iron conditions are in a transitional stage, owing to uncertainty regarding what is to be the future cost of fuel. Certain blast furnaces have been restarting operations to meet urgent needs, but many others will remain idle until fuel prices become stabilized. Number 3 Cleveland foundry iron is being quoted at £6 15s. ($24.44) for July and £7 ($25.34) for August shipments for home trade; but premiums are demanded for export.

In finished material, sentiment is somewhat better, and with more inquiry, but the great bulk of the buying is done on the continent. Some tin plate works have already re-started, but it is improbable that the output will reach any considerable figure until Autumn, though 250,000 boxes of oil sizes are wanted for the East. There is a better inquiry for galvanized sheets, but not much business is being actually placed.

Continental steel is offered freely. Business placed includes German billets at £6 15s. ($24.44) to £7 ($25.34) c.i.f.; Belgian and French billets at £6 2½s. ($22.67) to £6 5s. ($22.63) f.o.b.; German merchant bars at £7 15s. ($28.06) to £8 ($28.96) f.o.b.

Galvanized wire, 8 gage, is quoted at £12 ($43.44) f.o.b.; wire rods, 5 gage, £11 ($39.82), cost and freight to Japan. Wire nails are given as 16½s. ($2.99) cost and freight to Japan. Belgian plates are quoted at £9 10s. ($34.39) f. o. b.; German plates, at £8 10s. ($30.77) f.o.b. For India, an order of 13,500 tons of rails has been booked at £10 2½s. ($36.65) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.62 per £1 as follows:

Durham coke	£2 2	$7.60	
Cleveland basic	6 0	21.72	
Cleveland No. 1 foundry	6 5	22.63	
Cleveland No. 3 foundry	6 0	21.72	
Cleveland No. 4 foundry	5 19	21.54	
Cleveland No. 4 forge	5 17½	21.27	
Hematite	7 0*	25.34	
East Coast mixed	8 0 & £7 5*	28.96 & $26.25	
Ferromanganese	18 0 & 15 0*	65.16 & 54.30	
Ship plates	14 10	52.49	
Boiler plates	19 0 to 21 0	68.78 to 76.02	
Tees	14 10	52.49	
Channels	13 15	49.78	
Beams	13 10	48.87	
Round bars, ¾ to 3 in.	13 10	48.87	
Rails, 60 lb. and up	10 0 to 15 0	36.20 to 54.30	
Billets	11 0 to 11 10	39.82 to 41.63	
Sheet and tin plate bars, Welsh	10 10	38.01	
Galvanized sheets, 24 g.	22 10 to 23 10	81.45 to 85.07	
Black sheets	19 0 to 20 0	68.78 to 72.40	
Tin plate base box	1 4½ to 1 8	4.51 to 5.07	
Steel hoops	17 0	61.54	

*Export price.

To Restart Plants Costs Must Not Exceed 75 to 100 Per Cent of Pre-War Basis

LONDON, ENGLAND, June 29.—Whether the new scale of coal mine wages, whatever it may be, will permit coal to be sold at a figure enabling manufacturing operations to be resumed, remains to be seen. That coal getting can be renewed on the old scale is definitely impossible, for many pits are flooded and will not be reopened. The financial position is as unsatisfactory as that of industry, and combined with the appalling taxation, and the unceasing wastefulness and prodigality of the Government, there is an almost entire lack of incentive to capital, while the unwillingness of labor to work assists materially in maintaining a set of conditions which is not paralleled in modern experience.

Labor Inefficiency Evaluated

Some official figures have been issued by Richardsons, Westgarth & Co., marine engineers, setting out their experiences. The comparison between 1913 and 1920 is so striking that it may well be set forth in table form:

Pre-War and Post-War Labor Conditions

	Pre-War	Post-War
Working hours	2,597	2,303
Absenteeism in hours per man per annum	122	258
Actual hours worked per man per annum	2,475	2,045
Average hours per week	50.5	41.8
Hours per day	8½	7

The net result of shortened hours and increased malingering is a loss of 37½ per cent in output, which put in another way means that post-war production is only five-eighths of the pre-war total. The average wage per hour is now about three times greater than before the war, while actual costs are about four times as high. As this is typical of working conditions generally in this country, it needs no words to explain why we are ceasing to count as an industrial nation.

On all hands are complaints that our business is being taken by overseas competitors, and the announcement that America has picked up a contract for steel axles from that closely kept preserve of British manufacturers, the India State Railways, has caused some fluttering in the dovecotes, especially as the American price is said to be 30 per cent under the lowest British tender. The Australian Government order for rails (10,000 tons) has now been placed with the Continent. An order for 60,000 tons of steel rails for Russia has also been lost to this country, and has been taken by Germany. There is indeed no end to this process under existing conditions.

The National Federation of Iron & Steel Manufacturers, representing employers, and the Steel Trades Confederation, representing the workmen, have now presented to the Premier a statement regarding the condition of our iron and steel industry. According to this the chief factor affecting European competition is the low level of real wages in Germany, but it is added that British industry cannot restart until costs are reduced to a level not far removed from those ruling on the Continent, and it is the considered opinion of the employers that the British iron and steel works will not be able to restart unless fuel, as well as other items of cost, is reduced to a level not higher than 75 per cent to 100 per cent above the pre-war level.

The British Cast Iron Research Association has been formed as a company to conduct research and experimental work in connection with the cast iron trades and industries. The management is vested in a council, and among the first members are Lord Weir of the Holm Foundry, Cathcart, Glasgow (president), and D. Vickers (chairman of Vickers). The secretary is T. Vickers, and the registered office at Central House, New Street, Birmingham.

With regard to shipbuilding, a prominent builder here stated that there were at present 10,000,000 tons more shipping afloat than before the war, which meant that for many years ships would not be wanted except for special purposes.

Probable Effect of the President's Message

WASHINGTON, July 12.—The message of the President to the Senate this afternoon, meant to hasten economic and industrial readjustments, is considered to have killed proposed legislation for the soldier bonus. In substance, it calls for speedier action on legislation along the line previously recommended with modifications. The more essential parts of the program look to elimination of the excess profits tax and the fixing of a corporation tax with a rate of approximately 15 per cent. Congress is expected to devote its time more closely from now on to two important purposes, tariff and tax, but it is a question whether tax revenue revision will be given precedence over the tariff, although there is much support for this plan.

FOREIGN RAILROAD BUYING

Mexico Buys Locomotives—Bidding Closed on 30 Locomotives for Chile—Inquiry from India

NEW YORK, July 12.—Activity of foreign trade today compared with the activity of a few months ago shows a marked improvement, although transactions are still few and orders small, with the exception of foreign government railroad buying. This branch of export trade is quite active. The National Railways of Mexico, which are in need of equipment of all kinds, have placed orders with the American Locomotive Co. and the Baldwin Locomotive Works for a total, when arrangements are finally completed, of 90 locomotives, about 45 to each builder, of which about 40 are Consolidation type, 30 Mikado type and 20 Pacific type. This is the second large purchase of the Mexican railroads, the previous one consisting of 97 second-hand locomotives of a heavy type, of which 91 were bought from the Illinois Central Railroad and 6 from the Southern Railway.

On July 7 and 8, the Chilean State Railways, with a New York office at 141 Broadway, opened in Chile the bids submitted on its tender for 30 locomotives and a number of freight and passenger cars. The tenders on about 35 locomotives, 300 freight and 40 passenger cars for the Pekin-Kalgan Railroad and the Pekin-Suiyan Railroad in China, which were to be opened June 29 and 30, have been postponed indefinitely. It is reported that this contract will probably be let without public bidding.

Japan Buys in Germany

The 450 steel poles for the South Manchurian Railroad, recently placed with a New York exporter, are part of a total of about 4000 such poles, which will eventually be purchased by this railroad. Japanese buyers are purchasing in Germany, influenced by the low quotations and the favorable exchange rate, but recent reports of the extensive use of shell steel and other scrap in the present production of German steel, is believed by the Japanese to affect the quality of German products and despite the low prices there is a tendency to refrain from buying there. Orders for light gage black sheets and bars continue to be placed by Japanese consumers and there are inquiries for sheets and bars in the market from Cuba.

South America is also showing some railroad activity. There is about 5000 tons of 55-lb. rails in the market from Buenos Aires, Argentina, on which it is reported that a bid of £10 17s. ($39.43) c.i.f. Buenos Aires has been submitted by a Belgian seller. As it would be difficult even with present market conditions in the United States for an American mill to approach this quotation, it is generally expected that the business will go to Europe. Cuban railroads have issued tenders for 3300 tons of 60-lb. rails, which will be closed shortly.

Inquiries From India

McLeod & Co., 44 Whitehall Street, New York, are handling an inquiry from India calling for conveying machinery for use in factories, warehouses and mines. Printed matter and estimated prices for export have been requested by the exporter. The Burma Finance & Mining Co., Ltd., Hermyingi, India, contemplates the erection of a small crushing and concentrating mill to treat from 150 to 200 tons of ore per day. During 1920 the Hermyingi mine produced 1226 tons of mixed wolfram and cassiterite concentrate.

Specification No. 95, issued by the Commissioners of Electricity of the State of Victoria, Australia, covering steel work, etc., for a new power house at Morwell, has been amended to accommodate 5 generators of 12,500 kw. each. The engine room will have 8 bays. The crane capacity will be 60 tons. The amended tenders should be obtained from and mailed to the Australian Trade Commissioner, 161 Broadway, New York, before Aug. 31. The time limit on specification No. 99 has been extended to Aug. 31 by the Commissioners in Melbourne.

The bridge over the Yellow River in China, requiring something like 40,000 tons of steel, which has been figured on in the past several months by builders in no less than 19 countries, including several firms in the United States, is expected to go to the Continent of Europe on the score of price. There are some doubts, however, about the financing of this great project.

It is now expected that the rails for the Pekin-Mukden Railway, which have been before the rail makers of Europe and the United States for some time, will be let in the latter part of this month. The tonnage originally was 11,000, but it is now expected that 17,000 tons will be bought.

ARGENTINE RAILS

Orders for 9500 Tons Awarded to La Providence Works—British Prices Forced Down

(*Special Correspondence*)

BRUSSELS, BELGIUM, June 29.—The depression in all markets in Belgium is intense, many large establishments, considered to be in good condition, having closed down. New construction is at a standstill. Coke prices are still too high, despite reductions, and further cuts will probably be made in coke as well as in iron and steel generally. British manufacturers are making an effort, thus far unsuccessful, to reduce the importation of material from continental sources, particularly bars. Steel bars, produced in England, which have been selling up to £33 per ton, are down to £22 10s. per ton, one cut alone having totaled £6. Belgian pig iron has been shipped into England at £7 per ton, causing the British price to drop to £5 15s.

Rails Sold to Argentina

Against severe competition, the order for 9500 tons of rails for Argentine railroads was booked by La Providence works at 469 fr. ($35.66, with 1 fr. = 7.6c.) per ton, c.i.f. Santa Fe. The Providence works also took the fish plates at 620 fr., the bolts at 1200 fr. and the spikes at 890 fr. The following table shows the bids submitted by mills in various countries:

Ougree-Marihaye works (Belgium)	528 fr.
Sambre et Moselle works (France)	660 fr.
Usines de Wendel (France)	528 fr.
Acieries de Longwy (France)	532 fr.
Normand de Metallurgie (France)	562 fr.
Normand de Knutange (France)	562 fr.
Consolidated Steel Corporation	$62.15
United States Steel Products Co	$65.00
Krupp works (Germany)	2550 m.
Westphalian works, Bochum (Germany)	£11 9s.
Deutsche Luxemburgische (Germany)	2500 m.
Phoenix G. (Germany)	£11 10s. 6d.
W. H. Muller & Co. (Germany)	$48.00
Bidermann & Co., Prague (Bohemia)	$54.50

The Argentine railroads are reported to be about to issue a new tender for about the same tonnage of rails as the one just placed.

Worcester Companies Consolidated

The Arcade Malleable Iron Co. and the Baldwin Chain & Mfg. Co., both at Worcester, Mass., have been consolidated. The stock interests of the two companies have been much the same for some time. The former officers of the Arcade Co., Geo. T. Dewey, president; H. P. Blumenauer, vice-president, and Wm. H. Gates, treasurer, will hold the same offices in the consolidated company. The business of this company will be continued separately on the same basis as previously, with the additional foundry facilities secured by the recent purchase of the adjoining property of the Richard French Iron Works. The management of the Arcade plant will remain unchanged, with H. P. Blumenauer continuing as general manager, A. L. Scott, sales manager and John Jordan, plant manager.

The American Manganese Mfg. Co., has posted notice of a 40 per cent reduction in wages, effective July 1. This cut, which affects miners, coke-plant and blast furnace workmen, means that common labor goes from 36c. to 22c. per hour. The company last year paid common labor as high as 48c. per hr.

BASIC DAY ABROGATED

Steel Corporation Makes Announcements As to Prices and Overtime Pay

Judge E. H. Gary, chairman United States Steel Corporation, last week made two important announcements. The first adopted the prices announced July 4 by the Bethlehem Steel Co., and abolished the basic 8-hr. day in the following words:

We have decided to recommend to our subsidiary companies that they reduce selling prices to correspond with the existing prices of competitors. These include products and prices as follows:

Bars	$1.90	Blue annealed sheets	$2.65
Structural shapes	2.00	Black sheets	3.50
Plates	2.00	Galvanized sheets	4.50
Sheet bars	35.00	Tin plate	5.75
Billets, 4 x 4	33.00	Skelp	2.00
Slabs	34.00		

Also pipe and possibly some other products relatively.

Also to abrogate, as of July 16, 1921, the so-called "basic" or "overtime" day put into effect during the war as an emergency measure.

July 6, 1921.

Further Price Changes

The second announcement was made Friday, July 8 and was as follows:

Referring to our statement of July 6 instant concerning selling prices, and in accordance therewith, we have decided to recommend to subsidiary companies that the present prices of tubes be reduced as follows:

	Per Ton
Standard steel pipe:	
¼ in. and ⅜ in.	$2.00
½ in. to 6 in., inclusive	4.00
7 in. to 12 in., inclusive	6.00
Sizes above 12 in.	4.00
Boiler tubes:	
1¾ in.	4.00
2 in. to 3 in., inclusive	12.00
3¼ in. and larger	10.00

and that wire nails be reduced to $2.75 per keg base, plain wire to $2.50 per 100 lb. base, and other wire products relatively.

July 8, 1921.

Abrogating the Basic Eight Hour Day

The number of men employed 10 and 12 hours varies greatly at different times according to the pressure upon the mills for output. At the present time, owing to the efforts of the Steel Corporation to provide work for as many men as possible, few are working longer than eight hours, and the total curtailment in wages falls far short of what it would be if mills were in full operation. For example, in the Pittsburgh district Steel Corporation subsidiaries, when in full operation, gave employment to about 125,000 men, but at present the number is much smaller as the corporation plants are not running more than 35 per cent capacity. The rate of the Steel Corporation is 37c. per hour and that of the independents 30c.

Effect in the Youngstown District

YOUNGSTOWN, OHIO, July 12.—In so far as actual working conditions are concerned, elimination of the basic 8 hour day will have comparatively little effect upon the steel industry in the Mahoning Valley. Independents are virtually on an 8 hr. basis, which has been generally adopted in order to afford employment to a larger number of men during the current period of slack operations.

In the Carnegie Steel Co. plants, Youngstown district, the immediate effect will be to reduce wages. Operating officials state that there will be no change in working hours with exception that some of the shopmen have been reduced from 10 to nine hours because of the condition of business. Effective from July 16, under the order, men working 12 hours will be paid for 12 hours work, instead of 14 as heretofore, while employees working 10 hours will be paid for 10, instead of 11. This will reduce the common labor rate for 12 hours from $5.18 to $4.44 and for 10 hours $4.07 to $3.70, on the basis of 37c. per hour.

An additional wage reduction by the leading interest is anticipated by steel makers in this district, in view of the cut by independents effective July 16, to 30 cents per hour for common labor.

In its Mahoning Valley plants, the Ohio Works, Upper and Lower Union mills, McDonald bar mills and the Niles blast furnace, the Carnegie company ordinarily employs 5000 men, many of whom will be affected. Large numbers are also employed by the Steel Corporation in plants of subsidiary companies in the Shenango Valley.

President James A. Campbell of the Youngstown Sheet & Tube Co. points out that the more important steel producing groups throughout the country have now abolished the basic eight hour day and do not pay higher rates for time over eight hours. He states the institution of the shorter day by the Sheet & Tube company is merely temporary and that the longer hours will be restored when business conditions become more nearly normal.

Another Wage Reduction

YOUNGSTOWN, OHIO, July 12.—For the second time this year, Valley independent steel companies have reduced wages, effective July 16, the reduction in common labor approximating 19 per cent. The new common labor rate will be 30c. and it is predicted that it will still further decline to 25c. before the wage liquidation is completed. The new rate compares with a war peak of 47c. with time and a half for overtime.

An independent official expresses little hope of the steel market stabilizing at the current levels. Any further decline in prices will have to be offset by a further downward readjustment in wage rates, he declares. "We have cut wage rates to offset some of the loss from the price reduction. If we had not reduced wage rates we would have been obliged to suspend operations completely, as we could not have sold our product at the lower prices and continued wages on the former basis." The affected companies are the Sharon Steel Hoop Co., Republic Iron & Steel Co., Brier Hill Steel Co., Youngstown & Tube Co. and Trumbull Steel Co.

Sharon Steel Hoop Co. Reduces

Pittsburgh, July 12.—The Sharon Steel Hoop Co., announces a reduction in the wage for common labor from 37c. to 30c. per hour effective July 16. Tonnage rates and salaries will be revised downward in like proportion. Other independents are expected to make a similar cut. The Sharon Steel Hoop Co. eliminated time and one half for overtime on May 16 last.

Bids on Plates for the Navy

WASHINGTON, July 12.—On bids for 950 tons of plates for the Portsmouth, N. H., Navy Yard, opened yesterday by the Bureau of Supplies and Accounts, the Worth Steel Co. was lowest at a price equivalent to 2c., Pittsburgh, on 90 per cent of the tonnage, ranging up to 100 in. wide. On the greatest widths, 120 to 125 in., this company bid the equivalent of 2.26c., Pittsburgh. Delivery of the entire tonnage is to be made "probably within 30 days." The Carnegie Steel Co. bid a flat price for all tonnage equivalent to 2.11c., Pittsburgh; Cambria Steel Co., a flat price equivalent to 2.12c., Pittsburgh; the Jones & Laughlin Steel Co., bid equivalent to 2.11c., Pittsburgh, up to 100 in., and equivalent to 2.16c., Pittsburgh on 100 to 110 in. The Lukens Steel Co. bid equivalent to 2.06c., Pittsburgh, up to 100 in. and 2.32c. on 120 to 125 in.

The Bureau is to open bids on Aug. 5 for approximately 6500 tons of plates, bars and shapes for various Navy yards. The lots are divided into about 2800 tons of plates, 2100 tons of bars and 1600 tons of shapes.

The Champion Engineering Co., Kenton, Ohio, has taken an order for a 10-ton crane with 40-ft. span for the galvanizing plant of the Empire Rolling Mill Co., Cleveland.

IRON AND INDUSTRIAL STOCKS

Little Selling of Steel Issues Because of Cut in Mill Quotations

Some selling of steel and allied shares the past week unquestionably was based on the new prices recently announced by the mills, coupled with the steel, ingot production figures for June and the continued drop in the monthly unfilled tonnage on the books of the United States Steel Corporation. But the great army of investors in such securities long ago recognized the fact the steel industry is passing through a period of deflation. There has been no rush of late to unload steel and allied stocks. On the contrary, the number of investors in at least some instances is on the increase, as is attested by the number of owners of United States Steel common. Money continually is working easier and freer. It is true, however, that banks are not inclined to release large funds until after crop moving requirements are more defined.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	31 - 32	Lackawanna Steel.	37 - 41
Allis-Chalm. pf...	— - 72½	Midvale Steel.....	23½ - 24⅞
Am. Can com...	26 - 27⅞	Nat.-Acme	— - 15½
Am. C. & F. com.	123½ - 126⅞	Nat. E. & S. com.	44½ - 46
Am. Loco. com....	80 - 83¾	Nat. E. & S. pf...	— - 90
Am. Loco. pf.....	— - 104	N. Y. Air Brake..	58 - 59
Am. Steel F. com.	25¼ - 27¼	Pittsburgh Stl. pf.	— - 80
Bald. Loco. com.	69½ - 77⅝	Press. Steel com..	70½ - 71½
Beth. Steel com..	43 - 48⅜	Ry. Stl. Spg. com.	81⅝ - 83
Beth. Stl., Cl. B..	45 - 51½	Replogle Steel.....	18 - 19¾
Beth. Stl., 8% pf..	96½ - 99	Republic com.....	45 - 51¾
Chic. Pneu. Tool..	49⅛ - 51	Sloss, com.....	34¾ - 35
Colorado Fuel.....	26⅛ - 27	Superior Steel....	29⅜ - 31½
Cruc. Steel com..	54½ - 60⅜	U. S. Pipe com...	14½ - 15
General Electric..	126 - 129	U. S. Pipe pf.....	43 - 44
Gt. No. Ore Cert..	27 - 29¼	U. S. Steel com...	73½ - 76¼
Gulf States Steel.	33 - 35	U. S. Steel pf.....	109 - 110
Int. Har. com.....	73⅛ - 82½	Vanadium Steel...	28 - 31¾
Int. Har. pf.....	— - 100	Westingh'se Elec.	42¾ - 45½

Dominion Steel Report

The annual report of the Dominion Steel Corporation, Sydney, N. S., for the year ending March 31, 1921, which will be presented to shareholders at the annual meeting on July 20 next, shows earnings of $7,212,750, after deducting all expenses incident to operations, current repairs, taxes, administrative and selling expenses, and after making provision for shrinkage in the value of inventories and investments and allowance for possible loss on accounts receivable. In the previous year the earnings were $5,532,529. During the year under review the sum of $1,583,662 was set aside for depreciation of plant and properties and sinking funds, and $970,777 for interest on outstanding bonds, leaving a balance of $4,658,312 as net profit for the year. Regular quarterly dividends upon the preference shares of the corporation and preferred stocks of the Dominion Coal Co. and Dominion Iron & Steel Co. amounted to $980,000. The balance of the year's earnings, $3,678,312, was transferred to profit and loss account. Four quarterly dividends aggregating $2,226,000 were paid on the common shares of the corporation. The balance at credit of profit and loss account on March 31, 1921, was $9,663,548, an increase of $1,452,312 over the balance at the beginning of the fiscal year.

Plans of New Companies

The Victor Piston Ring Co., American Building Baltimore, recently incorporated with a capital of $500,000, expects to have piston rings made by contract until it can obtain a desirable site for building. The company, after looking around, finds property so high and building material so costly, that it has decided to postpone building.

The Signal Wick Co., Plainfield, N. J., recently incorporated, will continue manufacturing its railroad signal specialties as heretofore. It does not expect to build in the near future.

The Johnson Auto Body Corporation, 159 Franklin Street, Boston, recently incorporated, has taken over the Kelley & Trefry Body Co., West Roxbury, which formerly built bodies for the concern recently incorporated. The company builds passenger bodies for all standard chassis and heavy duty trucks. Its factory extension plans are incomplete, but during the summer it may need a small amount of new equipment.

The Stafford Appliance Co., La Porte, Ind., recently incorporated, has elected the following officers: Herbert A. Thomas, La Porte, Ind., president; Abel E. Stafford, Niles, Mich., vice-president; Harvey A. Gridley, Niles, Mich., treasurer, and Leonard R. Henoch, La Porte, Ind., secretary. The company was organized to manufacture and distribute improved garage tools and automobile appliances and accessories.

Trade and Office Changes

The Foster-Songer Co., Pittsburgh, has appointed Theodore L. Dodd & Co., Chicago, district sales agent for the Middle West. The line consists of seamless lap weld and charcoal iron boiler tubes; also seamless steel mechanical tubing, pipe and casing.

The Wright-Alexander Co., 201 Devonshire Street, Boston, room 302, has been made sales representative for the Millholland Machine Co., Indianapolis, line of turret lathes for all New England, Connecticut excepted.

The business and works of Buechele Iron & Tool Co., 4130 Liberty Avenue, Pittsburgh, manufacturer of structural and ornamental steel work, fire escapes, fire proof porches, wire works, etc., have been taken over and will be continued by the Builders' Steel Works Co. R. O. Belles and Fred C. Werry, formerly associated with Taylor & Dean, are respectively president and vice-president of the Builders' Steel Works Co., and Thomas H. Werry, Jr., is secretary and treasurer.

The New York Central Iron Works Co., Inc., Hagerstown, Md., has discontinued its Baltimore representation which was located in the Builders' Exchange. All inquiries from the Baltimore district are now being handled by the company's home office at Hagerstown.

W. H. J. Fitzgerald & Co., 165 High Street, Boston, have been made exclusive sales agents in New England, Connecticut excepted, for the Standard Lathe Works Co.

The Foster Machine Co., the Kempsmith Mfg. Co. and the Giddings & Lewis Machine Tool Co., for which L. S. Devos is export manager, have decided to close their New York export office at the Grand Central Palace because of the present export depression.

The Heine Safety Boiler Co., St. Louis, will change its name on July 7 to the Heine Boiler Co.

Topping Brothers, heavy and marine hardware and railroad and contractors' supplies, New York, have appointed as representatives in the New England states the Spencer Reed Co., 1265 Boylston Street, Boston. Frank S. Spencer represented Joseph T. Ryerson in that territory for a number of years.

C. Markhart, formerly of the engineering firm of Brown, Eagerman & Markhart, and H. R. Thayer, recently of the Carnegie Institute of Technology, have formed the Markhart-Thayer Engineering Co., with offices at 1319 Fulton Building, Pittsburgh. The company will specialize in estimates, designs, etc., for foundations, bridges and buildings.

The American Steel & Wire Co. announces that it has taken over as of June 30, the business and good will of the J. C. Pearson Co., Inc., Boston, which company it has owned and operated since its organization in 1913, and will now carry on the business direct. The Pearson company manufactures coated nails.

The Pennsylvania Forge Co. has opened an office in New York at 50 Church Street to facilitate handling its business in the metropolitan district. George H. Raush, Jr., has been appointed district representative, in charge of this office. He was with the Midvale Steel & Ordnance Co. for a number of years both in the manufacturing departments and in the New York and other branch sales offices.

The New York office of the Morrison & Risman Co., jobber in new and relaying rails and track accessories, has been moved to 26 Cortlandt Street, telephone Cortlandt 4405. The company's general offices and works are at Buffalo, and district sales offices are also maintained in the Drexel Building, Philadelphia, and Park Building, Pittsburgh.

The Walworth Mfg. Co., whose general offices have been at the Boston factory, First and O streets, Boston, have moved them to Pearl and High streets, Boston. This building embraces an entire block on High Street. The general offices comprise two floors where are located the president, vice-president in charge of operating, vice-president in charge of engineering, vice-president in charge of sales, treasurer, together with the entire general accounting force, branch house department, purchasing department and the sales promotion department.

The Wheeling Steel Products Co. has moved its Cincinnati district offices from the St. Paul Building to 709-10 Union Trust Building. A. F. Scherer is sales manager in charge of the district, which includes southern Ohio, Indiana, Kentucky and Tennessee. F. H. Alger, P. T. Barrett and E. F. Greisheimer have recently been added to the sales force of the Cincinnati district.

The Pittsburgh office of the American Manganese Mfg. Co., has removed from room 940, Oliver Building, to room 647 of the same building. L. S. Kerchner is resident manager.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $3.15; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65 to $2.75
Large boiler rivets.....$2.75 to $2.85
Small rivets.....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads.....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts.....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S..80, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....4c. to 4.20c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $43; chain rods, $43; screw stock rods, $48; rivet and bolt rods and other rods of that character, $43; high carbon rods, $51 to $58, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3 base; 5/16-in., $3 base. Boat and barge spikes, $3.20 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 to $4.20 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.90c. from mill. Refined bar iron, 2.50c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Steel Black	Steel Galv.	Iron Inches	Iron Black	Iron Galv.
⅛	50½	24	¼ to ⅜	+1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade an additional 5 and 2½ per cent are allowed over the above discounts, which are subject to the usual variations in weight of 5 per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel

1¾ in.	21½
2 to 2¼ in.	36
2½ to 3 in.	47
3¼ to 13 in.	52

Charcoal Iron

1½ in.	+10
1¾ in.	List
2 to 2¼ in.	—10
2½ to 2¾ in.	—15
3 to 3¼ in.	—16
3½ to 4½ in.	—20

Carload Discounts on Standard Commercial Seamless—Cold Drawn

1 in.	56	2 to 2½ in.	17½
1¼ in.	49	2¾ and 4 in.	20
1½ in.	48	4½ to 5 in.	7½
1¾ in.	25		

Hot Rolled

3 to 4 in.....30

These prices do not apply to special specifications for locomotive tubes nor to special specifications for tubes for the Navy Department which will be subject to special negotiations.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.55	Nos. 11 and 12	2.75
Nos. 9 and 10 (base)	2.65	Nos. 13 and 14	2.85
		Nos. 15 and 16	2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.30	No. 28 (base)	3.50
Nos. 22 to 24	3.35	No. 29	3.60
Nos. 25 and 26	3.40	No. 30	3.70
No. 27	3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.50	Nos. 25 and 26	4.20
Nos. 12 to 14	3.60	No. 27	4.35
Nos. 15 and 16	3.75	No. 28 (base)	4.50
Nos. 17 to 21	3.90	No. 29	4.75
Nos. 22 to 24	4.05	No. 30	5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.30	No. 28 (base)	3.50
Nos. 17 to 21	3.35	No. 29	3.55
Nos. 22 to 24	3.40	No. 30	3.55
Nos. 25 to 27	3.45	Nos. 30½ and 31	3.60

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Zinc	
		Electro-	Tin				
July	Lake	lytic	New York	New York	St. Louis	New York	St. Louis
6	12.75	12.62½	29.00	4.40	4.35	4.85	4.35
7	12.75	12.62½	28.75	4.40	4.35	4.85	4.35
8	12.75	12.62½	28.87½	4.40	4.35	4.85	4.35
9	12.75	12.62½	....	4.40	4.35	4.85	4.35
11	12.75	12.62½	29.12½	4.40	4.35	4.85	4.35
12	12.75	12.62½	28.50	4.40	4.35	4.80	4.30

New York

NEW YORK, July 12.

The markets continue very quiet. Copper is steady in price, but inactive, the undertone being slightly firmer. Tin prices have fluctuated a little during the week; there are few sales. Lead is firm, with little business. Spelter turned slightly softer in price to-day.

Copper.—There has been a slight lull in export buying and the domestic market continues quiet. Nevertheless, prices are quite firmly held, and the number of producers from whom prices lower than 13c. can be obtained is narrowing. Electrolytic is quoted by the leading producers at 13c., but some of the smaller producers continue to name 12.62½c. Lake copper is quoted at 12.75c. to 13c., delivered, but those naming the higher price are getting practically no business. While German business has been an important factor in the market for some months, British orders have fallen off, due probably to the drop in exchange recently. Preliminary estimates indicate that the total copper production in the United States for the first half of 1921 was approximately 408,000,000 lb. Imports during the same period were about 185,600,000 lb., indicating a refined production of 613,600,000 lb. Deliveries for domestic consumption are estimated at 360,000,000 lb, and export shipments 266,500,000 lb. This shows a wearing down of surplus stocks, as total domestic and export deliveries during the six months were 13,000,000 lb. in excess of production.

Tin.—The market has been quiet throughout the week; the only activity worthy of note was on Monday, when 300 to 400 tons was sold, mostly for shipment from June to September from the Straits Settlement. Prices on these transactions ranged from 28c. to 28.25c. per lb. A good portion of the tonnage sold is for consumers' account, the remainder of the trading being between dealers. Otherwise the market has been featureless. The fact that there is no reported improvement in the tin plate industry tends to keep the market in the narrow groove it has occupied for some time. Spot Straits tin, New York, has ranged during the week from 28.50c. to 29c. The London market was lower than a week ago, to-day's price being £166 5s. for spot Straits, with futures £168 5s.

Lead.—Lead is quiet and firm. The American Smelting & Refining Co. has the field pretty much to itself at its price of 4.40c., New York. None of the independent producers is willing to sell at this figure, but are asking 4.62½c. and will sell only small quantities even at this price. The lead industry is declared to be in good condition, though business continues very dull.

Zinc.—Though zinc was quoted during all of last week at 4.35c., St. Louis, or 4.85c., New York, the market turned slightly softer to-day, the metal being obtainable at 4.30c., St. Louis. Business continues dull, and it is not expected that there will be any sound improvement until the sheet mills experience a considerably larger demand for galvanized sheets. The brass industry, also a large user normally, continues dull and is buying very little.

Antimony.—No activity of moment is reported and the price continues unchanged at 4.75c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is still quoted by the leading producer at 28c., f.o.b. producer's plant. Foreign metal of like grade is available at 22.50c. to 23c., New York, and 98 to 99 per cent remelted metal at 20c. to 20.50c., New York.

Old Metals.—There is little change in conditions this week, business being practically impossible. Values are generally unchanged. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.00
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	10.50
Brass, heavy	7.00
Brass, light	5.25
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	5.25
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

July 12.—The market is exceedingly quiet and the only metal which has changed price is tin. Lead is held at 4.45c. by sellers with buyers offering less. Old metal prices remain unchanged. We quote lake copper at 13.25c. in carload lots; tin, 30.50c.; lead, 4.45c.; spelter, 4.45c.; antimony, 7.50c. On old metals we quote copper wire, 7.50c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 21c., all being buying prices for less than carload lots.

St. Louis

ST. LOUIS, July 8.—There is still hardly any activity in the non-ferrous markets. Lead and spelter are 10c. higher, each being quoted at 4.35c. in car lots. We quote Lake copper at 13.68½c. in car lots; tin, 29.74½c. and antimony, 5.48½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 9c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Reduction of Rates on By-Product Coke Ordered by Commission

WASHINGTON, July 12.—Rates on by-product coke from seaboard, New Jersey, to destinations in New England, New York and New Jersey were condemned as unreasonable and unduly prejudicial in a decision handed down yesterday by the Interstate Commerce Commission and are to be superseded by a mileage scale operative on Nov. 1, which, in general, will mean a reduction of approximately 20 per cent. The new scale will begin with 90c. a ton for distances not greater than 10 miles and will proceed with 10c. increases for each additional 10 miles up to 110 miles and then by 10c. increases for the next 15 miles, followed by 10c. increases for 25 miles up to 600 miles at which rates become $3.90 per ton. These rates are subject to the general advance in rates made last August. The commission also denied through routes and joint rates from seaboard to destinations on the New York, New Haven & Hartford Railroad, by way of New York harbor and ordered discontinuance of relief from the fourth section on coke. Reparation was awarded on findings as to the character of specific rates. The general finding was that the rates applied over all rail routes to the destinations involved from Aug. 14, 1917, to January 21, 1918, inclusive, were unreasonable and unduly prejudicial to the extent they exceeded 80 per cent of the rates shown in the distance scales outlined and that except to points on the west shore in New Jersey over intrastate routes are unreasonable to the extent of their excess over the rates shown in the scale, subject to the general advance mentioned. Rates increased under that advance will apply on a minimum of 50,000 lb. in open cars and 40,000 lb. when loaded in box or stock cars, except that when cars are loaded to cubic or visible capacity actual rates will apply. The decision was the result of a complaint made by the Sea-Board By-Product Coke Co.

PERSONAL

Walter S. Tower, who has been trade adviser of the Consolidated Steel Corporation, New York, took up on Monday, July 11, work with the Department of Commerce to which he has been assigned by Secretary Hoover. While Mr. Tower's position has not been clearly defined, it is stated, contrary to press reports, that he will not be the chief of an industrial division on iron and steel, at least not in the immediate future. His first task is expected to be in connection with a request made by the United States Shipping Board to the Department of Commerce, to assist the former in the organization of work looking to the gathering and analysis of shipping statistics. Mr. Tower, who is 40 years of age, was born in West Bridgewater, Mass., where he obtained his public school education. He is a graduate of Harvard, getting the degrees of A.B. and A.M. in 1903 and 1904, respectively, and also graduated from the University of Pennsylvania with the degree of Ph.D. in 1906. For a series of years, and up to 1917, he was engaged in teaching and traveling. While traveling he studied trade conditions, chiefly in North and South America. After that, he became connected with the Shipping Board. He has written several articles concerning Latin-American trade conditions. During the war he was associated with the Division of Planning and Statistics of the Shipping Board. Upon the resignation, in March, 1919, of E. F. Gay, as director of that division, he was succeeded by Mr. Tower, who remained in that position until June, 1919, when he went with the Consolidated Steel Corporation.

John S. Oursler, general superintendent of the Homestead, Pa., works of the Carnegie Steel Co., is very seriously ill at Lakeside Hospital, Cleveland, following an operation.

A cablegram from Paris announces that Ambrose Swasey, president Warner & Swasey Co., Cleveland, and past president American Society of Mechanical Engineers, has been honored by election in two prominent French societies. He has been elected an officer of the Legion of Honor, of which organization he has been a chevalier since 1900, and has also been made an honorary member of the Society of Civil Engineers of France. Mr. Swasey is a member of a delegation of American engineers who recently went to Europe to present the John Fritz medals, awarded to Sir Robert Hadfield and to Dr. Eugene Schneider.

George H. Hannum, general manager Oakland Motor Car Co., Pontiac, Mich., and A. B. C. Hardy, general manager Olds Motor Works, Lansing, Mich., have been made vice-presidents of the General Motors Corporation. John Scott, formerly assistant factory manager of the Olds Motor Works, has been made factory manager.

Prof. Arthur M. Greene, Jr., professor of mechanical engineering Rensselaer Polytechnic Institute, will assume the duties of dean and professor in mechanical engineering of the enlarged school of engineering of Princeton University in the fall of 1922. The school will give courses in civil, chemical, electrical, mechanical and mining engineering, these courses extending over four years. A fifth year will be required for an engineering degree. Professor Greene was born in Philadelphia in 1872, was graduated from the University of Pennsylvania in 1893 with the degree of B.S., securing an M.E. degree the next year. In 1916 this university gave him the honorary degree of D.Sc. He has taught at Drexel Institute, University of Pennsylvania, University of Missouri and Rensselaer Polytechnic Institute, where he established the mechanical engineering department for which Mrs. Russell Sage donated $1,000,000. During the war Professor Greene served as a member of the advisory committee of technical societies aiding the Naval Consulting Board; he was chairman of the plant committee for Rensselaer County, New York, for the Fuel Administration and served as a member of the Engineering Council of the United Engineering Societies. He is the author of several books and has contributed to the technical press and to the proceedings of the American Society of Mechanical Engineers, of which society he has served as manager and vice-president.

William P. Palmer, president American Steel & Wire Co., Cleveland, has established summer headquarters at the company's North Works, Worcester, Mass. He will pass week ends with his family at Bluehill, Me., where he plans to erect a summer home.

Joseph Michaels, vice-president Hyman-Michaels Co., Chicago, accompanied by his family, sailed for Europe on July 4, for a four months' vacation.

L. A. Holmes, engineer, McClintic-Marshall Co., Potstown, Pa., has been transferred to the Boston office of that company.

Col. R. P. Lamont, president American Steel Foundries, Chicago, recently sailed for London to attend the meeting of the International Chamber of Commerce, as a representative of the Illinois Manufacturers' Association.

C. H. Lydell, Mertz & McLellan, consulting engineers, London, Eng., who is inspecting American public utilities, spent several days in Milwaukee the past week to visit the new Lakeside power plant of the Milwaukee Electric Railway & Light Co., at St. Francis, Milwaukee county, an important installation of steam generating equipment operated with pulverized fuel.

H. J. Freyn, president Freyn, Brassert & Co., Chicago, sailed for Europe on an extended business trip through England, Belgium, Holland, France and other countries. Mr. Freyn is expected to return in October.

Harry Quinn, vice-president Fairbanks Co. and manager of the New Orleans branch, has resigned. He had been with the Fairbanks Co. since 1907, during which time he rose from the position of special accountant to vice-president and branch house manager; holding in the interval the positions of auditor of disbursements, branch house auditor, general auditor, comptroller, assistant to president, general manager, general manager and second vice-president, vice-president and manager of the New Orleans branch. He spent a year in Europe, reorganizing the European branches of the Fairbanks interests. In 1919 Mr. Quinn took over the New Orleans house.

Isaac Harter has been appointed general superintendent of the Babcock & Wilcox Co., succeeding the late James P. Sneddon. Mr. Harter's advance has been a continuous one. On graduating in 1901 from the University of Pennsylvania he entered the employ of the Altman & Taylor Machinery Co., Mansfield, Ohio, a corporation of which his father had been president. He began at the bottom in the boiler department as a gang boss on inventories, and was transferred later to the cost department, where he became familiar with the details of each branch of the business. He was elected a director of the company while in this department, and a little later was appointed acting superintendent of the boiler department. In September, 1905, the company sold its boiler business to the Stirling Co., and Mr. Harter joined the staff of E. R. Stettinius, the business head of the latter company, which was absorbed by the Babcock & Wilcox Co. in 1907. When L. I. Summers resigned the superintendency of the Stirling works at Barberton, Ohio, Mr. Harter succeeded him, and in 1911 became superintendent of the Bayonne, N. J., works. He served in this capacity until about a year ago, when he became assistant to the president, in New York, where his office will remain as general superintendent.

I. D. Bielostozky, representing Morris & Bramer, Petrograd, Russia, has arrived in New York to secure the representation of American machine tool manufacturers in Russia. His headquarters are with the W. P. Neth Co., 44 Whitehall Street, New York. He wishes to receive catalogs and price lists. His firm intends also to extend its activities to China, Japan and Finland.

Frank F. Sims, for several years with the Pacific Coast Steel Co. as sales engineer, has opened offices for the practice of industrial engineering at 1306 L. C. Smith Building, Seattle. He will handle industrial

engineering and make investigations of proposed engineering operations.

F. E. L. Whitesell, for several years with the sales department of the Railway & Industrial Engineering Co., Greensburg, Pa., has been appointed New England representative, with headquarters at 136 Federal Street, Boston. Mr. Whitesell is a graduate of Washington and Jefferson College and during the world war served with the ambulance corps in France.

H. W. Bishop, Jr., for 10 years attached to the general sales office of LaBelle Iron Works, Steubenville, Ohio, and since the consolidation of LaBelle Iron Works, the Whitaker-Glessner Co. and the Wheeling Steel & Iron Co., identified with the Pittsburgh sales office of the Wheeling Steel Products Co., resigned, as of July 1. It is understood that he will make a connection with an Eastern steel company.

Charles V. McIntire has resigned as chief engineer of the International Coal Products Corporation to enter the field of consulting engineering, in association with A. Stephen Knowles, 66 Broadway, New York. He will specialize in by-product coke oven work, low temperature distillation of coal processes and other systems pertaining to the preparation and treatment of coals. Mr. Knowles was engaged for a number of years in the design and construction of by-product coke ovens; first, during six years service with the Koppers Co. and later, covering a period of five years, as chief engineer of the Wilputte Coke Oven Corporation, New York.

Carl Carlson has accepted a position with the Woonsocket Wagon Mfg. Co., Woonsocket, R. I., as general superintendent in its drop forge department. He was formerly assistant general superintendent at Billings & Spencer.

F. E. Myers & Bro. Are Incorporated

F. E. Myers & Bro., Ashland, Ohio, force and lift pumps, hay tools, etc., after operating for 45 years as a partnership, have been incorporated at $6,000,000 as the F. E. Myers & Bro. Co. F. E. and P. A. Myers started manufacture in a basement with a few hand tools, limited capital and no outside help. The industry has grown to one employing 850 men and producing two pumps a minute of working hours and a corresponding number of cylinders, hay tools, door hangers, etc. It is known as one of the largest co-partnerships under one continuous management in Ohio. The business will be conducted the same in the future as in the past. The officers of the company as as follows: F. E. Myers, president; P. A. Myers, first vice-president and general manager; John C. Myers, second vice-president; Guy C. Myers, third vice-president; F. B. Kellogg, secretary and treasurer, who together with A. N. Myers, T. W. Miller and G. D. Myers constitute the board of directors.

F. E. MYERS

Francis E. Myers is the organizer, salesman and financier of the partnership, while Philip A. Myers is the inventor. Previous to the formation of the partnership, F. E. Myers was a successful salesman. Their career as manufacturers began in 1879 after P. A. Myers invented a double acting force pump. He has secured more than 70 active patents. F. E. Myers has just given up the presidency of the Cleveland & Southwestern Railroad; he is president of the First National Bank of Ashland and director of the Union Trust Co., Cleveland. Both brothers are prominent in civic and charitable affairs and have given money and land for public enterprises.

OBITUARY

HENRY S. MANNING, a one-time partner of Manning, Maxwell & Moore, Inc., machine tools, 119 West Fortieth Street, New York, died July 9 in his apartment in New York. He was 76 years old. He was studying at Yale with the class of 1862 when he left to fight for the Union, rising to the command of a colored regiment. The present corporation of Manning, Maxwell & Moore, Inc., had its origin with Mr. Manning, who, having been in business individually for several years, established the concern of H. S. Manning & Co., with headquarters at 111 Liberty Street, New York. In 1873 Eugene L. Maxwell became a partner in H. S. Manning & Co. and continued his connection with the establishment until his death in 1894. Charles A. Moore joined the firm in 1880, at which time the present corporation name was adopted. In 1905, Henry S. Manning and Charles A. Moore being the only remaining partners, Mr. Moore purchased Mr. Manning's interest and Mr. Manning invested heavily with Milliken Brothers, structural iron and steel manufacturers, New York, who failed, thereby causing a heavy financial loss to Mr. Manning. He then joined the International Banking Corporation, 61 Wall Street, and later withdrew and maintained offices at 49 Wall Street. He was a member of the American Society of Mechanical Engineers and the Union League Club.

HENRY S. MANNING

Prof. FRANCIS BACON CROCKER, founder and vice-president Crocker-Wheeler Co., Ampere, N. J., and one of the foremost electrical engineers in the United States, died July 9 at his home in New York at the age of 60. He was born in New York and was graduated from the Columbia School of Mines in 1882, later receiving the Ph.D. degree. He founded the School of Electrical Engineering at Columbia University, serving as the head for 20 years. Together with Charles G. Curtis and Dr. Schuyler S. Wheeler he created the commercial motor, first put to use in 1886. In 1917, with Peter Cooper Hewitt, he developed a helicopter which was able to fly. He was a former president of the American Institute of Electrical Engineers, the Electric Power Club, the New York Electrical Society and a past sceretary of the International Electrical Congress. He was active in the standardization of electrical equipment throughout the world and was one of two American delegates to the International Electrotechnical Commission in London. He was the author of several books in the electrical field.

JAMES HARRISON STEEDMAN, vice-president Curtis & Co. Mfg. Co., St. Louis, died on July 1 at Santa Barbara, Cal., where he had gone for his health in January. His illness began with a breakdown during the war from overwork, when he was a lieutenant-commander in the navy, supervising the conditioning of engines in the ships of the Atlantic fleet. Prior to the war, he was an officer in the Naval Reserve Corps. Mr. Steedman was born in St. Louis 54 years ago, and was graduated from the St. Louis Manual Training School and Washington University. He was president of the St. Louis Steel Foundry Co. from 1889 to 1891, since which time he has been connected with the Curtis concern, of which his brother, Edwin H. Steedman, is president.

GEORGE P. POPE, a prominent member of the sales department, Minneapolis Steel & Machinery Co., Minneapolis, and well known in the fabricating trade, died July 7.

Machinery Markets and News of the Works

TOOL PLANTS CLOSED

Most of the Larger Factories Are Idle for Indefinite Period

No Improvement in Buying of Machine Tools —Stocks on Hand Will Meet Demand for Months

Many of the larger machine-tool manufacturing plants are closed and will remain so indefinitely. Nearly all of these companies have made up sufficient stock to last for at least six months, and unless there should be a larger demand for tools during the last half of the year than is expected, the plants will remain closed until the first of the year. Some companies have experimental work under way and this will be continued until new tools recently designed have been perfected for the market.

At Chicago, where some railroad buying has been in prospect, no action has been taken. The Illinois Central and Rock Island inquiries are still pending, and a few additional machines have been inquired for.

The Automatic Electric Co., the Acme X-Ray Co., both of Chicago, and the Aerial Cutlery Mfg. Co., Marinette, Wis., have inquired for lists of tools in the Chicago market.

Federal vocational schools, which are being started throughout the country, offer possibilities of business. The McKinley School, Canton, Ohio, has inquired for about 25 machines.

A carpet company in New England was a purchaser of tools last week. A Revere, Mass., manufacturer also bought a few machines.

An inquiry has been issued by a Detroit company for 40 to 50 automatic screw machines, but the placing of the business is contingent on the closing of a pending order for automobile parts.

In general the machine-tool business throughout the country continues very dull, but inquiries in some sections are better.

New York

NEW YORK, July 12.

No signs of improvement in machine-tool inquiry and buying are apparent. The situation the past week has been the same as in preceding weeks, with the dullness intensified by the recent holidays. The only inquiry of note before the trade is that of the Bethlehem Steel Co., reported last week.

While the number of cranes sales reported the past week is small, the market generally is showing more activity. A fair number of inquiries is on hand, one for a total of 22 electric cranes, ranging from 7½-tons to 15-tons capacity being in the hands of at least one crane builder. This business, however, probably will not be placed for at least six months. The 12-ton hand power crane for the Government of Porto Rico, on which bids were submitted through New York exporters, will be awarded shortly. There is an inquiry in the market from Ray Houck, Reading, Pa., for a 5-ton, 40-ft. span overhead traveling crane for a client.

Among recent sales were: Shepard Electric Crane & Hoist Co., an electric hoist equipped with a 2-yd. bucket to the Broken Hill Proprietary Co. in Australia; Maris Brothers, a 10-ton electric crane to the Viscose Co. for its new plant at Lewiston, Pa., and a 5-ton crane for export to Cuba; Chisholm-Moore Mfg. Co., three 3-ton and one 4-ton hand power cranes to Marc Eidlitz & Son, 41 East Forty-second Street, New York, for the new building of the American Telephone & Telegraph Co., New York.

I. D. Bielostozky, representing the machinery firm of Morris & Bramer, Petrograd, Russia, is in the United States with a view to arranging to represent American manufacturers of machine tools at Vladivostok. Morriis & Bramer also intend to extend their selling activities to China, Japan and Finland. Mr. Beilostozky desires catalogs and price lists, his address being in care of the W. P. Neth Co., 44 Whitehall Street, New York.

The Crane Co., 490 Cherry Street, New York, manufacturer of valves, steam specialties, etc., with headquarters at Chicago, has awarded a contract to the Gabler Construction Co., 402 Hudson Street, for its new building, adjoining the present works, 100 x 145 ft., to cost about $28,000.

The Standard Change-Making Corporation, New York, has been incorporated with a capital of $250,000 by S. Bernstein, K. Sperberg and M. Sindel, 621 Broadway, to manufacture special machinery and parts.

The Butler Kwik Lift Co., Brooklyn, has been incorporated with a capital of $50,000 by E. M. and Z. M. Butler and H. E. Haupt, to manufacture lift devices and elevating equipment for automobiles, and other garage apparatus. It is represented by W. B. O'Connor, 375 Fulton Street, Brooklyn.

The W. F. Mangels Co., 2863 West Eighth Street, Brooklyn, manufacturer of mechanical amusement equipment of heavy type, as carousels, etc., is planning for the erection of a one-story addition, 90 x 200 ft.

Ashley Garages, Inc., New York, has been incorporated with a capital of $150,000 by J. R. Ashley, 351 West Eighty-sixth Street, to manufacture portable metal garages and attachments.

Simon Gasner & Son, Inc., 1876 Pitkin Avenue, Brooklyn, has completed plans for a three-story automobile service and repair building, 100 x 100 ft., at Glenmore Avenue and Powell Street, estimated to cost about $125,000.

The Rogel Lighting Fixture Mfg. Co., New York, has been incorporated under State laws to manufacture electric and gas fixtures. The incorporators are C. G. Robin and L. and I. Gelfland. It is represented by I. T. Fiatto, 261 Broadway.

The American Gage Corporation, Brooklyn, has been incorporated under Delaware laws with capital of $2,500,000 to manufacture gages and other equipment for automotive service. The incorporators are M. E. Nolan, E. C. Ballantyne and S. C. Berry, Brooklyn. The company is represented by the Capital Trust Co., Dover, Del.

The Die-Casting Specialty Corporation, Brooklyn, has been incorporated under State laws to manufacture die-castings and similar products. The incorporators are F. M. Cohen, C. Gould and A. Janssen. The company is represented by M. B. Sennett, 32 Court Street, Brooklyn.

S. B. Wight, agent for the New York Central Railroad Co., Grand Central Terminal, New York; Cleveland, Cincinnati, Chicago & St. Louis Railway Co., Michigan Central Railroad, and other affiliated lines, will receive bids up to 12 o'clock noon, July 22, for general repairs of 50 locomotives similar to class H-5 Mikado freight locomotives. Each bid must be accompanied by a $50,000 bond.

L. B. Redner, 200 West Seventy-first Street, New York, is taking bids for a new two and three-story automobile service and repair building, 25 x 100 ft., at 327-33 West Sixty-ninth Street, estimated to cost about $125,000.

The Pathe Freres Phonograph Co., 18 East Forty-second Street, New York, manufacturer of talking machines and parts, is being reorganized with W. W. Chase, president and general manager White Sewing Machine Co., Cleveland, as head of the company.

The Trumpbour-Whitehead Brass & Copper Co., 309

Canal Street, New York, has leased property at 265-67 Canal Street, for a new local establishment.

The 29 Jackson Street Garage Corporation, New York, has acquired the three and four-story buildings at Monroe and Jackson streets, extending to 372-76 Madison Street, totaling 75 x 100 ft., for an automobile service and repair works.

The MacCracken Garage Equipment Co., 373 West 125th Street, New York, has leased property at 433-47 East 124th Street for a long term of years, and will build a new one-story works building to occupy the entire plot, 100 x 188 ft.

Freight handling and conveying equipment will be installed on the new piers to be erected by the city of New York, Dock Commissioner Murray Hulbert in charge. The first structure, 1000 ft. long, will be built at the foot of Canal Street, North River, and plans and specifications will be completed about Aug. 1. Five other piers of the same size, approximately, will be constructed in this vicinity.

The Master Bake Pot Corporation, Bayonne, N. J., has been incorporated with a capital of $100,000 by M. M. Hogan, A. D. Harz and Percival H. Cruden, 14 North Street, to manufacture metal cooking utensils.

Gundiliere Brothers, 45 Hickory Street, Orange, N. J., are taking bids for a new one-story foundry, 32 x 60 ft., for iron casting production, at the rear of address noted. Albert P. Nucciarone, 206 Central Avenue, is architect.

The Safety Gas Apparatus Co., Inc., Hoboken, N. J., has been incorporated with a capital of $100,000 by William Wirt, William J. Connolly and Paul Devarco, 355 Fourteenth Street, to manufacture gas-burning equipment.

Fire, July 8, destroyed the automobile body manufacturing plant of Max Leowitz, Roosevelt, N. J., with loss estimated at about $20,000, including equipment.

The National Radio Electric Sign Co., Jersey City, N. J., has been incorporated with a capital of $25,000 to manufacture electrically operated signs. It is represented by Cornelius A. Cole, Hackensack, N. J.

The Metal Materials Co., Asbury Park, N. J., has been incorporated with a capital of $125,000 by Roscoe G. Tagle, Frank V. B. Young and Isaiah Matlack, 601 Mattison Avenue, to manufacture metalware products.

The E-Z Product Mfg. Co., 180 Amherst Street, East Orange, N. J., has filed notice of organization to manufacture filters and other mechanical specialties. Charles E. Wiltsey, 152 Halsted Street, heads the company.

The Henry R. Worthington Co., Harrison Avenue, Harrison, N. J., has made an offer of $8,459.27 to the Town Council for the purchase of 14 lots on Wilhelm and Sussex streets, for proposed plant extensions. The company manufactures pumps and pumping machinery.

The Williams Specialty Co., 9 Walnut Place, Montclair, N. J., has filed notice of organization to manufacture razor plate and kindred products. James Williams heads the company.

The Hudson Auto Body Co., Union Hill, N. J., has been incorporated with a capital of $100,000 by Joseph Solomon, Morris Bernstein and Carl Weitz, 8 Bergenline Avenue, to manufacture automobile bodies and equipment.

Oven equipment and other mechanical apparatus will be installed in the addition to be constructed by the Ward Baking Co., Ampere, East Orange, N. J., to cost about $450,000. A permit for the work has just been issued, and includes a one-story service department for automobile trucks.

The Zolleis Mfg. Co., East Orange, N. J., has been incorporated with a capital of $100,000 to manufacture valves and kindred mechanical equipment. Harry H. Picking, 525 Main Street, represents the company.

Louis J. Holzmann, 393 South Twenty-first Street, Irvington, N. J., manufacturer of chutes and other iron products, has secured permission for the erection of a new plant at 107-109 Montgomery Avenue.

The Electric Heating Apparatus Co., Newark, N. J., manufacturer of electrical equipment, has removed its plant from 123-25 Sussex Avenue to 18-34 Nesbitt Street, where increased facilities will be provided.

The New Jersey Chemical & Rubber Works, Inc., Newark, has been incorporated with a capital of $100,000 by Nathaniel Ginsburg, Meyer E. Gusman and Jacob Janoff, to manufacture rubber products. It is represented by A. Milton Jacobs, 9 Clinton Street.

The Miniature Bulb Co., Warren Street, Newark, has filed notice of organization to manufacture incandescent electric lamps. Angelo Paione, 695 Ridge Street, heads the company.

Alexander, Morrison & Co., Inc., Newark, has been incorporated with a capital of $500,000 by L. M. Scheer, E. T. Adams and Maurice A. Potter, 111 Gotthart Street, to manufacture boilers and kindred equipment.

The Flexible Products Co., 65 Clinton Place, Newark, has filed notice of organization to manufacture flexible tubing, etc. Herbert Bingham heads the company.

Fire, July 2, destroyed a portion of the factory of the L. S. Wright Machine Works, 9 Alling Street, Newark, with loss estimated at about $10,000. The company has been planning for removal to a new location at High and Boyden streets, and, it is said, will re-establish the works at this location.

The Board of Freeholders, Newark, will break ground at once for a new industrial building at the Overbrook Hospital, near Caldwell, to be equipped for vocational work. It is estimated to cost about $125,000. Chairman of the Building Committee, Mr. Ball, is in charge.

The Superior Auto Parts Co., 221 Plane Street, Newark, has filed notice of organization to manufacture automobile parts and other mechanical equipment. George Murphy and Carl Bettinger head the company.

New England

BOSTON, July 11.

The bulk of the machine tools moved the past week was sold by one concern. The purchase of tools by the Bigelow-Hartford Carpet Co., to replace equipment at its Clinton, Mass., plant, which was split up among three machinery houses, is the outstanding feature of the market. Among the tools taken were three Flather lathes, 24 x 26 in., 18 x 21 in., and 14 x 6 in.; a 16-in. shaper, 3-ft. radial drill, 36-in. x 16-ft. Liberty open side planer, and a Milwaukee milling machine, as well as some wood-working equipment. The company did not cover on grinders, drills, and other small tools on which it inquired. The Eastern Machine Co., Revere, Mass., bought one ¾-in. turret lathe, one 6-spindle and one 2-spindle drilling machine, while a Lancaster, N. H., interest took an Ohio milling machine. Other purchases for the week include a No. 25 Ohio milling machine by the Dennison Mfg. Co., Framingham, Mass., paper products; a used 6-spindle drilling machine by a Providence manufacturer; 6-spindle drilling machine and a No. 2 Southworth screw machine by the Rhode Island Machine & Tool Co., Woonsocket, R. I.; one 4-spindle drilling machine by a Cambridge, Mass., firm, and one 4-ft. Dreses plain radial drill by a local concern.

The Maine Central Railroad Co. has not covered on the lathe, shaper and drill on which it inquired recently and appears in no hurry to do so. The General Electric Co., West Lynn, Mass., which some time ago issued a list, bought only a few lathes against it. The other equipment needed was taken from other plants belonging to the company. School business is coming in slower than anticipated. The Worcester Consolidated Gas Co., Worcester, is in the market for a 12-in. grinder, a pipe machine and other equipment. Otherwise, inquiries are scarce. The demand for machine tools in Connecticut is unusually quiet. It is estimated approximately 67 per cent of the iron and steel-working industries of that State are closed for inventories, repair or other reasons, for periods ranging from 10 days to three weeks. Not in the history of the trade has the demand for machinery, tools, hardware and other iron and steel products been as light as it is to-day. Massachusetts appears relatively better off industrially than other New England States, but gaps are beginning to open and it is conceded by many that conditions will be quieter before the close of July. Leading machinery making interests of Boston, who some months ago contemplated purchasing machine tools but withdrew from the market because prices at that time were considered out of line with other commodities, this week again sounded the market only to immediately withdraw tentative inquiries on prices named by dealers.

The Wood Worsted Mills, a subsidiary of the American Woolen Co., asked prices on a 50-ton crane, but has decided not to purchase at this time. The Amoskeag Mfg. Co. is still negotiating on its 60-ton crane with a view to securing lower quotations. The difference between original and present bids made by crane interests in some instances is $6,000 to $7,500.

Stone & Webster, Boston, acting for the Ford Motor Co., has purchased four 2000-hp. hydraulic turbines for the proposed Green Island, N. Y., hydro-electric plant from the Allis-Chalmers Mfg. Co.

The Norton Co., Worcester, Mass., and the American Emery Wheel Works, Providence, R. I., have announced a reduction approximating 10 per cent in grinding wheels.

The adoption by manufacturers of machine screws of the National Standard Thread Schedule is a widely discussed topic in New England machine shops. Under the new schedule the old sizes, 14-20, 20-18 and 24-16 are eliminated and ¼-in.-20, 5/16-in.-18 and ⅜-in.-16 substituted. The discontinued sizes are considered specials except when

ordered in quantity lots. The new schedule also provides fine threads which sell at the same price as the standard.

The William E. Quinn Co., Northampton, capitalized for $50,000, has been granted a Massachusetts charter to manufacture saws, tools, machinery and supplies. Harry M. Chamberlain, Bardwells Ferry, is president, and Albert G. Beckman, Northampton, treasurer.

Harry L. Donahue, 1460 Tremont Street, is president and treasurer of the Daniels Mfg. Co., Boston, with a capital of $600,000, recently incorporated under Massachusetts laws to manufacture fastening devices. Charles T. Mackay, 95 H Street, South Boston, and Edwin J. Giblin, 17 Mt. Vernon Street, Dorchester, Boston, are interested in the company.

The General Electric Co., West Lynn, Mass., will erect additions to buildings Nos. 34, 36 and 51.

The H & H Foundry & Machine Co., Stamford, Conn., last week was damaged by fire to the extent of $25,000.

The city of Worcester, Mass., is in the market for two electrically driven pumps of 60 gal. per min. capacity each.

Plans are being drawn for a one-story, 170 x 300 ft. plant for the Meisel Press Mfg. Co., 944 Dorchester Avenue, Dorchester, Boston..

A Massachusetts charter has been given the Hygienic Coin Lock Co., Boston, capitalized for $100,000. Isaac J. Segel, 30 Warren Avenue, Malden, is president and treasurer.

The Shambow Shuttle Co., Woonsocket, R. I., manufacturer of shuttles and other textile mill equipment, is having plans prepared for a new three-story factory, 84 x 158 ft., on North Main Street, to cost about $100,000 with equipment. Lockwood, Greene & Co., Boston, are architects and engineers.

The Economy Electrical Mfg. Co., New Haven, Conn., has been incorporated with a capital of $25,000 by A. I. Lapides, S. D. Pardoll and S. Jacobson, 1 Lawrence Street, to manufacture electrical equipment.

Mercer Brothers, 280 Main Street, Nashua, N. H., have had plans prepared for a new two-story automobile service and repair works, 100 x 100 ft., to cost about $100,00 with equipment. Hutchins & French, 8 Winter Street, Boston, are architects.

The United States Screw & Stamping Co., Worcester, Mass., has been incorporated with a capital of $25,000 to manufacture screw products, metal stampings, etc. Robert C. S. Whittemore is president, and Henry Beland, 26 Baker Street, treasurer.

The Columbia Enamel Mfg. Co., Hartford, Conn., has filed notice of dissolution under State laws.

The David Brown Co., Foster Street, Lawrence, Mass., manufacturer of bobbins and other textile mill equipment, has awarded a contract to the E. W. Pitman Co., Bay State Building, for a two-story and basement addition, 40 x 104 ft., to cost about $40,000.

The Electrical Specialty Mfg. Co., 51 Beaufort Street, Providence, R. I., has filed notice of organization to manufacture electrical equipment. W. B. and L. J. Hopkins head the company.

The Arrow Tool & Mfg. Co., 200 Cannon Street, Bridgeport, Conn., formerly known as the Arrow Tool Co., will devote a large portion of operations to the manufacture of a new electric expansion plug, and which will be placed on the market at an early date. Other departments of the works will manufacture tools, dies and special machinery. H. S. Forsberg is president.

The Essandell Tire Co., Boston, has been incorporated with a capital of $250,000 to manufacture automobile tires. Franklin G. Saylor is president, and George A. Lufkin, 173 Shirley Avenue, Revere, Mass., treasurer.

Otto Fichtenmayer & Brother, New Bedford, Mass., operating a forge works at 326 South Water Street, have awarded contract to Samuel Gray & Son, Pine Street, for a two-story shop, 44 x 60 ft., for automobile repair work.

Buffalo

BUFFALO, July 11.

New construction at the works of the Buffalo Forge Co., 490 Broadway, Buffalo, plans for which were recently filed, will consist of remodeling the mechanical fan shop, increasing the department to a total of 64,235 sq. ft. of floor area, including about 23,800 sq. ft. of galleries for assembling operations.

The Ideal Electric Dumbwaiter Co., Buffalo, has been incorporated with a capital of $50,000 by G. A. Irvin, J. D. Hillery and J. A. Wechter to manufacture electrically-operated dumbwaiters and other lift equipment. It is represented by Sullivan, Bagley & Wechter, Chamber of Commerce Building.

Fire, July 7, destroyed a portion of the plant of Corning Brick, Terra Cotta & Tile Co., Corning, N. Y., with loss estimated at about $40,000, including equipment.

The new plant to be erected by the Mayer Coating Machines Co., 205 St. Paul Street, Rochester, N. Y., on Scottsville Road, will be one-story, 125 x 320 ft. G. Morton Wolfe, 1377 Main Street, Buffalo, is architect. G. W. Mayer is head.

The Atmospheric Nitrogen Co., Syracuse, N. Y., affiliated with the Solvay Process and Semet-Solvay companies, is planning to place the first unit of its new plant in service early in August, with construction work up to the present time representing an investment of about $3,000,000. Tentative plans provide for the erection of a second unit at an early date.

The Abott Electric & Supply Co. has incorporated for $10,000 to manufacture electrical appliances and do electrical contracting. William F. Burket, 61 Eaglewood Avenue, Buffalo, is the principal stockholder.

The Houde Engineering Corporation, 1392 West Avenue, Buffalo, will erect a factory to cost $50,000 for the manufacture of shock absorbers.

Philadelphia

PHILADELPHIA, July 11.

Frank P. Florentine, Park Avenue, Philadelphia, has awarded a contract to the Stewart Brothers Co., 2526 North Orkney Street, for a one-story machine shop on Park Avenue, for automobile parts manufacture and repair work.

The Electro Sherardizing Co., Philadelphia, has been incorporated with a capital of $25,000 to manufacture metal specialties. J. E. Gibson, Wood-Norton Apartments, is treasurer.

Davis Brothers, Inc., Philadelphia, is being organized by E. P. and Edward L. Davis to manufacture railroad spikes, bolts, nuts, etc. Application for a State charter will be made on July 25. Bayard Henry, Land Title Building, represents the company.

The Safety Oiling System, Inc., Philadelphia, has been incorporated with a capital of $100,000 to manufacture mechanical oiling devices and oiling systems. Arthur Baruch, 2064 North Sixty-second Street, is treasurer.

A one-story power plant will be constructed by the Logan Baking Co., Philadelphia, in connection with the erection of its new three-story and basement plant, 50 x 125 ft. T. Frank Miller, 1012 Walnut Street, is architect in charge of the work.

The McFarlan-Philadelphia Co., Philadelphia, is being organized to manufacture automobile and aeroplane parts and equipment. Application for a State charter will be made on Aug. 1. The company is represented by Illoway & Felix, Bulletin Building.

The F. J. Stokes Machine Co., Seventeenth and Cambria streets, Philadelphia, has disposed of its two-story plant, 45 x 195 ft., to W. H. Stehle, for $42,500. No announcement has been made by the new owner regarding character of operations in the future.

The McFarland-Meade Co., Seventieth Street and Kingsessing Avenue, Philadelphia, manufacturer of windows, etc., has filed plans for a new one-story metal shop, 100 x 125 ft.

Property of the Winfield S. Barnes Co., Twentieth and Erie streets, Philadelphia, manufacturer of automobile equipment, steel products, etc., will be sold at once by the receivers, Winfield S. Barnes and Otto R. Heiligman, the disposition to include the plant and entire machinery installation.

The Tri-Plex Safety Razor Co., Inc., Philadelphia, has been incorporated with a capital of $200,000, to manufacture safety razors, knives, etc. The incorporators are Herman and Melvin Perlish and Edward Somerson, care of the U. S. Corporation Co., Commonwealth Building.

A total of 60,245 lb. of mild steel angles, 1½ x 1½ x ¼ in., and 1069 bars, 24 ft. lengths, will be offered at public sale at 10 a. m., July 18, at the warehouse of the Harold McCalla Co., Beech Street and Columbia Avenue, Philadelphia.

Morris Jones, Inc., Philadelphia, is being organized by Morris Jones and associates to manufacture automobile engines, tractor equipment, etc. Application for a State charter will be made on July 20. The company is represented by John Weaver, Commercial Trust Building.

The Lane Signal Accessories Co., Sayre, Pa., has been incorporated with a capital of $500,000 by William H. Lane, Harry S. Fish and Raymond L. Gebhardt, Sayre, to manufacture signal devices and other electrical and mechanical equipment.

Fire, July 1, destroyed a portion of the plant of the Read Machinery Co., Inc., York, Pa., with loss, including surrounding property, estimated in excess of $80,000.

Fire, July 5, destroyed the machine shop of the Charles H. Nadig Mfg. Co., 14-24 North Fourth Street, Allentown, Pa., with loss reported in excess of $40,000. The factory

is one and two-stories, 60 x 100 ft., with wing, 49 x 50 ft., occupied as a foundry. Charles H. Nadig is head of the company.

Chicago

CHICAGO, July 11.

Although neither the Illinois Central nor the Rock Island have yet bought against their lists, the latter road has issued an inquiry for two additional machines, a 36-in. x 36-in. x 12-ft. planer and a 26-in. shaper. The Chicago, Indianapolis & Louisville has asked for prices on a punch and shear. Buying remains at a low ebb, but inquiries from industrial companies are more numerous than for some time. The Automatic Electric Co., Chicago, is in the market for a two-spindle and a four-spindle plain-bearing drill press, 15-in. drill press, 20-in. wheel and lever feed drill press, No. 3 Niagara, or equivalent, inclinable power press No. 4 Niagara, or equivalent, inclinable power press, hand milling machine, motor-driven filing machine, an automatic tappng machine, a No. 42 and a No. 82 Niagara lever press, combination surface, disk and tool grinder, two Wells No. 140, or equivalent, hand screw machines, a Burke sensitive motor-driven drill, and a 2-ft. or 6-ft. brake. These machines are for delivery at the company's Fort Dodge, Iowa, plant. The Acme X-Ray Co., Chicago Avenue and Orleans Street, Chicago, has taken figures on the following machines: A 16-in. shaper, No. 2 milling machine, 14-in. x 6-ft. engine lathe, 20-in. drill press, an 11-in. speed lathe, hack saw, punch press, squaring shear and a gas tempering furnace. Of this list the shaper and the milling machine are understood to have been bought, used machines having been purchased. The Aerial Cutlery Mfg. Co., Marinette, Wis., is in the market for three polishing and buffing lathes, a balancing tool and a grinding wheel stand with protection hood.

The Federal vocational schools which are being started throughout the country by the Government are expected to result in machine tool business. Such a school has been established at Jacksonville, Ill., and one is contemplated at Valparaiso University, Valparaiso, Ind.

The prospective settlement of a definite wage scale for building mechanics has tended to increase building in Chicago. Permits were issued in June for 675 buildings involving a frontage of 18,510 ft. and a cost of $7,484,200, as compared with 428 permits, 11,076 ft. frontage and $2,967,750 for May, 1921, and 315 permits, 10,468 ft. of frontage and $6,836,900 for June, 1920.

The Hudson Battery Corporation, manufacturer of electrical supplies, 155 North Market Street, Chicago, has purchased from G. S. Blakeslee & Co., makers of dishwashing machines, a one-story plant, 115 x 234 ft., at 2856 Quinn Street, and will occupy the building.

The Curtis Leger Fixture Co., 1119 West Jackson Boulevard, Chicago, manufacturer of display fixtures, has purchased 300,000 sq. ft. of land on Eighteenth Street, extending from Forty-sixth Court to Forty-seventh Avenue. It will erect a series of one and two-story buildings when building conditions permit. These structures will be occupied by itself and its allied corporation, the National X-Ray Reflector Co., 235 West Jackson Boulevard. The first units to be constructed will cost $400,000.

The Universal Battery Co., 3410 South La Salle Street, Chicago, will occupy a one-story plant, 50 x 138 ft., 3419-25 Wentworth Avenue, the contract for the construction of which has been awarded.

E. J. Sekt, 64 West Randolph Street, Chicago, has been granted a permit to construct a one-story garage 150 x 173 ft., 1238-52 Morse Avenue, to cost $70,000.

The plant of the Mann Corporation, Bradley, Ill., has been purchased by M. C. Rosenbaum and Henry Borenstein, New York, who will utilize it in conjunction with an Eastern factory for the manufacture of ironing machines and other household appliances. The new owners are contemplating the erection of an assembling building at the Bradley plant this fall.

The Keith Furnace Co., care R. S. Keith, Court Avenue, Des Moines, Iowa, has taken bids on the construction of a one and two-story plant, to include a foundry, on East Twenty-sixth Street, near Dean Avenue, estimated to cost $150,000.

The Twin City Motor Bus Co., 344 North Exchange Street, St. Paul, Minn., has taken bids on the construction of a one-story garage and office building, 120 x 150 ft., to cost $40,000.

The Miller, Bryan, Pierce Co., 225 River Street, Aurora, Ill., manufacturer of typewriter supplies, is planning the construction of a three-story plant, 60 x 150 ft., to cost $160,000.

The Edward Valve & Mfg. Co., East Chicago, Ind., is completing plans for a new structure to replace the plant destroyed by fire several months ago. The new building will cost $400,000.

The Lewis Motor Mfg. Co., Chicago, care of Ralph C. Harris, architect, 190 North State Street, has plans under way for the erection of a new one and three-story plant at Peru and North Streets, Michigan City, Ind., to cost about $200,000 with machinery.

The Great Western Sand Blast Co., 833 South Oakley Boulevard, Chicago, has been chartered under State laws to manufacture sand blast equipment. The incorporators are Fred W. Turner and Frank Silverthorn.

Fire, July 1, destroyed a portion of the plant of the Paxton & Vierling Iron Works, Seventeenth Street, Omaha, Neb., with loss estimated at about $50,000.

The Gurney & Selleck Co., 122 Michigan Boulevard, Chicago, has been organized to manufacture furnaces and kindred equipment. It is headed by Theodore G. Selleck and Richard K. Gurney.

The Swing-a-Wing Mfg. Co., Madison, Minn., has been incorporated with a capital of $50,000 by Benjamin Schmaal, Frank B. and William B. Lessman, Madison, to manufacture gates, and other iron and steel products.

The American Wire Fabrics Co., Western Avenue and 136th Street, Blue Island, Chicago, has completed plans for a new one-story galvanizing plant, 45 x 145 ft., to be constructed in conjunction with a new warehouse and both structures are estimated to cost about $100,000. E. M. Newman, 80 West Washington Street, Chicago, is architect.

The St. Paul & Sault Ste. Marie Railway, St. Paul, Minn., has been granted permission to issue notes for $2,400,000, the proceeds to be used in connection with the purchase of new equipment, estimated to cost $3,303,685.

Baltimore

BALTIMORE, July 11.

Fire, June 30, destroyed the power house and pumping plant of the Dorchester Water Co., and the plant of the Cambridge Ice Co., Cambridge, Md., with loss estimated at about $70,000.

The Victor Piston Ring Co., 608 American Building, Baltimore, recently incorporated with a capital of $500,000 to manufacture piston rings and other automotive products, is planning for the acquisition of an existing building for its proposed works, with adjoining property for expansion. Jackson Brandt is president and J. E. Butler, manager.

The Adamantex Brick Co. of Maryland, Baltimore, has been incorporated by officials of the Adamantex Brick Co., Brooklyn, N. Y., with capital of $1,000,000, for the establishment of a new plant at Arbutus, near Baltimore, to manufacture sand-cement bricks. The initial works will be equipped for a daily capacity of over 200,000 bricks, and will comprise 10 machines with auxiliary equipment. It is proposed to have the plant in service in about 60 days. Louis F. Ducker, president of the Brooklyn organization, will act in a similar capacity for the Baltimore subsidiary. Blum & Makover, Equitable Building, Baltimore, are corporate representatives.

The National Utensil Mfg. Co., 207 Guilford Avenue, Baltimore, has been incorporated with a capital of $125,000 to manufacture metalware, heating devices, etc. Henry L. Mendal is president and W. J. Demar, vice-president.

The Automatic Bearing Machine Co., Wilmington, Del., has been incorporated with a capital of $400,000 to manufacture machinery and tools. It is represented by Harry K. Hoch, Delaware Trust Building.

The Laurel Ice Co., Laurel, Del., has completed plans for a new ice-manufacturing and refrigerating plant, to be ready for service early in the fall.

The National Fibre & Insulation Co., Yorklyn, Del., has filed plans for the erection of a two-story addition, 140 x 160 ft. Warren Marshall is president.

The Darco Corporation, du Pont Building, Wilmington, Del., a subsidiary of the Atlas Powder Co., has disposed of a bond issue of $1,500,000, the proceeds to be used for a new carbon refining plant in Louisiana. A site is being selected in the northern part of the State, and initial machinery will provide for a capacity of 6000 tons per month. W. J. Webster is president of both companies.

The Board of Harbor Commissioners, Wilmington, Del., will install freight handling and conveying machinery and other equipment at the new docks and terminal to be constructed on the waterfront, bonds for which have been issued. Bids have been taken for the dock and warehouse construction, the lowest figure being received from the Hughes-Foulkrod Co., Commonwealth Building, Philadelphia, at $1,311,000. The available appropriation is $1,800,000.

The Common Council, Dover, Del., is having plans pre-

pared for the construction of a new municipal power plant. W. E. S. Dyer, Land Title Building, Philadelphia, is engineer.

The Grottoes Foundry & Machine Co., Grottoes, Va., has been incorporated with a capital of $25,000 to manufacture machinery, castings, etc. Charles M. Walker, Grottoes, is president, and Edward C. Martz, Harrisonburg, Va., secretary.

The Norfolk & Western Railway Co., Roanoke, Va., will receive bids up to 12 noon, July 20, for 18 steel coil engine truck springs; 200 bevel soft steel bars; 120 rods of wire fencing; 2500 steel angle bars, and 100,000 dating nails, with electrical material and apparatus. J. H. Clemmitt, Roanoke, is purchasing agent.

The Broadfoot Iron Works, Wilmington, N. C., is arranging to rebuild the main building at its plant, recently destroyed by fire.

Milwaukee

MILWAUKEE, July 11.

While tangible evidence of a revival in machine tool business is slow in development, nevertheless manufacturers in this market believe they are able to discern some improvement. The betterment is principally in inquiries, which were almost lifeless the latter part of May and during June. A small volume of orders is being received, but almost they invariably are for single machines. Production remains at a low point, as much of the business coming in can be filled promptly out of stock. Competition from used tools continues very strong, many of these being machines never set up for practical use, but despite their newness are available at a very great price advantage under new tools.

The Highway Trailer Co., Edgerton, Wis., sustained an estimated loss of $100,000 by fire of unknown origin which destroyed the main factory building and assembling floor, erected about 10 months ago. It was 188 x 950 ft., of brick and mill construction. Only a small part had been equipped, but this is a total loss. It is planned to start work on a new building as soon as insurance adjusters have completed their work. The original factory, now used mainly as a machine shop, was saved. James W. Menhall is president and general manager.

The Reliance Oil Burner Co. of Saukville, Wis., has been incorporated with a capital stock of $250,000 to manufacture heating devices using kerosene as fuel. The incorporators include Fred C. Keller and R. A. Sharp, officials of the Milwaukee Reliance Boiler Works, Milwaukee, and H. J. Cary, Saukville, Wis. The new concern takes over all of the assets and liabilities of the Ozaukee Heater Co. and the Ozaukee Sales Co., a subsidiary. The present plant will be continued in operation and later will be enlarged as demands require. Mr. Cary will remain in charge of the Saukville factory.

The Board of Education, Spooner, Wis., has engaged W. L. Alban, architect, St. Paul, Minn., to design a junior high and vocational training school, to be erected during the fall at an estimated cost of $100,000. W. C. Crocker is clerk of the board.

The Grant Furniture Co., 502-508 Sixth Street, Racine, Wis., will build a new three-story factory, 80 x 120 ft., of brick and mill construction, estimated to cost $65,000. The architect is D. R. Davis, Racine. Work will begin about July 20. Considerable wood-working machinery, with individual electric motor drive, will be required.

The Pelton Steel Co., 672 Kinnickinnic Avenue, Milwaukee, has disposed of its plant site, 300 x 720 ft., to the Milwaukee Electric Railway & Light Co., which requires the acreage for extensions of its car barns and shop adjoining the works. The transfer, however, will be made piecemeal and the operation of the foundry will not be affected for some time. The Pelton company intends to purchase a new site, probably in the West Milwaukee manufacturing district, and erect a new foundry between now and the time the Electric company finally takes possession. William H. Schuchardt is vice-president and general manager of the Pelton company.

The Dependable Baggage Co., Stanley, Wis., has started work on the reconstruction of its factory, which was gutted by fire March 3. The new building will be 100 ft. sq., of brick and mill construction, and will be equipped almost entirely with new machinery for manufacturing trunks, cases, luggage carriers, garment hangers and other wood specialties. J. F. Grubb is general manager.

The Hartenberger Double Wall Silo Co., Sheboygan Falls, Wis., has decided to relocate in the city of Sheyboygan, occupying a new factory on Calumet Drive recently erected by Alex Locke. It has increased its capital stock from $50,000 to $125,000 to accommodate the transfer and enlargement of the operation. Robert Hartenberger is president and general manager.

The Sunbeam Domestic Appliance Co., Milwaukee, manufacturer of electrically operated household devices, has moved into its new factory, containing 16,000 sq. ft. Oscar F. Fischedick, 1379 Richland Court, Shorewood, Milwaukee, is vice-president, treasurer and general manager.

The W. C. Dicke Motor Co., Manitowoc, Wis., has awarded contracts for a brick and concrete garage, 60 x 120 ft., with a basement, 45 x 60 ft., to be ready about Oct. 1. The machine and repair shop will occupy a space 38 x 75 ft. Equipment is now being purchased.

Morris Wald, president U. S. Radiator Co., 185 Fourth Street, Milwaukee, has engaged A. N. Strack, 693 Marshall Street, local, to design and erect a machine shop, 50 x 122 ft., two stories, on Twelfth, near Walnut Street, for general machine and automotive repairs and service. Work will start at once.

The Moloch Co., Kaukauna, Wis., manufacturer of automatic stoking devices, power hammers, etc., has completed the transfer of its operation to its new plant, erected at a cost of $200,000. The machine shop was moved early in June, and the foundry was transferred July 1, resuming operations July 5. Each building is 100 x 150 ft., of brick and steel. The Moloch Co. is a consolidation of the Kaukauna Machine Works Co. and the Moloch Stoker Co.

The Marathon Electric Mfg. Co., Wausau, Wis., manufacturer of small electric-motored appliances and devices, contemplates the erection of a one-story brick and steel addition, 40 x 180 ft., to be equipped as a machine shop, assembling floor, shipping room, offices, etc. The work is in charge of Oppenhamer & Obel, architects, Wausau.

The Co-Operative Axe & Tool Co., Chicago, with branch factory at Cleveland, is establishing a second branch plant at Green Bay, Wis. A lease has been taken of an existing three-story building, which will be equipped for machine work, manufacture of handles, etc. For the present the supply of forgings will be made under contract with the Green Bay Drive Calk Co., but later a forge shop and a steel refining plant will be added. The present installation includes polishing and electro-plating equipment, grinders, etc. E. D. Woods, general manager, will supervise the initial operations.

The Zwebell Brothers Co., 482 Milwaukee Street, Milwaukee, has let the general contract to the Northwestern Bridge & Iron Co., Milwaukee, for erecting a one-story brick and steel shop building, 60 x 110 ft., at Slinger, Wis., to manufacture vulcanizing machines, retreading devices, tire molds, and similar specialties. The architects are Judell & Bogner, Milwaukee.

The Board of Industrial Education, LaCrosse, Wis., will soon be in the market for miscellaneous equipment for the Longfellow vocational training institute, which is being remodeled and enlarged at a cost estimated at $50,000. Wells E. Bennett, local architect, is in charge.

Detroit

DETROIT, July 11.

Within the last year the machine tool market in the Detroit district has declined, one might say, from bucketfuls to thimble measures. Dealers are no longer in a position where they merely take orders, but instead they are "prospecting" for them, in all that the term implies. And before any selling can be done, considerable prospecting has to be done. A review of war-time expansion of both plant space and equipment offers little to cause optimism unless one looks beyond the immediate future.

It is probably true that a majority of plants in the city and State are equipped for future business needs during a period of at least five years, unless there comes another feverish demand for products such as characterized the last three or four years. Such a demand is not forecasted, and consequently dealers are becoming convined that the increase in business, which a short time ago was confidently looked forward to, will be very gradual and the needs for equipment remain moderate for a long time.

Whereas not long ago machines, such as turret lathes, drill presses and other bulky equipment, were sold in "squadrons," it is probable that during the next year, at least, they will be sold one at a time, here and there, and the field will have to be carefully canvassed. It is certain that wherever a machine is sold, the demand will be for every element of service that the manufacturer and dealer can give.

The demand to "deliver whatever you have that can be used on this job" now is changed to "look over my problem first and then deliver what I need to do this work most efficiently and at the lowest cost. If you can't solve my problem to the best possible advantage, I'll have to look elsewhere." This is an experience already widely met with by dealers and manufacturers selling machine tools to automotive parts industries.

When the automotive industry greatly increased the range of possibility in the machine tool field and demanded more specialization, owing to the keen competition for quantity production, the result was that specialization of machines was carried to great lengths and at great cost. Production engineers leaned toward special equipment that would make possible rapid production with the simplest possible operations.

Tools for these special machines were made in the tool rooms of the factories, as required, and as a result were extremely expensive. The expense of custom-built machinery and tools has been much greater than was realized.

But now the time has come when these items of expense must be closely examined. It is probable that automotive production engineers will turn around and demand less specialized machinery and tools, which may be had at less initial cost. Consequently it is probable that we will see machine manufacturers standardizing their products to some extent, at least in connection with the automotive field. The tool manufacturers will also discover a demand for a more standardized line of tools.

Whatever the type of demand that may develop the next year or so, there can be no doubt that manufacturers and dealers must look almost entirely to replacements for their business. It is certain that as much effort will have to be expended in selling one machine as was expended to sell a "flock" of them a short time ago.

According to one dealer in Detroit, the sale of machine tools the last three or four years has been twice as great as it would have been normally. He says that if he can sell during the next year or two 50 per cent of the number of machines sold in war time he will be selling 25 per cent more than he sold five or six years ago.

A great many of the smaller machine shops, which were turned exclusively to automotive parts production during the period of great demand, have been left high and dry by the falling off in the demand for automotive parts. Many of these are turning to other lines of production. This will create a demand for equipment changes, which should result in some business.

The brass-working industry in Detroit and Michigan is gaining. There is a field here for machine tool business that should become richer as time progresses. In fact, there are probably many such fields in Detroit and Michigan that have not yet been touched.

Meanwhile, dealers and manufacturers' agents are getting their organizations in shape, with particular regard to the increased sales engineering facilities which they will require in future, and are establishing service policies. It is observable that many dealers and agents are enlarging their stocks and equipment to make a good showing in the fight for business that is just beginning.

The Illinois Tool Works, Chicago, will soon start work on the construction of additional manufacturing units, duplicating the present plant, at Marysville, Mich. It has more than 100 men working at the Marysville works and the demand for its product is so brisk that various departments are operating day and night shifts. The company makes steering gears, oil pump spiral driven gears, oil pump vertical shaft assembly, speedometer drive pinions and gears, tools, jigs, fixtures and gages.

The Michigan Agricultural College, East Lansing, Mich., will erect a power plant, one story, 50 x 136 ft.

The Acme Chair Co., Reading, Mich., contemplates building a new factory with 80,000 ft. of floor space, and a 300-kw. power plant, at a cost of about $250,000, complete.

The Ann Arbor Mfg. Co., Ann Arbor, Mich., has been organized by Francis L. Lapointe, president, and David A. DeLong, secretary, with a capital stock of $10,000 to make automobile accessories and household specialties. Mr. Lapointe is also president of the American Broach & Machine Co.

The Utility Compressor Co., Adrian, Mich., has started construction of a new plant. It will have a frontage of 240 ft., with wing 70 ft. long paralleling the Wabash Railroad tracks.

The Ross Valve & Mfg. Co., Detroit, has been organized with a capitalization of $20,000 by C. A. Ross, 1263 West Grand Boulevard, C. C. Rosser and S. J. Cameron, to manufacture valves and other mechanical devices.

Bids will soon be asked by L. J. Heeman and F. G. Strauss, architects, 30½ West Pike Street, Pontiac, Mich., for a new one-story foundry, 40 x 50 ft., to cost about $30,000. The name of the owner will be announced at an early date.

The Dennis Wrench Co., Detroit, has been chartered under State laws to manufacture wrenches and tools, and operate a general machine works. The incorporators are Alva L. Dennis, 4081 Seyburn Avenue; A. L. Milham, and Harold E. Hotchkiss.

The Cheney Talking Machine Co., Grand Rapids, Mich., manufacturer of talking machines and now occupying a portion of the former plant of the Berkey & Gay Furniture Co., has tentative plans under consideration for a new plant on local site. No definite time has been fixed for the construction and the project is still in a preliminary stage.

The Regenerator Co., Detroit, has been chartered under State laws to manufacture carburetors, heating equipment, etc. The incorporators are Frank T. Armstrong, G. B. Sayre, and Robert D. Nesbitt, 607 Blaine Avenue.

The Angle Steel Stool Co., Otsego, Mich., is considering the erection of a new plant at Plainwell, Mich., and negotiations are under way for a local site. The initial unit, tentative plans for which have been prepared, will be 70 x 300 ft., and will provide for large increase over the present production. It is planned to remove the existing works to the new location.

Pittsburgh

PITTSBURGH, July 11.

The stagnation in the machinery market still is unbroken. Machine tool dealers report occasional sales of individual tools, usually out of stock and for quick delivery. There are no inquiries from the big steel companies in this district and, while there has been a material improvement in the financial standing of the railroads as a result of economies effected through the wholesale dropping of men and there is a likelihood of further savings from lower wage rates, it is generally expected that it will be at least a couple of months before the carriers will revive old inquiries. The Shepard Electric Crane & Hoist Co., through its Pittsburgh office, has secured a 5-ton monorail hoist and a 2-cu. yd. grab bucket monorail hoist for the Pittsburgh Screw & Bolt Co., and a 1-ton coal hoist for a Youngstown high school. The International Nickel Co. has awarded the Mesta Machine Co. seven gear drives for its new plant at Huntington, W. Va., and also has placed two tilting tables and three roll lathes, the latter with a Pittsburgh district manufacturer. The Duquesne Slag Products Co. is in the market for a 2-ton electric hoist with motor driven trolley. W. S. Read is purchasing agent for this company.

The Crane Co., 636 South Michigan Avenue, Chicago, manufacturer of pipe, fittings, steam specialties, etc., has awarded a contract to the Bates & Rogers Construction Co., 37 West Van Buren Street, for its new pipe and pipe-bending shop at Thirty-fourth Street and the Allegheny Valley Railroad, Pittsburgh, with new warehouse adjoining. It is said that the new plant will cost about $800,000.

Fire, July 3, destroyed the four-story, brick building at Fourth Avenue and Fancourt Street, Pittsburgh, occupied by the Electrical Mfg. & Repair Co., the Raylo Corporation and other industrial interests, with total loss estimated at $50,000.

The Wellsburg Refrigerating Co., Wellsburg, W. Va., has been incorporated with a capital of $25,000 by W. J. Harvey, J. O. Fisher and John R. Elson, Wellsburg, to manufacture refrigerating apparatus.

The Lovill-Dix Co., Mount Airy, W. Va., is arranging for the erection of a new cold storage and refrigerating plant.

The National Pump & Mfg. Co., Wheeling, W. Va., has been incorporated with a capital of $750,000 by John L. Kirkland and W. S. Romaine, Wheeling, to manufacture gasoline pumping equipment. The corporate agent is the Delaware Registration Co., Ford Building, Wilmington, Del.

The Cosmopolitan Mfg. Co., White Sulphur Springs, W. Va., recently organized with a capital of $25,000, will operate a local plant for the manufacture of spark plugs and will purchase steel and brass rods, wire and other products. G. P. Brown is president, and W. M. Sullivan, vice-president.

The Welch Automobile Co., Welch, W. Va., has awarded a contract to the King Lumber Co., Charlottesville, Va., for a new three-story service and repair building, estimated to cost about $50,000.

The Buckhannon Light & Water Co., Buckhannon, W. Va., will commence the erection of the superstructure for its new electric power plant at an early date. Leo Hudson, 808 Wabash Building, Pittsburgh, is engineer. Enoch Bellis is president.

Cleveland

CLEVELAND, July 11.

The McKinley School, Canton, Ohio, has issued an inquiry for about 25 machine tools and quite an assortment of small tools for machine shop equipment for the manual training department, and is also inquiring for complete equipment for a foundry, forge shop and electrical shop. Bids will be received July 29. An inquiry has come from Detroit for 40 to 50 automatic screw machines, but it is stated that the purchase is contingent on the placing of

a large pending order for automobile parts. With the exception of these inquiries the market is dull, although manufacturers of automatic screw machinery report an improvement in single tool inquiries. Sales by local dealers are limited to single tools. Several recent inquiries, involving numerous machines, have not yet resulted in orders. The Empire Rolling Mill Co., Cleveland, has an inquiry out for a 10-ton crane for its new galvanizing department. Among orders placed the past week was one for two 14-in. lathes for the Ohio State University, Columbus, and another for a No. 6 vertical milling machine, purchased by the Erie Stove & Mfg. Co., Erie, Pa.

The following are the principal items on a list issued by the McKinley School, Canton:

Four 14-in. engine lathes.
Seven 12 or 13-in. engine lathes.
One 16-in. plain shaper.
One 16-in. universal shaper.
One 3-in. radial drill.
One 10 x 30-in. cylindrical universal grinder.
One universal milling machine.
One vertical milling machine.
One universal tool room grinder.
One 20-in. upright drill.
One hacksaw.
One wet tool and drill grinder.
One large and one small arbor press.
One dry grinder.
One 2-ton elevating platform truck.
One portable floor hoist.

The Western Reserve Cotton Mills Co., Kent, Ohio, has had plans prepared by Lockwood, Green & Co., Hanna Building, Cleveland, for a three story mill for the manufacture of tire fabric. The project has been held up temporarily but it is expected that bids will be asked shortly. The estimated cost of the plant is about $300,000.

Stockholders of the Hydraulic Steel Co., Cleveland, upon recommendation of the directors, have rejected the plans proposing a merger with the Detroit Pressed Steel Co., Detroit. It was also decided to give up an option taken on the Detroit plant.

The Republic Electric Mfg. Co., 1820 East Eighteenth Street, Cleveland, has placed contract for the construction of a three-story factory and office building, 47 x 57 ft.

The City Council, New Philadelphia, Ohio, has decided to substitute electric for steam pumps at the municipal water works pumping station. City Engineer Arnold was instructed to prepare plans and estimates for the three pumps, each with a daily capacity of 750,000 gal.

Cincinnati

CINCINNATI, July 11.

Practically all of the larger machine tool manufacturing plants are closed. As most of these have made up sufficient stock to take care of needs, judged by the present rate of sales, for the next six months, it is expected that they will remain closed indefinitely. Skeleton forces of picked men are being maintained in the shops for experimental purposes and some greatly improved tools will be on the market within the next year. There has been very little activity the past week. None of the railroads at present are purchasing against their lists before the trade and a list from an aeroplane manufacturer involving approximately $60,000 worth of miscellaneous tools has been withdrawn for the time. A local frog and switch company purchased eight electric hoists the past week. Dealers report scattered orders for tools and a slight increase in inquiries.

The Venue Phonograph & Needle Co., Cincinnati, has been incorporated with a capitalization of $20,000 by Frank Herringer, Frank L. Gamble, W. G. Koch and Joseph W. Silver. While plans have not been completed, it expects to establish a local factory for the manufacture of phonographs and needles.

The Superior Oxy-Acetylene Machine Co., Hamilton, Ohio, has purchased a three-story building at the corner of South Seventh and Walnut streets. This was made in anticipation of future expansion, but will not be occupied at the present time. It is planned to make improvements to the present factory.

The plant of the Solar Metal Products Co., Columbus, Ohio, manufacturer of metal specialties, which has been merged with a Chicago concern, will continue in operation. The new company will be known as the Solar-Sturges Mfg. Co., with head offices in Chicago. C. R. LeSauvage is president and manager of the new concern.

The Clifton-Pratt Co., selling agent for foundry equipment and a general line of new and used machinery, 1224 West Eighth Street, Cincinnati, is in the market for the following used equipment: Two turbo-generator sets, three phase, 60 cycle, 440 volt; two 400-hp. Sterling water tube boilers; one 75-100 kw. unit, three phase, 60 cycle, 220 volt, direct connected to a Skinner, Ball or equal high speed engine; one 1000-hp. Cookson heater, steel buildings approximately 50 x 200-300 ft.

Indiana

INDIANAPOLIS, July 11.

The Pendergast Fence Co., Stillwater, Minn., has plans under way for a new one-story and basement factory on Division Street, Elkhart, Ind., estimated to cost about $25,000.

The American Generator Co., Poseyville, Ind., has been incorporated with a capital of $100,000 by E. D. Fletchall, O. E. Caudell and Valentine Bender, Poseyville, to manufacture electric equipment for lighting, heating and cooking. A branch of operation will be devoted to the manufacture of galvanized tanks and other metal equipment for farm service.

The Indiana Oil Refining Co., Columbus, Ind., will commence work at once on the superstructures for its new oil refinery on a site about three miles from the city. It will consist of five buildings, and with machinery is estimated to cost about $500,000. O. L. Bartlett is president.

The Charles A. Marks Mfg. Co., Elkhart, Ind., has been incorporated with a capital of $50,000 by Charles A. and John Marks and C. A. Thompson, Elkhart, to manufacture automobile equipment and other metal products.

The Mutual Ice & Coal Co., Columbus, Ind., recently organized, has plans under way for a new ice and cold storage plant to cost about $60,000. J. R. Dunlap is president and Courtney Moore, treasurer.

The Crown Fuel Saver Co., Richmond, Ind., has been incorporated with a capital of $50,000 by L. E. and A. H. Harter and J. W. Hansel, Richmond, to manufacture equipment and appliances for fuel saving.

The India Rubber Corporation, 310 West Ewing Street, South Bend, Ind., is completing plans for a two-story addition, estimated to cost about $50,000. W. W. Schneider, 120 South Main Street, is architect.

The Central South

ST. LOUIS, July 8.

The machine-tool business in this section is the quietest the trade has ever known. Most of the industries are closed and no new inquiries are out. The only hope lies in the railroad demand, and it is not known when that will manifest itself.

Fifty additional men were added on July 6 to the locomotive department of the Missouri Pacific shops at Sedalia, Mo.

The Scanlan & Haynes Piston Ring Co. 3001 LaSalle Street, St. Louis, has been organized by Daniel J. Scanlan, Jeremiah J. Hayes and Raymond J. Ambs, with a capital stock of $50,000 fully paid.

The Common Council, Marble Hill, Mo., has preliminary plans under way for the construction of a new municipal electric power plant, to cost about $50,000. C. Alexander, Lutesville, Mo., is in charge.

The Pennsylvania Tank Line, Third National Bank Building, St. Louis, is perfecting plans for an addition, to be equipped primarily for repairs to oil tank cars.

The Mayo Oil Service Co., Eleventh and Front streets, Ashland, Ky., is planning for the erection of a new local oil refinery. The company has recently been organized, with John C. C. Mayo as president and treasurer.

The Terrill Tire & Rubber Co., Clinton, Mo., is planning for the erection of a new two-story plant, 90 x 150 ft., estimated to cost about $65,000, including machinery.

The Curtis-Bentley Woodworking Co., Oklahoma City, Okla., has preliminary plans under way for the erection of buildings to replace its works recently destroyed by fire, with loss of about $500,000, including machinery. A new power house will be constructed.

The Universal Swinging Joint Mfg. Co., Chattanooga, Tenn., has plans under way for a new plant to manufacture flexible metallic pipe and pipe joints. The company was recently incorporated with a capital of $400,000. W. L. Mitchell and J. V. Brandon are heads.

The Farm Club Cold Storage Co., Clinton, Mo., recently organized, is planning for the erection of a new ice-manufacturing and refrigerating plant, estimated to cost about $50,000.

The Raines-Torstrick Co., Louisville, recently chartered, under State laws, will operate a local plant for the manufacture of automobile bodies, with department for general repair and rebuilding work. Verner V. Raines and Edward W. Torstrick, Louisville, head the company.

The Garfield Refining Co., Enid, Okla., has acquired

the properties of the Oil State Petroleum Co., the Penn-Oklahoma Oil Co., and the Healdton Oil Co., all operating in this district, with total acquisition valued at about $4,000,000. The new owner is planning for a number of improvements at the different refineries.

The Magnolia Petroleum Co., Duncan, Okla., has completed plans for the erection of two new one-story buildings at its refinery, 40 x 260 ft., and estimated to cost about $100,000 with equipment.

The Hermitage Marble Works, Nashville, Tenn., is planning for extensive development work in connection with quarrying operations. It has a tract of about 300 acres of coal lands. The installation will include grinding and crushing machinery, parts, etc. Lewis Butler is general manager.

The Missouri Farmers' Association, Kirksville, Mo., is planning for the erection of a series of new ice-making and cold storage plants. Two of the structures at Kirksville and Moberly, Mo., will be built at an early date.

The Missouri, Kansas & Texas Railroad Co., St. Louis, has plans under way for enlargements and improvements in its repair shops and engine houses at Houston, Fort Worth, Smithville and Waco, Tex. F. H. Ringer is chief engineer.

The Pacific Coast

SAN FRANCISCO, July 5.

The feature of the local market is an order being filled by a prominent interest for tools for shipment to New Zealand, involving mostly lathes and drilling machines. On the whole, there is a slightly better feeling in the trade, but the situation is by no means clarified yet. Movement of miscellaneous tools has been fair, and some prospects are in sight. The heavy supply of second-hand stock is still a serious obstacle to business in new machinery, and it is felt that the probable retirement of numerous small operators, by reason of insufficient business, will throw additional used materials on the market.

The Bethlehem Shipbuilding Co., San Fancisco, is arranging facilities at its local plant, as well as at the works at Alameda, Cal., for the manufacture of American-Diesel marine engines on a large scale. J. J. Tynan is general manager.

The Barley Motor Car Co., Kalamazoo, Mich., which makes Roamer cars, has purchased the business and equipment of the Roamer Motor Car Corporation, San Francisco, Cal., for a branch factory.

The B. H. Delay Aircraft Co., Venice, Cal., has been incorporated with a capital of $200,000 by B. H. and C. F. Delay, to manufacture aeroplanes and parts. It is represented by Francis Heney, 1009 Title Insurance Building, Los Angeles.

The S. P. Brick & Tile Co., Fresno, Cal., has been incorporated with a capital of $250,000 to manufacture brick, tile and similar products. A local plant will be established. The incorporators are H. W. Shields, Fresno; W. D. Trewhitt, Hanford, and L. E. Hayes, Exeter, Cal.

M. F. Marsh, Long Beach, Cal., has awarded a contract to Fred E. Tucker, 913 Olive Street, Long Beach, for a new one-story forge shop at 1322 Coronado Street.

The Owens Tire & Rubber Co., Euclid Avenue, Cleveland, is planning the erection of works at Los Angeles, estimated to cost close to $1,000,000. It is expected to give employment to more than 1000 men. Robert Owens is president of the company.

Fire, June 24, destroyed a large portion of the plant of the Swayne Lumber Co., Oroville, Cal., with loss estimated at close to $500,000, including machinery, etc.

The Anderson Ornamental Iron Works, 1143 San Pedro Street, Los Angeles, has filed notice of organization to manufacture iron products. Gustaf A. Anderson, 4516 Gramercy Place, heads the company.

Bagby & Mott, Modesto, Cal., operating an automobile service and machine repair works, are arranging for the immediate rebuilding of the plant, recently destroyed by fire, with loss of about $100,000, including equipment.

The California Wire Co., Orange, Cal., recently organized to manufacture electrical wires and cables, has plans under way for its new factory, one-story, 80 x 134 ft. Louis Koth, president of the company, is in charge.

The Gulf States

BIRMINGHAM, July 11.

The Texarkana Spring Bed Co., Texarkana, Tex., recently organized under State laws, will operate a local plant for the manufacture of bed springs and cots. R. L. Marshall, Dallas, Tex., is president, and L. A. Stewart, Texarkana, secretary and general manager.

The White Eagle Refining Co., Augusta, Kan., is considering the erection of a new refinery in the vicinity of Fort Worth, Tex. A site has been acquired.

The Knowlan Machine & Supply Co., Victoria, Tex., will erect two buildings each about 40 x 75 ft., instead of a single structure, as previously announced, and will remove its present works to the new location. Bids for the buildings, one of which will be equipped as a general machine works, have been received. Frank Knowlan is president and manager.

The Taft Packing Co., Taft, Tex., has completed plans for a new two-story fertilizer manufacturing plant, 65 x 115 ft., and power house. Construction will begin at an early date. H. S. Green, 415 Euclid Avenue, San Antonio, Tex., is architect.

The Reclamation Oil Co., Orange, Tex., has been incorporated with a capital of $2,000,000. Plans for a refinery have been prepared. J. E. Pike is president.

The Baton Rouge Electric Co., Baton Rouge, La., is planning for extensions and improvements in its electric plant and system to cost about $200,000. T. L. Small is manager.

B. A. Lewellen, Florence, Ala., is organizing a company to build a plant for the manufacture of automobile truck bodies. Preliminary plans are under way. The Chamber of Commerce is interested in the project.

The Bronson Mfg. Co., Bronson, Fla., has plans in preparation for the construction of a new electric light and power plant, and ice-manufacturing and cold storage plant. B. B. Stokes is secretary.

The Isthmus Co., Corpus Christi, Tex., has tentative plans under way for the construction of a new gasoline distillation plant, estimated to cost about $150,000 with machinery.

The American Motors Export Co., Jacksonville, Fla., has acquired about 30 acres of land for a new plant for the manufacture of automobiles and parts, to cost in excess of $150,000. Bids for the buildings will be taken at once. Henry L. Innes is president.

The Blue Ribbon Refineries, Box 295, Brownwood, Tex., are planning for the installation of new equipment at their plant, including filters, dryers and other apparatus. P. J. Baney is president.

The El Dorado Refining Co., El Dorado, Ark., is planning for the construction of a new oil refinery comprising two units, each with 1000 bbl. capacity per day. Later the refinery will be increased to a daily output of 5000 bbl. W. J. Brown is head.

Canada

TORONTO, July 11.

The Canadian machinery and machine tool market continues quiet. The demand for all classes of equipment is small and buyers are sending out inquiries only when in need of a single tool for some particular work. The railroads have been out of the market for some time and the makers of automobiles have also ceased to buy equipment. Even the demand for wood-working equipment, which was one of the main features of this market for a few months has dropped off. Second-hand equipment continues in better demand than new lines, but sales are small. Small tools are in fair demand and some good buying has recently been done. Prices continue unchanged.

J. D. Robertson, deputy minister, Department of Public Works, Calgary, Alta., is receiving bids for the construction of a power house to cost $150,000. R. F. Blakey, Parliament Buildings, Edmonton, Alta., is architect.

R. C. Desrochers, secretary Department of Public Works, Ottawa, Ont., will receive bids until July 22 for the supply and installation of an oil engine and generator in the power house at William Head, B. C.

The Standard Paper Box Co., 8 St. Paul Street East, Montreal, is building a factory to cost $200,000.

The lumber mill owned by the Robert Stewart Lumber Co., Wyndham Street, Guelph, Ont., was destroyed by fire with loss to machinery and building of $200,000. It will probably be rebuilt.

W. A. Galbraith, secretary Utilities Commission, Wingham, Ont., will receive bids until July 19, for one pumping unit; construction of pump house, etc.

The Municipal Council, Bagotville, Que., will build a hydroelectric plant to cost $30,000. L. P. Chayer is secretary.

Joseph Langevin, Coteau du Lac, Que., will build a power house and electric line to cost $20,000.

The plant of the Haileybury Brick & Tile Co., Haileybury, Ont., was destroyed by fire June 28, with a loss to building and equipment of $25,000.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.93c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.93c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.03c.
Channels, angles and tees under 3 in. x ¼ in., base	2.93c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.93c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.13c.
Toe calk, ½ x ⅜ in. and larger	3.60c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.03c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.68c.
No. 12	3.73c.
No. 14	3.78c.
No. 16	3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	5.60c.
No. 26	4.40c.	5.65c.
No. 28	4.50c.	5.75c.
No. 30	4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.50c.
No. 16	4.75c.
Nos. 18 and 20	4.90c.
Nos. 22 and 24	5.05c.
No. 26	5.20c.
No. 27	5.35c.
No. 28	5.50c.
No. 30	6.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt...	—46	—30	¾ in. Butt...	—18	List
¾ in. Butt...	—52	—37	1-1½ in. Butt.	—20	— 2
1-3 in. Butt..	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap.	—49	—35	2½-6 in. Lap.	—18	— 2
7-12 in. Lap..	—40	—24	7-12 in. Lap..	— 7	+10

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20	
		Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.80 $6.55
		90 lb....	6.90 6.65
		100 lb....	7.00 6.75
IC..	$10.60 $9.50	IC...	7.20 6.95
IX..	11.80 10.75	IX...	8.10 7.85
IXX..	13.60 12.25	IXX...	9.10 8.85
IXXX..	15.60 14.25	IXXX...	10.50 10.25
IXXXX..	17.20 16.00	IXXXX...	11.50 11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	32c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	24c.
No. 1 solder	21c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 30c. to 33c.

Old Metals

Conditions are generally unchanged, business being practically nil. Values are unchanged. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	8.00
Brass, heavy	4.75
Brass, light	4.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

New York, July 21, 1921

ESTABLISHED 1855 VOL. 108: No. 3

Disposing of Scrap Systematically

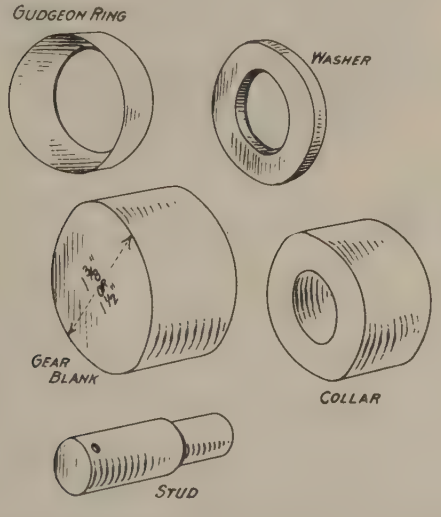
The Crompton & Knowles Loom Works Makes Discarded Material Over Into Other Useful Articles—Scrap Committee Formed

BY GERARD FRAZAR

SELLING waste material as such only when it cannot be made over into another useful article is the recent policy of the Crompton & Knowles Loom Works, Worcester, Mass., which has created a department especially for the economical disposal of waste.

In 1917 this company established within its organization a scrap committee for the purpose of devising means of utilizing to better advantage large quantities of steel and wood scrap accumulating from time to time. Since the committee's inception it has become an important adjunct to the organization as a whole, its field of activity having been materially widened to include anything that can be classified as scrap.

The committee is composed of a representative body of departmental foremen and executives, who are in



Gudgeon Rings Were Produced from Short Pieces of Scrap Pipe. Though not so shown in the sketch, one end of the ring is a very thin edge, while the other end is about ⅛ in. thick. Washers were made from rusted flat steel scrap. Gear blanks, collars and studs were made from short pieces of cold-drawn steel

direct contact with such materials that are used in loom construction from which there results a certain percentage of scrap. Each member has a certain class of material to cover. The principal items are wood, cold-drawn steel, hot-rolled steel and iron, tool steel, pipe and miscellaneous items such as sandpaper, glass rods, solder, etc. The activities of the committee are not limited to material alone, however, for obsolete machine tools, motor trucks, and, in fact, anything becoming inefficient that is owned by the corporation comes under the jurisdiction of this committee, as well. The chairman of the committee is a member of the purchasing department, who is in a position to determine the relative value of articles recommended to be manufactured from scrap material, compared with prevailing market prices.

The committee meets the first of each month and the chairman calls on each member separately concerning scrap produced during the previous month for which he is responsible. A report is then submitted as to the quality of the scrap on hand according to classification. Each class is then considered separately to determine whether or not the salvaging of the respective articles would be advantageous, and at the same time the chairman ascertains the relative value of the material under discussion so that the committee may decide intelligently as to final disposition.

The object in view at all times is to consider the salvaging of all such materials that can be fabricated further and used as a part toward construction of looms or otherwise. During 1920 when materials, especially iron and steel, were costly and difficult to obtain, many hundred dollars' worth of scrap material was salvaged. In addition, greater care in working up material developed throughout the various departments in this large plant, thus resulting in an additional saving.

Salvaged material is properly cared for in stockrooms, where men in charge are familiar with department raw material requirements. When requisition is made at the stockroom for material it is the duty of the one in charge there to apply salvaged material whenever possible. The labor charge of working up salvaged material naturally is larger than it would be otherwise, but not sufficiently so to more than offset the saving in raw material costs. Workmen much prefer not to handle salvaged material, consequently there is the tendency to eliminate it as much as possible.

In the company's foundry a Make-Every-Ton-Count-Committee is incorporated to work in conjunction with the main plant reclaim committee. Its purpose is to make every piece of casting from a mold count for something. The day of workmen carelessly throwing castings against other hard substances, and large percentages of breakage, has passed. The welding department is materially reduced as a result. Not only is breakage much smaller, but better castings have resulted, thereby increasing the efficiency of the foundry organization.

Ways of disposing scrap materials are varied. It is not always possible to net the company a profit, especially on falling markets, but instances cited here illustrate the resourcefulness of committee members in the early part of last year. Previously, wood scrap was sold to employees at a nominal price representing a loss to the company, or was consumed in the boiler department. The committee classified the scrap, selling four cars of ash butts at 4c. per ft., netting a profit,

and apple wood butts to manufacturers of handles. Such accumulations of wood pieces that cannot be further used are sold to employees during the summer months at a small price which barely covers the cost of handling.

The committee is at present considering whether or not it would be profitable to invest in a machine for separating shavings from sawdust, there being a ready market for the latter. Worn out sandpaper rolls yield 4-in. to 6-in. strips, which are cut into convenient pieces for general hand purposes. Short pieces of glass rods are sometimes used to advantage in the production of Jacquards, while scrap paper is sold at prevailing market prices. Solder, accumulating in the emery wheel department, is reclaimed and used in babbitting boxes and in lead hammers. All used files are sent away and recut at a cost of less than 15c. each. Last year the company saved about 25 per cent in its file purchases by using recut files, and, in, addition, disposed at a good price of recut stock after worn out.

At one time there was an accumulation of several thousand pounds of rusted flat steel scrap on hand. From this a supply of washers was obtained at comparatively little expense and at a period when deliveries of washers were uncertain. Obsolete sizes of high-speed tool steel and of high-speed steel drills and reamers have been converted into usable sizes, 1 in. to 1½ in. Short pieces of cold drawn steel, nothing less than 14 in., are stored in separate racks according to size. When possible, they are used in the production of studs and collars. Pieces 1½ in. and 1 15/16 in. in diameter sometimes are used in making upright shafts, and pieces 1¾ in. in diameter welded and used for bottom shafts. Short pieces 1⅜ in., 1 3/16 in. and 1½ in. in diameter commonly are utilized in making gear blanks and collars, while pieces 1 15/16 in. in diameter have been welded and used for girts for worsted looms.

The company annually consumes a considerable tonnage of pipe. Its disposition of smaller sized scrap pipe offers an illustration of the thoroughness of the committee's methods. It decided gudgeon rings could be produced from 1¾-in. and 2-in. short pieces in place of malleable iron rings, when conditions warrant, to considerable advantage. In 1920 there resulted a saving of 1.31c. each and 3.08c. each on the No. 37 and No. 47 rings, respectively, in that these were produced from short pieces of pipe, as against the purchase price of malleable iron rings.

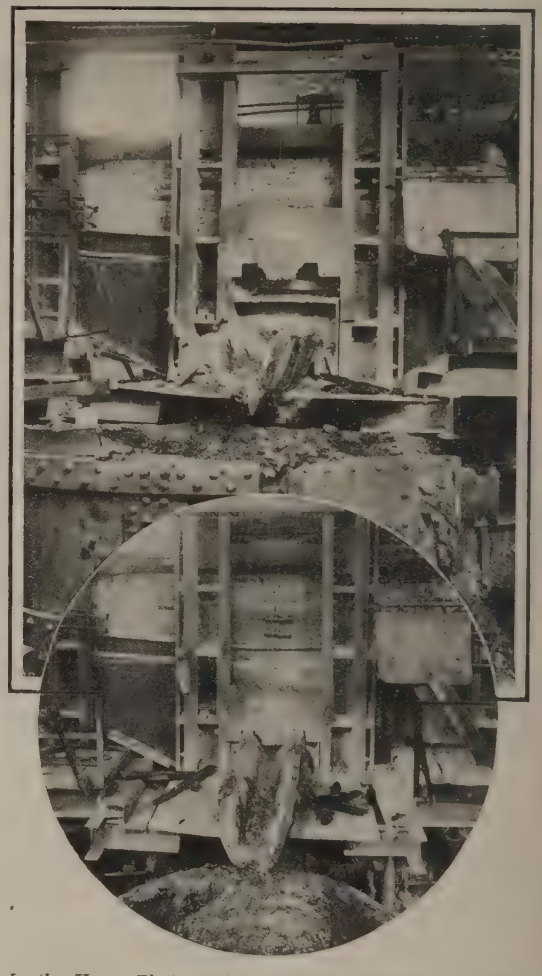
Salvaged pieces of 2-in. channel iron are used for reinforcing and repairing transportation platforms for shipment of looms. Interesting problems come up before the committee, which are outside its jurisdiction, and assigned to proper plant executives or committees.

It should not be construed that the reclaim committee permits indiscriminate working up of salvaged material to the detriment of manufacturing costs. As a matter of fact working up costs, as related to raw material and scrap material prices, constantly are compared by members of this committee with a view to determining the most advantageous manner of disposing of property. If, for instance, the market for gear blanks is such that it is cheaper in the end for the company to buy from outside interests rather than work up salvaged cold drawn steel stock, scrap material is sold at going prices. Care also is taken not to overstock on products derived from salvaged material. Whether the committee can save money for the company this year is problematical, due to liquidation of raw material markets in general. It nevertheless is serving its purpose, for ways and means are being constantly studied and put into practice whereby waste is eliminated as much as possible, which, of course, means a saving to the Crompton & Knowles Loom Works.

American Consul W. Duval Brown reports from La Paz, Bolivia, that an American concern has recently purchased tin ore lands in Bolivia valued at about $2,000,000. He states that the output of this property is not large and that it has little effect on the total Bolivian output.

Kinney Tapping-Hole Shield

A tapping hole shield, consisting of a steel plate with a fringe of chains, has been developed by Charles L. Kinney, Jr., superintendent of the open-hearth department, Illinois Steel Co., South Chicago, Ill., for use on open-hearth furnaces, blast furnaces and at the capping and uncapping platforms in Bessemer plants. The company has found such a shield effective for preventing burns from molten metal.



In the Upper Photograph the Shield, Consisting of Plate and Chains, Is Raised. Below, it is in position ready for tapping

The shield is attached to the open-hearth furnace by angle irons bolted to a buckstay on each side of the furnace spout and is operated by pulleys and weights. The fringe, or guard of short chains in the center, is made of ¾-in. links to fit the tapping hole.

According to Robert J. Young, manager department of safety and relief, Illinois Steel Co., this shield was developed in 1917. The shield formerly used was known as the Conway shield, which covered the tapping hole only partly. After a second helper at No. 1 open-hearth was burned in a break-out of the heat, Mr. Kinney evolved the protector described. Experience with this shield has demonstrated that even though a heat does break out while the hole is being opened, the workman is protected by the Kinney shield.

Dam Contracts Awarded

BIRMINGHAM, ALA., July 18.—The Alabama Power Co. has let company railroad and other contracts for building the $8,000,000 Mitchell power dam on the Coosa river and work has begun. The dam is to be completed in two years. It will have initial installation of 60,000 hp. with eventual of 120,000.

Explosion Hazard and Its Prevention

Analysis of Characteristics of Fuels and Other Combustible Materials, with Special Reference to Powdered Coal Installations — Explosive Mixtures and How They Are Formed

BY JOSEPH F. SHADGEN*

EXPLOSION hazards in all industries treating purposely with dust of all nature, or dealing incidentally with it, have recently received special attention through the joint efforts of the United States Department of Agriculture and the Bureau of Mines. An educational campaign familiarizing manufacturers with the dangers due to the possibilities of explosion caused by dust has been carried on. It has been pointed out that fire hazards are distinctly different from explosion hazards, and that the same precautions do not guard against both calamities. This seems contradictory, but the facts are undeniable.

Last December the Industrial Commission of Ohio called to Columbus several powdered coal equipment manufacturers, and some users of that method of burning coal, to discuss the explosion hazards in connection with pulverized coal. Several accidents had occurred in that State and the authorities sought a multitude of opinions, dealing with the problem from all stand-

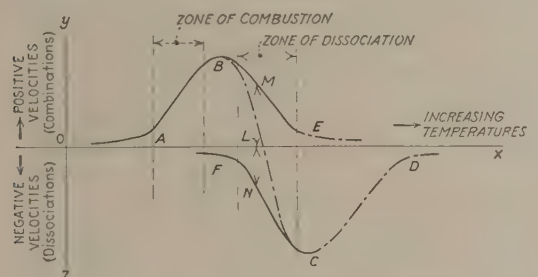


Fig. 1. Variations in Velocities of Reactions

points, before making preventive recommendations to the legislature. In conjunction with that meeting the writer made a short investigation of the subject for a New York concern.

Complete absence of comprehensive literature explaining the problem involved, or dealing with the subject from the safety standpoint, are the reasons for this independent study. A mass of material is loosely spread in different publications of all nations, as explosion problems have been investigated for a number of years in conjunction with military objects, and for safety purposes in mining. The classic studies of Mallard and LeChatelier on the danger of "fire damp" are known to the whole technical world. The object of this essay is to co-ordinate in comprehensive form the knowledge gleaned from various sources.

That a theoretical study of the problem is necessary will hardly be denied by anybody, in spite of the sarcastic sneers of some hard-headed business men, who always point out the difference between theory and practical experience. Only exact and full knowledge can father remedies of real value, as compared with the hit-and-miss precautions due to slow practical evolution. There is no difference between real science and practical facts. It is the half-knowledge that is too often misleading.

Explosions—Fires—Oxidation Reactions

All explosions, as well as fires, are in last analysis the result of an oxidation, meaning the chemical combination of a material with the oxygen of the air. Hence the study of those chemical reactions forms the foundation of all research.

All chemical reactions are due to affinity of one material for another, and the release of this energy always produces either an absorption or a generation of heat, another form of energy. If heat is generated the reaction is called exothermic, while endothermic reactions are those which absorb heat. It must be emphasized that the heat phenomena are only the effect, not the cause of the reactions.

Most oxidation reactions are exothermic; in other words, they produce a surplus of heat, specific to each case. Table 1 is a compilation of the results of oxidation of various material, as found experimentally by investigators.

Reversibility of Reactions

As a typical example of an oxidation, let us take

$$CO + O = CO_2 \qquad (1)$$

oxide of carbon in presence of oxygen producing carbonic acid. It is well known that the result of that reaction can be destroyed either by dissociation, caused by a considerable increase in temperature, as expressed by

$$CO_2 = CO + O \qquad (2)$$

or by the influence of a third body, whose presence disturbs the balance (catalytic action) also expressed by

$$CO_2 = CO + O \qquad (2)$$

or by the interference of a third body producing a new reaction called reduction

$$CO_2 + C = 2\,CO \qquad (3)$$

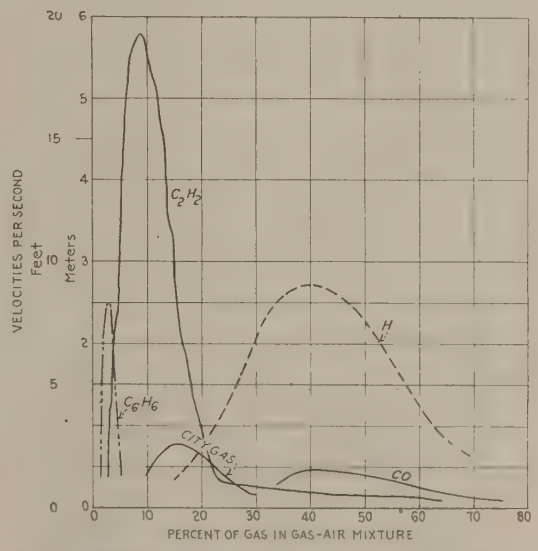


Fig. 2. Relative Inflammability of Certain Air-Gas Mixtures, Showing Upper and Lower Limits of Percentages at Which the Gases Are Actively Combustible

This seems to prove that it is more accurate to write

$$CO + O \rightleftarrows CO_2$$

meaning that most of the chemical reactions are reversible and that the direction depends entirely upon the conditions under which the reaction takes place.

Intensity of Reactions

It follows that, if outside factors govern the direction of most of the reactions, either positive one way or negative the other way, these same conditions will influence their intensities. If a certain number of molecules of CO are in presence of O, they may combine one at a time, ten at a time, one hundred at a time or all at a time. In other words, the velocity of reaction, representing the ratio of the number of molecular reactions actually taking place per unit of

*Consulting engineer, New York.

time to the number of molecular reactions possible, may be great or small, depending on favorable conditions or retarding circumstances. This velocity of reaction expresses the speed at which the phenomena take place and is of the greatest importance in all practical applications.

The temperature, reflecting the heat concentration

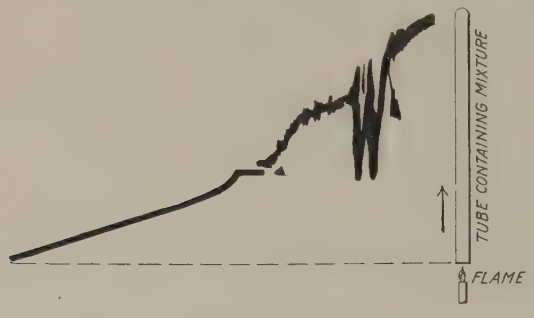


Fig. 3. Schematic Representation of Vibrating Character of Flame Propagation

of the reacting materials, influences most of the velocities of the chemical changes. An increase in temperature usually accelerates the speeds at which the oxidations occur, and a decrease of temperature reduces those velocities. This well known and accepted fact led to the theory of the absolute zero temperature (— 273 deg. C. or — 459 deg. Fahr) where all reaction-velocities are nil, where absolute lethargy exists and no combinations of any nature are possible.

In all exothermic reactions the temperature is increased, as the heat generated is usually superior to the loss by transmission to the neighborhood; this causes the speed to reach a point where the intensity of the reaction becomes violent and visible, and all combustion phenomena of industrial value are quick oxidations of fuels, accompanied by the production of light and fire.

Similarly it is found that endothermic reactions do require certain temperatures which, if reduced, slow down the phenomena and often cause its freezing up.

These variations of the velocities of reaction are often graphically represented as in Fig. 1. Suppose *OX* the line of increasing temperatures, *OY* the line of positive velocities and *OZ* the line of negative velocities, and consider the case of the exothermic reaction (1). With increasing temperature the velocity rises gradually but slowly along *OA*. From *A* the velocity increased rapidly along *AB*, and that zone, of great industrial importance, is called "zone of combustion," in the case of a fuel. If the temperature continues to rise, the speed drops along *BE*, while the opposite reaction according to formula (2) starts with increasing intensity, as indicated by *FC*. That belt is called "dissociation zone," where variable proportions of *CO*

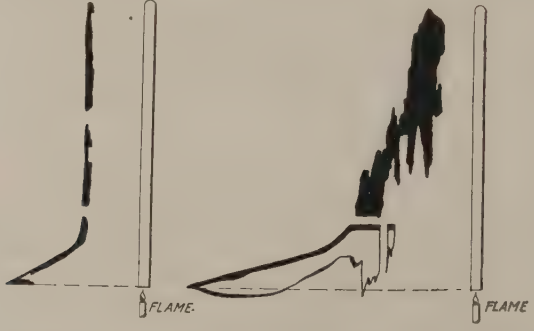


Fig. 4 and Fig. 5. Typical Examples of Sudden, Explosive Combustions

and CO_2 mixed are in equilibrium, according to the temperature level. The reaction (2) reaches its maximum intensity at *C;* after that temperature the velocities diminish gradually, as graphically expressed in the curve *CD*.

Study of this example brought out the existence of a certain temperature (point *A*, Fig. 1), called temperature of reaction, that marks a noticeable increase in the intensity at which the combination takes place. For fuels this is usually called temperature of ignition, and corresponds to the lowest temperature assuring the continued combustion of the fuel. At the temperature of ignition the oxidation of a few molecules generates enough heat to maintain the heat level high enough to guarantee the continuity of the reaction at high speed. For a large number of materials this temperature has been determined experimentally under various test conditions, using different principles, of which Table 2 gives incomplete compilation. Besides the temperature, the speed of reaction of many materials is influenced by the pressure and the presence of foreign materials such as platinum, or large cooling surface, etc., that may accelerate or retard the intensity, according to circumstances.

It follows (1) that oxidation of a material can take various forms, involving the time factor, and the difference between combustion or fire and an explosion is merely a matter of seconds or fractions of a second; (2) that explosions are not only not limited to fuels in the industrial sense, but that under certain circumstances the hazard exists with all materials liable to oxidation.

Close Contacts for Intense Reactions

All chemical affinities are active only at close distances. It is well known that gases react more quickly

TABLE 1
Heat Generated by Oxidation Reactions

Material	Symbol	Combinations with Oxygen	Kg. Cal. per Mol. Gram	Kg. Cal. per Kg. Material	Kg. Cal. per Kg. Oxygen
Aluminum	Al	Al_2O_3	380.2	7,014.7	7,920
Phosphorus	P	P_2O_5	370	6,014	4,624
Ethylene	C_2H_4	$2\,CO_2+2\,H_2O$	333.3	11,904	3,472
Acetylene	C_2H_2	$2\,CO_2+H_2O$	310	11,923	3,875
Methane	CH_4	$CO_2+2\,H_2O$	211.9	13,243	3,311
Silicon	Si	SiO_2	184.5	6,496	5,766
Magnesium	Mg	MgO	143.3	5,970.8	8,956
Potassium	K	K_2O	97.1	1,240	6,069
Carbon	C	CO_2	96.96	8,080	3,030
Sodium	Na	Na_2O	91	1,978	5,687
Zinc	Zn	ZnO	85	1,307	5,312
Iron	Fe	FeO	75.7	1,350	4,725
Sulphur	S	SO_2	71.1	2,222	2,222
Oxide of Carbon	CO	CO_2	67.96	2,427	4,228
Tin	Sn	SnO	67	568	4,225
Hydrogen	H	H_2O	58.1	29,050	3,630
Copper	Cu	CuO	37.2	585	2,325

than liquids, and that liquid solutions combine more easily than solid materials. This is because the intensity of the reaction is a matter of close contact; each molecule has to find its mate without physical difficulties. As the molecules of gases mix by diffusion, and present an enormous surface of contact, their reaction possibilities are the least interfered with by the material form.

That is why combinations of gases are controlled with great ease, why the laws governing reactions are studied on typical gaseous mixtures, and why for many industrial purposes solids and liquids are transformed into quasi-gaseous material by vaporization and pulverization to obtain better and quicker results. This is particularly true for oxidation reactions, because in most applications the oxygen is supplied by the air, its most economical form.

The second part of the study is therefore clearly defined and reduced to the analysis of how mixtures of air and materials liable to oxidation behave under conditions practically possible. These mixtures may be gas and air, such as hydrogen, methane, oxide of carbon, coke oven gas or producer gas and air; liquids and air, such as alcohol vapors, gasoline evaporates, sprayed oil or atomized kerosene and air; solids and air, such as finely pulverized coal; sawdust; flour meal or metal flakes floating in the air. These are only a few practical examples of the same principle. An individual study will bring out the specific peculiarities of each class.

All mixtures are characterized by two main qualifi-

cations that have the greatest influence on their properties; these are their ratio of constituency and their uniformity. Two materials may be mixed in any proportions; the ratio of volumes or weights of the one constituent against the other is of greatest importance; and, expressed by the density of the mixture, the concentration or dilution of one material in the other. Furthermore, as the materials mixed may have different specific weights or may present various specific tensions, it can easily be understood that within a given volume the constituents may be segregated or stratified. The uniformity of mixture has a very definite influence on the reactions that are liable to take place, and their intensities as well.

TABLE 2
Temperatures of Ignition of Some Materials

Material	Conditions of Experimentation	Source of Publication	Temperature of Ignition	
			Deg. Cent.	Deg. Fahr.
Oxide of Carbon	$CO+O+CO_2$	Mallard	700	1,292
	$2\ CO+O_2+N_2$	Falk	644	1,191
	30% CO+70% Air	Mallard	654	1,209
Hydrogen	$2\ H_2+O_2+4\ N_2$	Falk	649	1,200
	30% H_2+70% Air	Mallard	555	1,031
Methane	$CH_4+2O_2+N_2$	Mallard	650	1,202
Acetylene	.....	.....	450	842
Alcohol	Air Mixture	Holm	450	842
Gasoline	Air Mixture	Constan	510	950
Kerosene	Air Mixture	Constan	380	716
Benzine	Air Mixture	Constan	350	662
Mazut	Air Mixture	Constan	380	716
Fuel Oil	Air Mixture	Constan	430	806
Tar Oil	Air Mixture	Constan	600	1,112
Benzol	Air Mixture	Holm	520	968
Lubricating Oil	Air Mixture	Holm	400	752
Lignite	Air Mixture	Holm	250	482
Coal	Air Mixture	Holm	390	734
Anthracite	Air Mixture	Holm	440	824
Dextrine	Air Mixture	Price	540	1,004
Sulphur	.....	Bacon	248	478

REMARK: Temperature of Ignition and Flash Point of Liquid Fuels differ.

To Avoid Combustible-Air Mixtures

Before going further it seems logical to draw an *a priori* conclusion by recommending as best precaution against fires and explosions the avoidance of all mixtures of air with combustible matter. Thus will all danger be guarded against. Logical it is, but not practical, because these inflammable mixtures are often purposely wanted, to obtain a definite industrial result while sometimes their existence is accidental or incidental to a process. Therefore this radical precaution has to take the more tolerable form: "Reduce dangerous mixtures of air with combustible material, as much as possible."

This general principle is clad in innumerable forms in the various industries, such as: Keep gas conduits tight, because not only will gas be saved, but unnecessary mixtures of gas and air, that may create a hazard, will be avoided. Store inflammable liquids in tight reservoirs and keep the cover on the gasoline tank, because vaporization will not only produce a loss of fuel, but also create a dangerous air-vapor mixture. Reduce the production of dust in factories, avoid whirling up of dust clouds, because they are objectionable from the hygienic standpoint of welfare to workmen, and they may create a hazard if the material is of oxidizable nature. Therefore, it should never be forgotten that to prevent all unnecessary inflammable mixtures is the first elementary rule of safety.

TABLE 3
Upper and Lower Limits of Inflammability

Gas	Reaction Formulas (With Volumes)	Ratio		Theoretical Mixture	Limits of Inflammability	
		Gas	Air	Percent of Gas	Percent of Gas in 100 Percent Mixture	
					Lower	Upper
Hydrogen	$2\ H_2+O_2+4\ N_2$ (2+1+4)	2	5	28.6	10	70
Carbon Monoxide	$2\ CO+O_2+4\ N_2$ (2+1+4)	2	5	28.6	16	75
Methane	$CH_4+3\ O_2+12\ N_2$ (1+3+12)	1	15	6.25	6	16.5
Acetylene	$C_2H_2+3\ O_2+12\ N_2$ (1+3+12)	1	15	6.25	3	65
City Gas	1 cu. m., about 5000 Cal. or 1 cu. ft., about 565 B.t.u.	1	6.5	13.5 (about)	8	25
Water Gas	1 cu. m., about 2600 Cal. or 1 cu. ft., about 300 B.t.u.	1	33	30 (about)	15	32

Gas Mixtures—Methods of Flame Propagation

Suppose a combustible mixture of two gases such as city gas with air, and let us raise its temperature locally to the ignition point, either by an outside flame, such as a Bunsen burner, or by an electric spark. The ignition will be propagated to all the mixture. The time from start to the ignition of the last gas molecules is called the duration of the phenomenon. In dividing the distance between the first and last point of ignition by the time of duration, a ratio will be obtained called average velocity of propagation of the flame, or flame velocity. In a uniform and quiet mixture the flame will spread until it reaches the sides of the receptacle in all directions; the surface of advance will have a spherical form. For ease of experimentation these phenomena have always been studied in cylindrical tubes, that permit a linear study of the phenomena.

Mallard and Le Chatelier used in their pioneer experiments tubes from 10 to 40 mm. (⅜ in. to 1½ in.) inner diameter, 1 to 3 meters (3 to 10 ft.) long, closed at one end, open at the other. After the mixture had been introduced a Bunsen gas flame was brought close to the open end to produce the ignition, and the results were determined by the photographic impression of the light on a film strip moving at a known velocity.

TABLE 4
Variations of Flame Velocities of Various Gas-Air Mixtures (after Le Chatelier)

Hydrogen H	Percent of Gas	8	10	20	30	40	50	60	70	75
	Velocity in M. per Sec.	0	0.6	1.9	3.3	4.3	3.4	2.3	1.1	0
	Ft. per Sec.	0	1.97	6.23	10.8	14.1	11.2	7.55	3.61	0
Methane CH_4	Percent of Gas	5	6	8	10	12	14	15	16	17
	Velocity in M. per Sec.	0	0.03	0.23	0.42	0.61	0.36	0.2	0.1	0
	Ft. per Sec.	0	0.1	0.75	1.25	2.0	1.18	0.66	0.33	0
City Gas	Percent of Gas	7	8	10	12	15	17	20	24	25
	Velocity in M per Sec.	0	0.3	0.5	0.7	1.05	1.3	0.8	0.4	0
	Ft. per Sec.	0	0.98	1.64	2.3	3.44	4.27	2.62	1.31	0
Acetylene C_2H_2	Percent of Gas	2.8	3	5	7	9	15	22	40	65
	Velocity in M. per Sec.	0	0.2	2	4	6	3	0.4	0.22	0
	Ft. per Sec	0	0.66	6.56	13 1	19.7	9.84	1.31	0.72	0
Carbon Monoxide CO	Percent of Gas	16	20	25	30	40	50	60	70	75
	Velocity in M. per Sec.	0	0.2	0.4	0.6	0.5	0.35	0.2	0.1	0
	Ft. per Sec.	0	0.66	1.31	1.97	1.64	1.15	0.66	0.33	0

The first observation was that gas mixtures of the various natures tested are characterized by a uniform flame velocity so long as the equilibrium of the gas mass is not disturbed by secondary effects, such as cooling of walls, currents within the gas volume or vibrations of the mixture.

These flame velocities have been found experimentally for various gases, CH_4, H, CO, water gas, city gas. The densities of the mixtures were varied and it was found that if the concentration or dilution of the gas in the air were too great no propagation occurred; this led to the conception of the upper and lower limits of inflammability. Table 3 is a compilation of these limits for various gases mixed with air. Beyond and below these proportions it was impossible to maintain any flame, and no ignition of the mixture occurred. These data have an important industrial value, as they form precise information for guidance. It is regrettable that no figures are available for industrially important gases, such as natural gas, coke oven gas, clean producer gas, etc.

Table 4 is a compilation of experimental results made to find the influence of the mixture densities on the flame velocities. These data are only indicative, as the results of each test depend on the diameter of the tubes used and other circumstances. Especially

with *CO* are difficulties encountered, because its flame is hardly visible and the photographic impressions are not clear. If the same gases are mixed with pure oxygen the reactions are greatly activated and the velocities increased with *H* up to 22 meters (72 ft.) per sec., with *CO* up to 2 meters (6½ ft.) and with C_2H_2 up to 200 meters (656 ft.). Fig. 2 reproduces in diagrammatic form the results of Table 3. It must be emphasized that these results have only relative value, and that not all experimenters are in accord on individual figures. The problem is so complex that it would be surprising if it were otherwise.

This simple method of propagation of the flame is explained by Mallard and Le Chatelier by the direct heat transmission; each zone ignites its neighboring strata by heating them up to the temperature of ignition through contact and radiation.

The second observation was that, under certain circumstances, the propagation of the flame took the form of a vibrating motion with a greatly increased average velocity. Fig. 3 reproduces schematically the film impression recorded of this phenomenon; it must be remembered that these very rapid oscillations sometimes reach 100 per sec. In the diagram the difference between the two methods of propagation is clearly visible. These vibrations seems to be due to local compressions caused by temperature increase, and disturbances of the quiet equilibrium of the mixture.

A third distinct observation was made by Berthelot and Vieille; during their experiments the velocities sometimes increased above 1000 meters (3280 ft.) per sec. to as high as 2800 meters (9200 ft.), and the propagation took the form of an explosive wave. These experiments have been repeated by Dixon, who found that the explosive wave phenomena never could be produced gradually. They were always sudden occurrences, of which the sketches of Fig. 4 and Fig. 5, copied from photographic records, are typical examples. Explosive waves are always accompanied by enormous pressures that make experiments difficult and dangerous, as the effects of such waves are always destructive. The existence of these extremely quick combustion reactions is explained by self-ignition of all strata of the mixture, due to the pressure created by the large volumes of high temperature gases. These explosive waves hardly occur with air mixtures; in the laboratories they are always produced with pure oxygen, but the possibility of their occurrence always exists when high pressures exist.

Concentration versus Dilution

From these theoretical data we can draw the practical conclusion that, if inflammable gas mixtures are created, their inflammability can be counteracted by either a too great concentration or a too high dilution, as under those circumstances the flame is not transmitted. In the one case the fire dies from want of oxygen, in the other from lack of combustible. Furthermore, it has been shown that explosions become particularly destructive if the expansion due to the changes in temperature are interfered with. In those cases the gases will be compressed, which increases considerably the reaction velocities and may give birth to an explosive wave causing destruction.

In industry this has been recognized, and so-called explosion doors or flap valves or safety traps are provided, in all gas mains, which open automatically to relieve any possible excess pressure inside the line in case of fires or local combustion. A third point of precaution is the prevention of an ignition through an outside source. If no kindling takes place, if fires are kept away, if electric sparks are made impossible, the danger can lie only inside, through self-ignition, which has to be prevented also by all means.

All these prescriptions are known to the gas industry in all fields, be it city gas, producer gas or blast furnace gas, and experience has proved to those interested that they have to be rigorously observed to guarantee the safety of the operators and to maintain the equipment in working condition.

In fuel gas engineering the combustible gas is never mixed with air except at its immediate point of utilization. The two gases (air and fuel) usually meet only within the burners, close to the furnaces themselves, and their combination is therefore progressive. In fact, the greatest care is taken to prevent the existence of any mixture in the distribution lines that might create a hazard. This applies to acetylene welding as well as the autogenous cutting torches with hydrogen gas, to water gas burners as well as open-hearth furnace ports.

(To be concluded)

Electrical Machinery Manufactured

WASHINGTON, July 18.—Manufacturers of electrical machinery and apparatus in 1919, according to figures issued by the Census Bureau, amounted to $1,014,373,000, compared with $359,432,000 in 1914, an apparent increase of 182 per cent. But it must be remembered that unit prices in 1919 were far higher than in 1914. With "index" at 87 in 1914 and 161 in 1919, the 1919 product, on the basis of 1914 prices, would have been about $548,139,000, the corresponding increase being 52½ per cent.

In the following table are the reported figures for the total and for the principal items of interest. The great development of household electrical devices will be noted; also the effect of the wireless upon the production of telegraph apparatus. Automobiles accounted for much of the growth of batteries.

	1919	1914
Number of establishments	1,483	1,121
Value of products	$1,014,373,000	$359,432,000
Of which—		
Motors (not including starters or controllers)	116,898,000	44,176,000
Generating apparatus and parts	86,266,000	23,233,000
Insulated wire and fittings	84,217,000	69,506,000
Batteries, storage, dry, liquid	92,506,000	23,402,000
Incandescent lamps	59,372,000	17,350,000
Magneto-ignition apparatus, etc.	47,389,000	22,261,000
Telephone apparatus	46,340,000	22,816,000
Telegraph apparatus, all types	12,816,000	2,248,000
Industrial and household apparatus and devices	54,998,000	4,049,000
Transformers and feeder potential regulators	31,691,000	13,120,000
Electric locomotives	8,161,000	3,721,000

Blast Furnace CO Not Permanently Harmful

Frequent exposure to carbon monoxide causes headache and malaise, but no evidence has been found of a cumulative harmful effect, according to a report of Dr. Henry S. Forbes, Division of Industrial Hygiene, Harvard Medical School, published in a recent issue of the *Journal of Industrial Hygiene*. The report is based on a survey of metal mines, coal mines, blast furnaces and producer gas boilers and engine rooms in eight states. "Carbon monoxide," says the report, "as met with in metal and coal mines and about blast furnaces in this country rarely causes late after-effects following acute severe gassing. When such effects do appear, there is evidence, almost always, of a pre-existing pathological condition. A recent advance in treatment has been made by adding carbon dioxide to the oxygen inhalations administered. Recovery is three times as rapid as when oxygen alone is used."

Shipyard Wages Cut

Wage reductions, effective Aug. 1, or shortly thereafter, have been planned in nearly every shipbuilding district between Maine and Texas. The plan includes complete reclassification of labor, and adjustment of wage scales according to ability. The cut will affect both piece work rates and hourly rates for it is pointed out that, except for a 10 per cent cut in March, the wartime rates have been maintained.

It is expected that the Delaware River district will be first affected, announcements having already been made that the new scale will be put into effect Aug. 1 by the New York Shipbuilding Corporation, Merchant Shipbuilding Corporation and Sun Shipbuilding Co. It is stated that a still further cut may be required, if the new scale fails to reduce construction costs enough to meet competition.

The Fore River Works, Quincy, Mass., Bethlehem Shipbuilding Corporation, is to cut its working force one-third, bringing it down to approximately 5000. A reduction in wages, amounting to 15 per cent, goes into effect July 15.

Percentage of Defective Castings Too High

Many Foundry Losses Could Be Prevented by the Proper Study of the Human Factors—Responsibility of the Purchasing Department

BY HERBERT W. RAMP*

EVERY person intimately connected with the foundry industry realizes the importance of the entry "Defective Castings" in the records of the business and views the percentage with apprehension when it begins to ascend. This is the most constant point of leakage in the foundry and shows a clear-cut wastage that is often quite unjustifiable.

Defective castings are to the foundry what leaky containers are to the shipper. They stand out as a tangible loss that never fails to impress the executive. They may run at an ordinary average for months and then, without apparent cause, burst forth like a regular epidemic, causing expensive analysis and attention. Equipment will be changed, material rejected, or men replaced in the effort to correct the condition, and often the troubles will be ironed out until it seems that defective work will be the rare exception, when suddenly out of a clear sky the trouble will start again and refuse to yield to the treatment that cured it before and another cycle of loss and delay will follow.

An excessive proportion of bad castings is a menace to the successful conduct of the business, for it interferes with two most important fundamentals—production and low cost. A foundry must have a reputation for promptness in deliveries in order to procure and hold trade, as well as be in line on the price question.

It is scant satisfaction to a customer to know he gets a slightly superior quality, or a little lower price, if he cannot get the material to fill the orders on his books, or maintain his schedule because the foundry has made so many defective castings, and it is equally galling to the management to see its profits absorbed by this item.

The old questions are still being asked: "Why is it that 5 to 15 per cent of the castings made have to go back to the cupola as scrap?" "Why can a molder make ten good castings and then lose five?" "Has the foundry business no real foundation for its practice?" One answer often given, "It is the human element," has more significance than is usually accorded it and some points in its application may be profitably considered.

The Foreman Factor

There are few standards or definite formulas in foundry work. Every foreman is a law unto himself. He has been educated, not in the school of chemistry or mathematics, but in first-hand experience. No one prescribes for him how his sand must test, what percentage of moisture it may contain, or how he must pour or vent a certain piece. He has worked on certain lines with certain material and produced satisfactory results; he naturally feels that he is the Moses to lead the way out of the wilderness, and often a temporary success makes him feel his judgment is infallible. He closes his eyes and ears to what others are doing, with the result that when trouble comes he has nothing but his own experience to fall back on. He has contested or discounted every other man's efforts until he is unable to absorb others' ideas, and he has to stand or fall upon his own necessarily narrow information.

This is the first "human element" in the foundry—the mind that directs the practical operations. The foreman must be broad enough and clear enough of vision to keep in touch with the progress and development made by his men if he expects to conduct the business profitably.

Variables in the Workman

Again, workmen in the average foundry do little routine or automatic work. They may be employed upon the same class of product, or even the same pattern, but the changes in the material or conditions, the character of the operations, the dependence of one branch of the work upon another, call for the constant exercise of judgment on every casting made. The molder must make the casting, not as the contractor builds the house, according to plans and specifications, but so that the completed casting will be satisfactory. He may often be called upon to make one that has never been molded before, for which there are no gages or templates, text books or standards to guide him. He must be the pioneer and blaze his own way to success. His judgment and interest in his work make him a good mechanic or a poor one.

Coupled with these variations of work, a great influence is exerted by the physical and mental condition of the workman. His habits of life, his health, the state of his home life, all have a bearing on the quality of the work he produces, and this "human element" demands that the foreman study the individual ability and habits of his men to determine their fitness to produce the kind of work desired.

Because a certain molder is paid the ruling rate of wages or has served a regular apprenticeship at the trade does not decide that he is capable of making a good automobile cylinder, or a lathe bed. Hire and educate a hundred molders and you will find a hundred varying shades and degrees of workmanship and ability. It is as important to select the right man to perform the work as it is to choose the material or equipment used in its production, for foundry work is rarely routine. You cannot set the speed and feed and leave the workman to stop and start the machine. He must use his brains and when he neglects to do this defective castings increase and costs ascend.

Changes in Raw Materials

The material furnished the foundry is another important factor. It is not enough that it should be a standard make, or that it meet certain chemical specifications. It should above all else be uniform. This is often more important than the grade of material purchased. The foundry foreman and employees learn by practical contact with the supplies the best way to use them. Often without warning changes are made without the knowledge of the foundry. A new brand of pig iron or a new coke has been purchased; sand has been secured from different pits, or other supplies furnished from new sources. While the materials may be equal in quality to what they were using, it is strange country to the men and the foundry goes through a period of experimentation and loss before they forget how to use the old material and learn how to use the new.

The "human element" has been at work in the purchasing department. In their desire to make a showing for their end of the business, the buyers have substituted new material for that against which there was no complaint, perhaps because the new could be purchased slightly cheaper, and the results in the foundry may be loss and defective castings. When the foundry complains of this substitution, the purchasing agent usually replies: "Brown & Brown use this material and find it all right; why can't you?" or "It analyzes the same as what you were using." He fails to realize that Brown & Brown may have spent much time and money learning to use it and continue for that very reason. They know the cost of a change.

A Case in Point

I have in mind a case where castings kept coming bad for several months. One week they would be good,

*American Locomotive Co., Dunkirk, N. Y.

the next week they were condemned. Everything possible in the way of practice was tried without avail until a survey of all the material used showed the contract for the sand used in making the molds had been divided. Part was furnished by a dealer who knew what the foundry wanted and part by a new dealer who did not know. The sand from both was unloaded in one bin for the winter's supply. One grade was all right and the other was not. When the sand that was unsuitable was used the castings were bad; when a vein of the good sand was struck they were satisfactory.

The small saving effected in purchasing was lost a hundred times over in the foundry. The purchasing agent's duty to buy cheaply is unquestioned, but he should consider, first, that satisfactory material is of the greatest importance; that different men give their material different treatment. If it seems wise to change and often it may be, the change should be made with the co-operation of the shop man. The material should be tested and proved out by the men who must use it and a uniform and constant quality supplied as far as it is humanly possible.

Changes Require Infinite Care

Due to the lack of standards and the need of uniformity in supplies furnished the foundry, it becomes a fertile field for experimentation. When trouble occurs and defective castings result, the man in charge turns to other methods and ways of doing the work and that is the time when sound judgment must be used.

There are so many ways to make a casting bad; so many different things can cause the same defects; so many workmen contribute to its making that the real cause of trouble is often obscure and sometimes the best men fail to diagnose the symptoms correctly, so that when a radical change is made it must be watched and tried and tried again.

Don't declare the new method a success because it worked all right the first few times. Get an average over a period, see if it stands the test of time when the special interest and attention that are given to something new are withdrawn. Prove it right before you make a carload of work that may be rejected, for the most experienced may overlook some point or some unforeseen trouble may develop. Don't avoid new methods; search for them, cultivate them. It is the road to progress and good castings; but don't let enthusiasm over an apparently successful new method lead you into a bad hole and a heavy loss.

The Right Sort of Preparatory Work

A common reason for defective castings is that many foremen do not prepare ahead of time to overcome known trouble. A certain casting will be ordered and many will be spoiled; but finally the order will be filled and the pattern sent back to storage. Later the same casting will be ordered again and the same troublesome period will be gone through until that particular pattern grows to be considered a Jonah and is feared by the entire organization.

These are the jobs that run up the percentage of defective castings—the ones that are not mastered. When one loss has been sustained on a pattern, the foreman should set himself to work to control and correct that trouble. The time for experiment and study is when there is no order crying for production, when careful research can be made even though it means making some castings that are not on order and may never be used. It is a great deal more economical to make a few castings experimentally that will be scrapped than to lose 10 or 20 per cent of an order when the shop demands the product. Besides, this is taking the right attitude toward defective work—meeting it face to face and fighting it out, not heaving a sigh of relief when the order is filled.

Design Real Reason for Many Defects

Again, many of our troubles arise out of the design. The engineer makes his designs as he wants them. He does not know that the changing of the thickness of a section, the addition of a lug or boss, may change the manner in which the shrinkage of the iron occurs.

It may seem impossible that a small deviation from a tried design will give the foundry trouble; yet this is often true. And the foundryman may look everywhere else—to his iron, his coke and his sand—before he finds out that the design was the real reason for the defects. This point must be studied by the foundryman. He cannot expect his engineer to know how molten metal acts in a mold. He does not always know himself. The engineer must be open-minded enough to co-operate and change his design where practical and when requested by the foundry. An hour's work in the engineering department has often saved thousands of dollars in the foundry.

Ruling As to Rates on Bars

WASHINGTON, July 19.—The Interstate Commerce Commission has handed down a decision ordering the application of the same rates to cold-rolled steel bars as are given to merchant bars, on or before Oct. 1, on shipments from Cumberland, Md., in the Atlantic Seaboard territory, and from Beaver Falls, Pa., and other points adjacent to but not in Seaboard territory, to Galveston, Tex., by way of New York. The decision involves a complaint of the Texas Carnegie Steel Association vs. the Baltimore & Ohio et al. The commission held that the combination rail-and-water rates on cold rolled or drawn steel bars, bar iron (polished), and shafting are unreasonable and unduly prejudicial in so far as they exceed the rates on merchant bars and also that they violate the fourth section in that they are higher than the rates contemporaneously in effect over the same route by way of Galveston to Houston and other points in Texas.

Commissioner Hall, who prepared the decision, described processes with regard to the manufacture of the different kinds of bars to show that there are instances in the market where merchant bars are more valuable than shafting or cold-rolled bars. This was done to support the position that the difference in value is not sufficient justification for a variance in rates. The New York-Galveston water component was the one specifically attacked. It is 19c. higher on the cold-rolled bars and shafting than on merchant steel bars. The carriers defended the higher rate on the ground that the polished bars, used in making machinery shafting, automobile axles, etc., being covered with grease, were harder to handle and more likely to cause damage to ships by slipping out of the slings. It was also claimed that bending of the polished bars is more serious than the bending of merchant bars. Commissioner Hall said that the boat lines, while alleging the greater danger in handling the polished bars, had not introduced any evidence to show that they had ever paid any loss and damage claims on shafting which were attributable to the greater difficulty in handling or the fact that they were bent while in transit. Attention was called to the fact that the railroads make no distinctions between cold-rolled and other kinds of bars.

P. J. McBride and George B. McClennen, heretofore part owners of the Delta Equipment Co., 148 N. Third Street, Philadelphia, have purchased the company and now have sole ownership. The company will be continued under the same name. It recently purchased for its exclusive use the four-story building in which it is located. The Delta Equipment Co. deals in machine tools, electric motors and generators, boilers, engines, feed water heaters, pumps, air compressors and similar equipment.

Effective July 15, the Colonial Steel Co., Pittsburgh, announces a cut ranging from 8 to 15 per cent in all grades of tool steel. The company now is quoting No. 6 oil-hardened steel at 30c. per lb.; No. 7 Vanadium 24c.; No. 14 special 21c.; and its red star brand tool steel at 13½c.

Reasons for Wage Revisions Are Explained

President James A. Campbell Fears Prices Must Be Still Further Reduced—Believes Present Conditions Due Largely to High Freight Rates

"STEEL products have declined from $20 to $30 per ton since the prices were fixed by the Government, and my fear is that further reductions must take place in order to equalize with the farmer," states President James A. Campbell of the Youngstown Sheet & Tube Co., Youngstown, Ohio, and a director of the American Iron and Steel Institute, in explaining the general wage reductions by independent interests, effective July 16. "These cannot be made without further reduction in costs. We have no assurance at present of a reduction in freight rates. Hence, we can only reduce our costs by reducing wages, which is unfair to our employees, as railroad wages have not yet been reduced to correspond.

"Not only the steel industry but all lines of industry, from the farm to the factory, and not only in this country but the world over, are seriously affected by this depression. The majority of the farmers have not yet sold all of their last year products—grain and cotton—and there are large stocks of these still on hand. Many of the farmers were advised by their bankers not to sell when they had the opportunity, on account of prices being lower than they expected to prevail later, but on the contrary, all of the products of the farm are now selling at lower prices than at any time since 1915, with some of them at lower prices than obtained prior to the war.

"There is some reason for every depression. In 1907 it was a financial depression, caused very largely by fear on the part of the people as well as on the part of the banks. With our improved Federal Banking system, the time, I believe, has happily gone by when we will have financial panics; so that we must look in some other direction for the cause of the present depression in all lines of business."

Cause of the Slump

Mr. Campbell attributes the current slump largely to high freight charges. "Since the first of January, I have talked with a large number of people on the subject of freight rates and their relation to the business depression, because this has been foremost in my mind all the time, and nearly every well informed man discussing it with me agrees that my diagnosis is correct," he adds.

"Our company has lost a large percentage of its export business, and I fear we can hope for little improvement in this respect as long as there is such a great disparity in exchange and wage rates as at present. It therefore behooves us to 'get our own house in order' so that the domestic business of the country can go on with as little disturbance as possible.

"If we have located the trouble, what is the remedy? The railroads are still paying a higher rate of wages than during the war. The union leaders, who control railroad labor, are refusing to make concessions. Even at present, with the small amount of transportation offered, many of the railroads are not breaking even; and while the War Labor Board ordered a wage reduction of about 12 per cent, effective July 1, this will give little relief.

Results of Reclassification

"The classification of railroad labor is even worse than the rate of wages the roads are paying, as in some cases railroad men who were receiving $60 a month prior to Government control were by reclassification raised to $240 per month under Federal control. Common laborers who were oilers of the block signals, receiving about $1.75 to $2 per day before Government control, were paid as high as $6 and $7 per day, reclassified as electricians. This classification was made under what is called the 'National Agreement' and was arranged by labor leaders who were called in consultation by Mr. McAdoo, when he was Director General of the railroads. Very recently there was considerable pressure brought to bear on the Railroad Labor Board to have it abolish the National Agreement, which it did, but in doing so specified that the railroads must make their own classification in agreement with their own workmen. Now these workmen, through the union labor leaders, are demanding that no change be made in the classification from that specified in the National Agreement.

"The railroad managers' hands are tied, and the railroads are under what might be called the triple control, with their managers looking after the operation of the railroads, the War Labor Board fixing the wages of railroad employees, and the Interstate Commerce Commission fixing the income, or rates received, which are based largely on the financial returns of the companies. Until this triple control is done away with and the railroad managers are held responsible for the operation of their lines, for the adjustment of wages with their employees, and for the freight rates charged, we cannot hope to get anywhere.

Favor Reasonable Wages

"I believe, of course, that railroad labor should be paid reasonable wages; but these wages should be in line with the prices of commodities and also in line with wages paid for other activities in the communities which the roads traverse. For instance, wages in the South are usually considerably less than those prevailing in New York, Chicago or Pittsburgh, or other congested districts because it costs less to live in many sections of the country than it does in other sections; and for that reason railroad wages should not be as they are now, alike the country over, but should be in line with the cost of living in each section; and only selfish wage earners or demagogic politicians believe, or pretend to believe, that railroad wages should remain as they were while the price of every commodity is being reduced.

"Many men in this community are walking the streets without employment. Most of these are willing to accept work at reasonable wages, and I am anxious to do everything I can to help them secure employment. The American Federation of Labor, at its recent meeting in Denver, made the statement that it would resist every reduction of wages in all lines. This is at least a selfish viewpoint. It is unfair to the workmen of this and every other community to suffer reduction of their earning power and at the same time be taxed, as they are on everything that they eat or wear, to keep the wages of railroad employees above what they are willing to accept for their own services."

Unique "No-Accident" Campaign

An impressive "No-Accident" campaign was launched July 14 at the Farrell, Pa., works of the American Steel & Wire Co., to show a clean safety sheet. The desirability of exercising caution at all times was stressed in talks by operating officials and by a pageant. John McHugh, assistant superintendent of the Farrell plant, acted as chairman. One float in the pageant represented four pallbearers bearing a casket which contained the remains of "Mr. Carelessness." A mule that has been working at the plant for 14 years bore a banner with the following inscription printed on both sides: "I am a dumb animal and have served 14 years without an accident. Have I more sense than you? Get some new sense." A truck loaded with old and new tools also conveyed the importance of the drive.

STEEL SHIPMENTS TO CANADA

New Regulation by the Dominion Government as to Imports from the United States

TORONTO, July 18.—Firms having occasion to import material from the United States are having an opportunity of seeing in action the proposals set forth by Sir Henry Drayton, Minister of Finance, in his last budget speech at Ottawa.

THE IRON AGE correspondent saw an invoice going through the office of the United States Steel Products Co. here, and on the bottom was the following wording:

> We certify that the fair market value as shown on this invoice is not less than the cost of production of similar goods on the date of shipment to Canada, plus a reasonable profit thereon.

To get at the meaning of this, one must turn to the situation confronting the authorities at Ottawa, when they were faced with the action of the United States Government in placing further barriers against the selling of farm produce in the United States. Previously much of this was bought by the United States for re-export to Europe, but this is out of the question now. Ottawa feels that either Canada is not selling enough to the United States, or the United States is selling too much to Canada. Of our total trade during the past year, 57 per cent was with the United States. Of total imports of $1,240,125,056, those from the republic to the south were no less than $856,593,470, or 69 per cent of the whole.

Sir Henry Drayton's Views

Speaking in the House of Commons, on May 8, Sir Henry Drayton, Minister of Finance in the Meighen Government, said: "As already pointed out, temporary tariff legislation of the United States would place a barrier against our exports to that country, amounting to no less than $168,000,000. Such or similar action made permanent, of necessity would require a careful and permanent revision of the Canadian tariff for the purpose of insuring the proper continuance of Canadian business—of insuring employment and Canadian stability—a matter of gravest moment to all our people. . . . Much of the unemployment at present existing results from the importation into Canada of goods at prices below the cost of production. In so far as the public is concerned, little price advantage has accrued to them from these importations. . . . Goods ought to be valued for customs purposes, not at forced-sale prices, justified by temporary quotations in the foreign market, but having regard to the regular standard value in that market and to cost of production, and a reasonable profit thereon."

What Amendment Says

Following the declaration of his principles, Sir Henry went on to propose the following amendment to the Canadian customs act:

> Provided that the value for duty of new or unused goods shall be in no case less than the actual cost of production of similar goods at date of shipment direct to Canada, plus a reasonable profit thereon, and the Minister of Customs and Inland Revenue shall be the sole judge of what shall constitute a reasonable profit in the circumstances.

The amendment was adopted, and came into effect on June 30. Toronto dealers, jobbers and warehouse interests believe the ruling will interfere with business coming from the United States. One dealer says, "The Government evidently does not know that the great bulk of steel business is being carried on just now without any 'reasonable profit' attached to it. The business of liquidation is still in progress. I think it will mean that we will be unable to take advantage of chances that come up of buying in lots from mills and jobbers at very advantageous prices, which we always try to pass on to our customers. Shipments are very light at the present time. Were they heavier, and business normal, the ruling probably would have never been made, for there would have been no reason for it. On the face of it, it seems as if the price to Canadian users will have to be marked up, to the advantage of Canadian steel makers."

Another Clause

The number of firms in the United States that have opened banking accounts here and are taking payments in Canadian money must run into hundreds if not thousands. The charge has been made several times that the absorption of the exchange has been used as another means of beating out the anti-dumping law, which makes it necessary for American goods to be sold here within 5 per cent of the selling price in the United States. The new ruling covering the computing of tariff charges from countries where Canadian money is not at par is as follows:

> Notwithstanding any of the provisions of this section, in computing the value for duty of the currency of an invoice, no reduction shall be allowed in excess of 50 per cent of the value of the standard of proclaimed currency of the country from whence the goods are invoiced to Canada, irrespective of the rate of exchange existing between such country and Canada on date of the shipment of the goods, and in respect of goods shipped to Canada from a country where the rate of exchange is adverse to Canada, the value for duty of the currency of the invoice shall be computed at the rate of exchange existing between such country and Canada at the date of the shipment of the goods.

The trade in Canada agree that the foregoing is aimed at the importation of goods from the United States to this country. Machine tool dealers differ as to the probable effect. Some of them hold that the better class of machine tools are not sold "at a price" at any time, and there will be little difficulty in selling, no matter which way the amount of duty is collected. Several of them have stated that the trouble will be in trying to get a Canadian substitute for certain lines which they have been bringing from across the border.

The steel and machine tool trade in general seem to accept the two rulings as part of the Ottawa Government's policy to protect Canadian trade from further depletion owing to the increased adverse exchange rates, and at the same time to do something for the manufacturing interests in the Dominion which have been persistently calling for support of the "Made in Canada" idea on the plea that it would help right exchange difficulties.

An Explanation Offered

BUFFALO, July 18.—Some explanation of the Canadian Government's ruling, referred to in the Buffalo market report in THE IRON AGE of July 7, with reference to information as to costs and profits appearing on shipments into Canada, has been made to mills and offices and the drastic nature of the ruling is modified to some extent. Steel men are informed that the purpose of the ruling was not to prohibit shipments from the States, but was aimed at Central European competition in steel products. In other words, the Canadian interests said the influx of materials from Europe threatened to interfere seriously with domestic manufacturers and the ruling followed. It is known that a number of shipments from the United States have been held up and the invoices returned to the shipper with directions to supply the information as to costs and profit. American shippers now understand that a reasonable assurance that goods are made at cost plus a reasonable profit will expedite shipping.

Fairbank & Co., Cleveland, have been appointed exclusive sales agents by the Chippewa Iron Mining Co., operating in St. Louis County, Minn., on the Vermilion Range. A considerable tonnage is available for shipment this year and the firm will be in position to ship between 300,000 and 400,000 tons during the season of 1922. There will be several grades of ore of both soft and hard hematite.

The sixth annual convention of the National Association of Purchasing Agents will be held Oct. 10-13 at Indianapolis, Ind.

Production and Uses of Cold-Drawn-Steel

Extensive Application in Many Industries—Annual Output Estimated at 900,000 Tons —Automobile Field Largest Consumer

BY C. E. BREGENZER

COLD-DRAWN steel has a wide field of application and there are few industries which do not use it in some form. The annual output last year is estimated at about 900,000 tons, or close to 3 per cent of the total finished steel.

The automobile industry has been one of the largest consumers. Its favored use for screw machine products and the fact that about 33 per cent of cold-drawn steel is handled through jobbers makes it a matter of some difficulty to determine accurately the relative percentages used by various industries, particularly as manufacturers have markets in some lines where others are

Group Showing Wide Range of Special Cold-Drawn Steel Shapes

not represented. A survey of the field gives approximately the following percentages:

Industry	Percentage
Automobile	30
Screw machine products	23
Agricultural machinery	15
Machine tools, textile machinery, printing machinery, etc.	8
Electrical machinery	5
Typewriters, cash registers, sewing machines, washing machines, etc.	7
Shafting	6
Export	6

These percentages of distribution showed considerable variation during the latter part of 1920 and early part of 1921, especially in the automotive and the agricultural machinery field.

Uses

The main uses of this steel are indicated in the table showing allocation of percentages in the various industries. It can be used for all purposes for which finished steel is used and has a well established place as a product of the greatest utility to machinery and automotive parts manufacturers, and new uses are being discovered constantly. One of the best known is for stock for automatic screw machines, semi-automatic screw machines, wire feed screw machines and turret chucking machines where it has proved most uniform for cutting, threading, forming and parting. Wear on tools is also reduced. It owes its popularity in the automotive industry to the high-speed production which it makes possible due to its free cutting qualities and to the fact that, when it is used as a substitute for drop forgings, it saves machining. A list of uses follows:

Adding machine parts
Aeroplane parts
Arbors
Automobile parts
Agricultural machinery parts
Automobile accessory parts
Axles
Ball races
Balls
Bag filling machine parts
Baking machine parts
Billing machine parts
Bolts
Bicycle parts
Cranes
Connecting rod keys
Candy machine parts
Center tit keys
Camera parts
Clutches
Carpet sweeper parts
Crank shafts
Cash register parts
Calculating machine parts
Casket handles
Chair rims
Clasps
Cones
Concrete mixing machine parts
Cream separator parts
Culinary utensils
Cups
Curtain rods
Cutlery
Dovetail keys
Dowel pins
Driving shafts
Electrical machinery parts
Electrical appliances
Electrical iron shells
Elevator guides
Fan shafts
Firearms parts
Flat taper keys
Furniture molding
Furniture parts
Furniture trimming
Gages
Gears
Gibs
Go-cart trimmings
Grain drill parts
Guides
Guns
Hand bag frames
Hardware specialties
Hubs
Instruments
Jar caps
Keys
Lantern frames
Locomotive parts
Lock washers
Marine engine parts
Machine tool parts
Machine gun parts
Mine car parts
Mining machinery parts
Motorcycle parts
Moving picture projector parts
Motor truck parts
Molding
Novelties
Nuts
Numbering machine parts
Package machine parts
Phonograph parts
Propeller shafts
Piano hardware
Pinions
Pin stock
Piston rods
Plates for electroplating
Pneumatic machinery parts
Propeller shafts
Printing machinery parts
Pump rods
Racks
Rear axle shafts
Roller skates
Roller chain parts
Rollers for bearings
Roller bearing hangers
Round end feather keys
Rivets
Screws
Screw drivers
Sewing machine parts
Stove parts
Stove trimmings
Shafting
Shoe eyelets
Shoe horns
Scale parts
Spark plug shells
Show case parts
School desks
Skate runners
Slides
Small tools
Special gib head keys
Splines
Spindles
Studs
Textile machine parts
Telephone instrument parts
Textile machinery parts
Threshing machine parts
Tool steel keys
Toy parts
Tractor parts
Turnbuckles
Typewriter parts
Type
Vacuum cleaner parts
Watch parts
Washing machine parts
Woodruff keys
Wrenches

The following list shows further uses of cold-drawn steel in some of the products noted above under parts:

Automobile, Motor Truck and Motorcycle Parts

Magneto,
Interrupter levers
Armature gear blanks
Starting motor shafts
Switch sleeves
Pole piece section
Distributor shaft
Axles
Spark plug shells
Conduit clamps
Cable clamps
Washers
Steering wheel pivot pins
Cam rollers
Push rods
Cams
Armature shafts
Wrist pins
Transmission countershafts
Bearing balls
Bearing rollers
Propeller shafts
Spindles
Rocker arms
Valve lifters
Shifter rods

Rifle, Revolver and Machine Gun Parts

Barrel spline
Bolt stop screw
Bolt stop spring rest
Butt plate spring screw
Butt swivel
Extractor collar
Floor plate
Front sight carrier
Guard screws (various)
Band pin
Band screw
Bolts
Screws
Nuts
Safety lock holder
Sleeve
Stock bolt
Butt plate bracket
Butt swivel plate
Magazine end
Rear sight slide
Front sight carrier pin
Sear
Sear stud
Sear pin
Trigger pin
Cocking piece
Floor plate catch
Safety lock plug
Striker

Typewriter, Billing Machines, Etc., Parts

Carriage frame rails	Ribbon spool driving ratchet pawl
Tabulator rack	Drop platen
Carriage frame front roll bracket	Line-finder lower wire bracket
Margin stops	Line space driving shaft cam
Actuator driving pawl	Line space lever shaft bracket
Tabulator blade frame	Way rod

Hardware Specialties

Bells	Knives for food choppers
Chest handles	Locks
Door knobs	Metal furniture
Door plates	Metal molding
Door stops	Mince knives
Drawer pull	Push plates
Electric fan base	Sash lifts
Escutcheons	Sash locks
Ferrules	Slides
Hack saw frames	Stove ornaments
Keys	Trunk hardware

Steel and Alloys Used for Cold-Drawing

All grades of steel, including alloy steels, are used for cold-drawing. Bessemer steel is the most suitable for stock for screws, bolts, nuts, spark plugs, gun and automotive parts, sewing machines, typewriters and practically every product of automatic screw machines. It is free cutting, accurate as to size, concentricity and straightness.

Open-hearth steel is also used for screw stock. It does not machine as freely as Bessemer but is used where more strength is required. Nickel steel, 3 to 3.50 per cent, is used for parts highly stressed, subjected to shock and vibration and possibly requiring threading. It is much used in the automotive industry and gives good service for shafts, ball and roller bearings, gears, spindles, axles, bolts, studs, piston rods, crank shafts, propeller shafts, clutches, turnbuckles, engine motor, machine and transmission parts. Nickel steel of 1 to 1.50 per cent is used where a better quality than plain open-hearth steel is required, also for minor structural purposes in machine manufacturing.

Chromium steel machines readily and has a good range especially for ball races, cups and cones. Chrome-nickel steel is used for important structural parts as it is very tough and has great ability to withstand shock. It should be heat-treated after cold-drawing, otherwise there is no gain commensurate with the increased cost. Chrome-vanadium machines more readily than chrome-nickel and is used for the most important case-hardened or heat-treated parts. It is suitable for shafts, gears, axles and important machine parts. Vanadium steel is used when increased elastic limit, tensile strength and durability are required.

The illustration shows some of the special shapes which have been cold-drawn. Any shape can be drawn for which a die can be made. The experience gained by American manufacturers in the manufacture of cold-drawn products indicates accuracy as to shape and high finish as to smoothness of surface. Investigations abroad show that British and German cold-drawn steel does not equal American products, the former lacking accuracy and the latter being brittle.

United States Copper Production

Figures of the United States Geological Survey show that the smelter output of copper in 1920 amounted to 1,209,061,040 lb., compared with 1,286,419,329 lb. in 1919 and considerably larger amounts in the four preceding years, as shown in the table. The value of production in the United States in 1920 is given as $222,467,000, as compared with $239,274,000 in 1919 and considerably larger amounts in the four preceding years. It is to be noted that the low figures of value in 1919 and 1920 are evidence of the lower price at which copper has been sold during the past two years.

	Thousands of Net Tons					
	1915	1916	1917	1918	1919	1920
Smelter output	694	964	943	954	643	605
Mine production	744	1,003	948	955	...	...
Consumption, new copper	568	739	697	831	457	527
Exports, metallic	341	392	563	372	258	312
World production*	1,189	1.496	1,569	...	1,101	...
Copper ore produced	43,404	57,863	58,483	62,289	...	...
Average yield, per cent	1.66	1.70	1.60	1.51	...	...
Average price, per lb.	17.5c.	24.6c.	27.3c.	24.7c.	18.6c.	18.4c.
Value, millions	$242.9	$474.3	$514.9	$471.4	$239.3	$222.5

*All other figures are for United States only.

Figures are not yet available for the production of the mines in either 1919 or 1920, nor for the production of copper or average yield of copper per ton in those years. The latest figures for copper ore produced are those of 1918, with a total of 62,289,069 short tons, from which the average yield of metallic copper was 1.51 per cent. The average price of copper in 1918 is given as 24.7c. per lb. compared with 18.6c. in 1919 and 18.4c. in 1920; the present price is under 13c.

Figures for the world production of copper for 1920 are wholly incomplete. For 1919 figures are available for most of the countries producing large amounts. If the 1919 production of the other countries be estimated at the same figures as obtained for the last year for which figures are available, the grand total for the world is 2,202,885,000 lb. American production in 1919 represents, therefore, 58.4 per cent of the total world production, compared with 64.4 per cent in 1916.

By adding to the United States stock of copper at the beginning of the year the total supply of new copper, and then deducting from the sum the amount of copper exported and the stock at the end of the year, an estimate is obtained of the apparent consumption of copper by the United States. This figure for 1920 is 1,053,838,558 lb. as compared with 914,471,572 lb. in 1919 and considerably larger quantities in the four preceding years.

Sheet and Tin Mill Workers Reduced

Average invoiced selling price of Nos. 26, 27 and 28 gage plain sheet steel shipped by Mid-Western mills during the 60-day period ended June 30 was disclosed as 3.85c. per lb., at the bi-monthly examination of sales sheets July 14 at Youngstown, Ohio. This was a decline from 3.95c. revealed two months before, and sheet workers as a consequence sustained a reduction of 3 per cent on the base rate for the July-August period. The actual working reduction, however, from the rate paid in May and June is less than 2 percent. The tonnage rate for sheet mill employees is still 51 per cent above base, as compared with 109½ per cent at the peak rate during the war.

Tin mill workers sustained a larger loss in tonnage rate, however, as the examination disclosed a reduction in the price of tin plate per base box to $5.95 from $6.50, on which the May-June rate was based. This decline in selling price produced a reduction of 11 per cent in the base rate, or an actual cut on the going rate of 7 per cent. Tin mill employees are now paid a rate which is 49 per cent above the base.

The average shipment price of tin plate during the past two months compares with a nominal market quotation of $5.75 per base box, and in the case of sheets 3.50c. per lb. As neither of these prices is regarded as firm, it is likely that wage scale adjustments will continue to trend downward.

The settlement was conducted by representatives of the Western Sheet and Tin Plate Manufacturers' Association and the Amalgamated Association of Iron, Steel and Tin Workers.

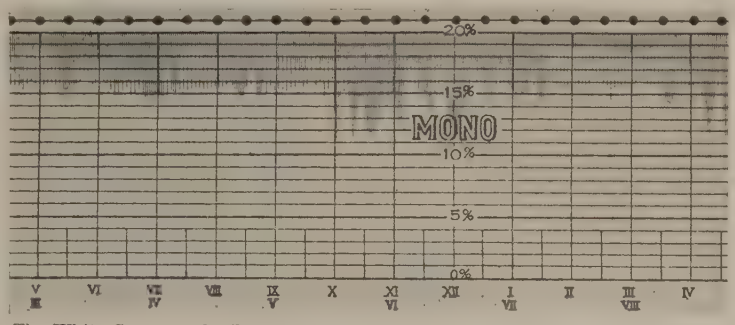
Chicago will likely be selected as the meeting place for the adjourned conference to adjust the bar iron scale. Representatives of both the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers will convene on Monday, July 25, in separate conferences, and will meet in joint session on July 26. At the previous conference in Atlantic City early in June, manufacturers and the men were unable to agree upon the new contract.

RECORDS COMBUSTIBLE GAS

Duplex Mono Indicates Both CO_2 and Escaping Burnable Gas

A gas recorder which not only shows the amount of CO_2 in the flue gases of a boiler furnace, but the escaping combustible gases as well, is being manufactured by the Mono Corporation of America, 25 West Broadway, New York, the instrument being known as the Duplex Mono. The maker calls attention to the fact that the maximum efficiency in firing is secured when the highest amount of CO_2 results without the accompaniment of combustible gases and that the Duplex Mono gives a complete indication of all the elements of waste heat.

No moving mechanical parts are used to force the gas through the apparatus. Mercury is used instead and also performs the functions of valves. The apparatus is dust-proof and is found to require little attention.



The White Space at the Bottom Represents Carbon Dioxide. The lightly shaded areas represent combustible gases

The accompanying flue gas recorder chart was produced in tests of a boiler furnace. The clear space at the bottom represents CO_2 in the flue gases, while the lightly shaded areas between the white area and the heavily shaded area indicate combustible gases. The chart reveals as a whole by the continual presence of combustible gases, improper firing and poor draft regulation, in spite of the high amount of CO_2.

The Duplex Mono serves to make sensible heat and combustible gas losses visible to the fireman and the plant executive. No limit should be placed on how high the CO_2 should be kept by the fireman, provided he avoids combustible gases in the flue. Under this régime, the fireman who maintains the highest average CO_2 record with the least evidence of combustible gases is the best man, provided, of course, that he carries his share of the load.

By-Product Coke Production

WASHINGTON, July 19.—Reports from operators of by-product coke ovens again are being received by the Geological Survey, after having been discontinued at the close of the war. The Survey as a result has resumed publication of production figures, and in its weekly report of July 16 gives current statistics for June in a preliminary and estimated form. The total output, on this basis, for that month was 1,540,000 net tons. In comparison with the monthly average for 1920, this was a decrease of 1,025,000 tons, or 40 per cent. As the present maximum capacity of the by-product ovens in the United States is in round numbers 3,510,000 tons of coke per month, the bulletin states, it will be seen that the industry was operating during the month of June at only 44 per cent of capacity. Of the 81 plants reporting, 10 were closed down entirely. As with active demand an average production of 85 to 90 per cent of capacity is to be expected, it is pointed out that the June output of by-product coke was less than half of normal. The depression is declared to be more significant when the virtual cessation of beehive coke manufacture is remembered.

The coal charged in June is estimated at 2,210,000 tons. The normal monthly consumption of the ovens, assuming 85 per cent operation, would be 4,300,000 tons. The by-product ovens therefore were getting along with some 2,090,000 tons of coal per month less than they would be using if business were active.

The monthly output of by-product coke in the United States in net tons, exclusive of screenings and breeze, is reported as follows:

	Coke Produced	Coal Charged
1917 monthly average	1,870,000	2,625,000
1918 monthly average	2,166,000	3,072,000
1919 monthly average	2,095,000	2,988,000
1920 monthly average	2,565,000	3,685,000
June, 1921	1,540,000	2,210,000

Rate Not Unreasonable

WASHINGTON, July 19.—Rates applied on steel ingots from San Francisco and South San Francisco to Seattle, Wash., between Oct. 24, 1918, and June 18, 1919, were not unreasonable or unduly prejudicial, according to an opinion of the Interstate Commerce Commission based on the complaint of the Pacific Coast Steel Co., vs. Southern Pacific, et al.

It is the contention of the complainant that the rate applicable to castings should have been imposed on the shipments of the large ingots which, though a raw product, took a higher rate than castings. Seventy-three car loads of the ingots were to be forged into ship shaftings and moved on rates of 52.5c. from San Francisco and 55.5c. from South San Francisco. The steel company held that the rate of 44c. on castings should have been charged. The lower rate on castings was due to the competition of ships for business between San Francisco and Portland.

High Wages in Germany

WASHINGTON, July 19.—According to the statistics of the Union of German Metal Workers, the largest trade union in Germany with a membership of 1,600,000, about 63 per cent of these workers are receiving wages which are more than 800 per cent greater than those of 1914. About 36 per cent are receiving wages from 500 to 800 per cent greater and the remainder are receiving wages which have not increased as much as 500 per cent since 1914. The increase in wages in the German metal industry has been set forth in a report made to the Bureau of Foreign and Domestic Commerce by Economist Consul Maurice Parmelee, Berlin, based on figures prepared by a statistical bureau of the union showing wages and cost of living for those engaged in the metal industry. The investigation included not only members of the union but many other workers in the metal industry, so that the report covered 2,300,000 workers. It is stated that it is not possible from the statistics to arrive at an average wage increase for the whole of this group of workers.

The trade unions estimate that the entire cost of living for a family of four has increased about 1550 per cent since 1914, while Calwer's Bureau, a private statistical bureau, which usually makes use of official statistics, estimates that the cost of food alone for a family of four has increased about 1470 per cent since the year mentioned.

C. W. Leavitt & Co., New York, have been appointed selling agents in the United States for Mines de Manganese, Marquesa-Baja, Chili, producers of high grade manganese ore. New equipment now being installed at the mines will place that company in a position to ship up to 300,000 tons of ore per annum.

The General Fireproofing Co., Youngstown, Ohio, has instituted a general wage reduction of 15 per cent.

Labor Costs in Belgium

Hourly wages in the iron and steel industries of Belgium, with conversion into American values at the rate of 7.6c. per franc, are shown in the following table:

Steel Works

	Francs	U. S. Cents
Converters:		
Smelters	3.15	23.94
Retort hands	3.15	23.94
Cupola hands	3.05	23.18
Sheets:		
Heaters	4.17	31.69
Rollers	4.19	31.84
Laborers	2.02	15.35
Stamping and rolling:		
Heaters	3.58	27.21
Rollers	3.60	27.36
Hammerers	4.33	32.93

Open Hearth

	At Furnaces		Casting	
	Francs	U. S. Cents	Francs	U. S. Cents
Founders (melters)	3.09	23.48	2.42	18.39
Furnace hands	3.05	23.18	2.38	18.09
Laborers	2.75	20.90	2.31	17.56
Boys	1.58	12.01	1.43	10.87
Masonry:				
Masons	297	22.57	...	....
Laborers	1.83	13.91	...	....

Blast Furnaces

	Francs	U. S. Cents
Founders, maximum	2.50	19.00
Founders, minimum	2.30	17.48
Laborers	2.48	18.85
Overseers	2.38	18.09

Foundries

	Francs	U. S. Cents
Molders	3.00	22.80
Core makers	3.00	22.80
Modelers (pattern makers)	3.00	22.80
Mechanics	2.70	20.52
Chippers	2.50	19.00
Laborers	2.35	17.86
Apprentices, maximum	1.60	12.16
Apprentices, minimum	0.50	3.80

Machine Shops

	Francs	U. S. Cents
Turners (lathe hands)	2.60	19.76
Planers	2.45	18.62
Milling machine men	2.60	19.76
Drillers	2.60	19.76
Borers	2.40	18.24
Mortisers	2.50	19.00
Mechanics	2.55	19.38

Boiler Works

	Bridge Work		Boiler Work	
	Francs	U. S. Cents	Francs	U. S. Cents
Tracers (layers-out)	2.90	22.04	2.90	22.04
Fitters	2.60	19.76	2.65	20.14
Riveters	2.60	19.76	2.60	19.76
Machine tool operators	2.55	19.38	2.65	20.14
Boiler makers	2.50	19.00	2.50	19.00
Laborers	2.10	15.96	2.10	15.96
Forges:				
Smiths	...	....	*2.50	19.00
Stampers	...	....	*2.00	15.20
Laborers	...	....	1.90	14.44

*Receive bonus of 35 per cent.

Prices of iron ore used in Belgium are reported to be 18 francs ($1.37) per ton for 35 per cent ore of Belgian origin, this being the price at the mine. Spanish ore containing 52 per cent iron, for hematite pig, costs 85 francs ($6.46) per ton. Blast furnace coke has sold since June 1 at 112 francs ($8.51) per ton.

American Automobiles in Norway

American automobiles predominate in the Norwegian market but English, French, Italian, Dutch and German cars also are offered. Most of the importations during 1918-1920 period came from the United States. American cars owe their supremacy, it is stated, to superior motors, but the European car is less expensive, as a rule, owing to the lower cost of its transportation to Norway. The number of motor cars of all classes in use in Norway rose from 1007 in 1913 to 7915 in 1919, according to a report from United States Consul General Osborne at Christiania. More than 5000 cars were imported in the first eleven months of 1920, and the total number now in operation is estimated at more than 12,000. The distribution among the population of some 2,600,000 is now at the approximate rate of 1 to 216 persons.

In 1918-1920 American manufacturers obtained advance payments before accepting orders, although Norwegian importers objected to this practice. Since the war, this requirement has been modified, and in some cases ninety day drafts are now being accepted in lieu of cash in advance.

Trucks of the heavier type are not in such demand as the light. Delivery cars of the lighter kind are also preferred.

Steel in New American Ships

Figures of the Bureau of Navigation of the Department of Commerce show that at the close of the fiscal year, June 30, the number of American documented vessels was 28,500, of a total of 18,350,000 gross tons. Comparison is made with the British tonnage of one year before, at 18,330,424 gross tons, comprised in 8561 vessels of 100 tons and over. The American figures include a great many vessels under 100 tons, which would heavily affect the number of vessels, but only slightly affect the total gross tonnage.

American sea-going vessels of 500 tons and over number 3723 of a total of 13,234,401 gross tons. Great Lakes vessels, 2850 in number, counted over 2,625,000 gross tons. This makes a total of 15,859,000 gross tons of large vessels, compared with 7,928,688 gross tons of all vessels in 1914. The increase during the last fiscal year was about 2,025,000 gross tons, or something more than 12 per cent.

This increase, having been almost wholly in steel vessels, must have represented fully 1,000,000 tons of iron and steel, of which perhaps 750,000 tons consisted of plates and shapes. This is more than 10 per cent of the 1920 production of 7,338,420 tons in shapes and in plates ¼ in. thick or over.

United States Foreign Trade

Preliminary figures for the fiscal year ended June 30 show imports valued at $3,666,769,537 and exports valued at $6,519,365,734. This represents a total trade of $10,186,135,271, which, with the exception of the two immediately preceding years, is the largest on record. Comparative figures are shown in the table. January of this year ended a period of 31 consecutive months during which the exports did not in any month fall below $500,000,000. December, 1920, ended a period of 22 consecutive months during which the imports did not in any month fall below $250,000,000. These two stretches of high figures are the greatest, both in duration and in value, which we have ever experienced.

*Millions of Dollars, United States Foreign Trade**

Year Ending	Imports	Exports	Total Trade	Export Excess
June 30, 1917	$2,659	$6,290	$8,949	$3,631
June 30, 1918	2,946	5,920	8,866	2,974
June 30, 1919	3,096	7,232	10,328	4,136
June 30, 1920	5,238	8,109	13,347	2,871
June 30, 1921	3,667	6,519	10,186	2,852

*Excluding movements of gold and silver.

Decline in German Machinery Exports

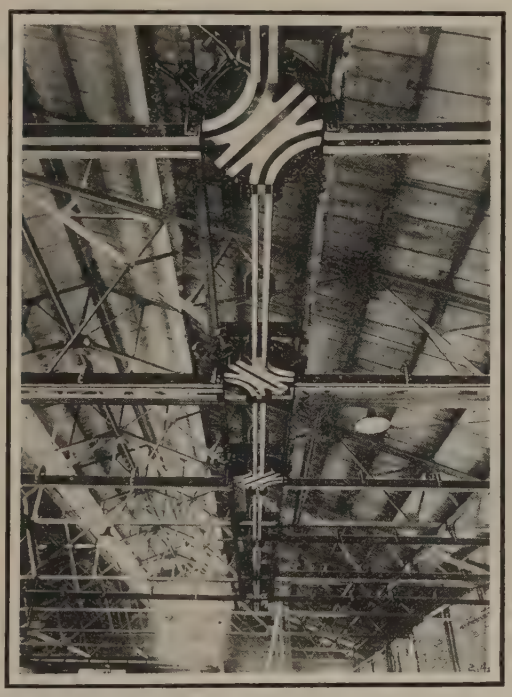
The association of German machine builders (*Verein Deutscher Maschinenbau Anstalten*) held its annual meeting in Berlin June 8. The opening address by Dr. E. von Borsig, according to *Stahl und Eisen*, emphasized the necessity of increasing the export of high priced products, because of the tax burden which had been imposed on export by the peace terms. The annual report showed that in May, 1921, 944 individual firms and 40 branch works representing over 550,000 employees were members of the association. In view of the vital importance of export, the association has, in co-operation with other industrial branches, worked out a preliminary draft for a new tariff, and has already investigated its probable effect in Switzerland, Sweden and Czecho-Slovakia. Since October, 1920, 20,000 export orders have been the monthly average.

The address of Dr. von Borsig showed that the machine building industry now employs 700,000 men. The industry, according to official reports, exported six milliards marks ($90,000,000) of machine products in 1920, but this year has shown a decrease, with generally poorer business conditions in the industry. The discussion at the meeting bore on the necessity of quality to hold export markets, also of more economic production.

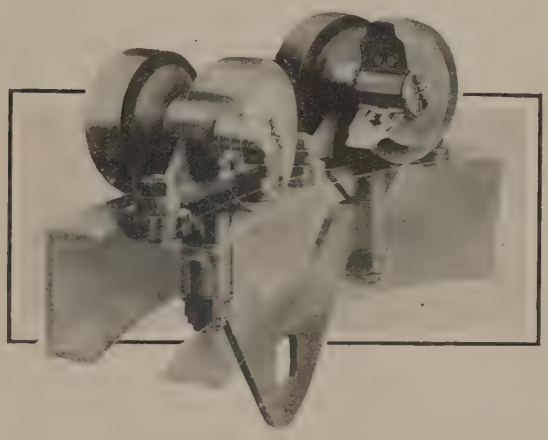
Short-Turn Overhead Trolley System

A short-turn overhead trolley system comprised of tracks, trolleys and switches has been placed on the market by the Whiting Corporation, Harvey, Ill. A section of an installation of the system is shown in the accompanying illustration.

The track, consisting of two parallel standard rolled channels spaced 2⅛ in. between flanges and held in place by champs, is designed to carry loads with no intermediate supports except at the splices, corners and switch points and is fabricated to meet the requirements of each installation. Spanning a long span over a driveway, from one building to another, can



Short-Turn Overhead Trolley System. The track has no intermediate support except at the splices, corners and switch points. Trolleys run on the level top of the channel tracks



also be done without intermediate supports by using a heavier section, keeping the channels 2⅛ in. between flanges but extending down to the depth of the channel.

Right and left 90-deg. switches, right and left 45-deg. switches, and universal switches are part of the equipment. Each corner and switch connection is interchangeable and can be removed at any time and a double or a universal switch bolted in the same place. All of the short turn corners and switches have a track curvature of 18 in., turning the load practically at a right angle, a feature especially advantageous in foundries in getting up and serving a row of brass furnaces or machines close to the wall without losing space by long sweeping curves. It is likewise adaptable to freight and terminal houses.

The track is equipped with special trolleys having 2, 4, or 8 wheels, ball bearing mounted, and having guide rollers which run between the toes of the channels. The trolleys run on the level top of the channel tracks and are designed so that they can swing in the same 18 in. radius curves.

Electric hoists may be used as well as chain blocks. Binding of the trolleys and the possibility of trolleys running off the track is said to have been effectively eliminated. The sections of track are built and erected as single units, a feature advantageous to low erection costs.

Molding Sand Research

In co-operation with the National Research Council, the American Foundrymen's Association is undertaking an investigation of natural and synthetic molding sands and of the employment of greater proportions of used sands in molding operations; also a study of refractory sands and refractory and plastic clays. The program as laid out at present is:

1. To collect all published information available on these subjects in this and foreign countries. This work is now well under way.

2. To study and formulate by field operations of a practical technical investigator, the practices in the best foundries of the country.

3. To submit all information so obtained to a committee composed of practical foundrymen and technical experts, with a request that this committee formulate suggestions for promising lines of research that might be followed to attain the desired end.

The bibliographies were prepared by the National Research Council. The work of the technical investigator is made possible by funds placed at the disposal of the American Foundrymen's Association for research work.

President W. R. Bean, in a letter to the members of the association, submits a questionnaire the answers to which are expected to be of help to the committee. Members who have been able to get greater tonnage from their sand by special mechanical mixing, by the use of old core and molding sand, or in other ways are asked to give details.

Decrease in Steel Corporation's Orders

Unfilled orders on the books of the United States Steel Corporation June 30 were 5,117,868 tons, compared with 5,482,487 tons May 31. This is a decrease of 364,619 tons and compares with one of 362,737 tons in May, 439 541 tons in April, 649,102 tons in March, 639,297 tons in February and 574,958 tons in January, and represents the eleventh consecutive monthly decrease reported. The unfilled tonnage a year ago was 10,978,817 tons, or 5,860,949 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31.....	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28.....	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31.....	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30.....	5,845,224	10,359,747	4,800,685	8,741,882
May 31.....	5,482,487	10,940,465	4,282,310	8,337,623
June 30.....	5,117,868	10,978,817	4,892,855	8,918 866
July 31.....	.....	11,118,468	5,578,661	8,883,801
Aug. 31.....	.....	10,805,038	6,109,103	8,759,042
Sept. 30.....	.....	10,374,804	6,284,638	8,297,905
Oct. 31.....	.....	9,836,852	6,472,668	8,353,293
Nov. 30.....	.....	9,021,481	7,128,330	8,124,663
Dec. 31.....	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

The Isthmian Steamship Co.'s vessel, Atlanta City, sailed July 12 from Mobile, Ala., for Darien and Yukow with 5000 tons of steel rails and a heavy tonnage of splice-bars, nuts, bolts and rivets for the Manchurian railroad, cargo coming from mills of the Tennessee company. The Charlton Hall sails July 14 with 5400 tons of steel rails for Seward, Alaska, for the Alaskan railroad. A considerable tonnage of angle bars was also taken. This cargo was also from the Tennessee company mills and is one half of a recent order.

June Steel Ingot Output at New Low

The steel ingot statistics of the American Iron and Steel Institute for June show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output last month of 1,003,406 gross tons, as compared with 1,265,850 tons in May. The decrease was 262,444 tons, or about 20.7 per cent. Estimating the production of the other companies on the basis of those reporting, the total production of ingots in June was 1,191,693 tons, or 47,667 tons per operating day, counting 25 working days to the month, against an estimated total of 1,503,206 tons, or 57,815 tons per operating day in May. This is a decrease of 311,513 tons or 10,148 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920...	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920...	26,197,843	8,112,753	121,656	34,432,252
January, 1921...	1,591,281	608,276	3,629	2 203,186
February	1,295,863	450,818	2,796	1,749 477
March	1,175,591	392,983	2,404	1,570 978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265 850
June	808,286	193,644	1,476	1,003,406

The June ingot production was at the yearly rate of 14,824,437 tons, counting 311 operating days to the year. This compares with a rate in May of 17,980,465 tons, of 17,242,773 tons in April, and of 21,258,405 tons in March. The decrease of 311,513 tons in the estimated ingot output of all companies in June from that of May compares with a decrease of 156,388 tons in the June pig iron output from that of May.

Iron and Steel in Four Countries

Comparison in production of pig iron and steel ingots and castings for the United States, Great Britain, France and Belgium may be made, up to the end of May, figures for Germany not being available. The figures shown are all on the basis of monthly averages, giving the averages for 12 months in 1913, 1919 and 1920, for five months of 1921, and the figures for May alone.

Average Production per Month, in Gross Tons

	United States	Great Britain	France	Belgium
Pig Iron				
1913	2,580,513	855,000	427,000	203,800
1919	2,584,614	617,000	198 000	20,600
1920	3.077,167	667,300	272,100	92,700
1921, 5 months..	1,672,667	313,100*	287.700	97,700
1921, May	1,221,221	13,600*	280,000†	74,600
Steel Ingots and Castings				
1913	2,608,406	639,000	385,000	202,300
1919	2,889,269	658,000	179,000	27,400
1920	3,511,078	754,700	242,900	101,300
1921, 5 months..	1,900,000†	282,500*	254,600	97,100
1921, May	1,503,000†	5,700*	250,000†	62,800

*Showing effects of the coal strike. †Estimated.

Steel Employment Still Falling

WASHINGTON, July 12.—Unemployment in the iron and steel industry showed a further decline of 19,701 workers in June, amounting to 5.7 per cent, according to the monthly survey of the United States Employment Service. The number engaged in the iron and steel industry in June was 21.3 per cent of the total reported employed in the 14 groups dealt with. The figures of the Employment Service relate to 1428 firms in 65 principal industrial centers, employing a total of 1,600,000 workers, and show a net decrease of 46,414, or 2.9 per cent on the pay rolls in June. According to these figures, therefore, the decrease in employment in the iron and steel industry was 42.7 per cent of the total net decline.

Stating that detailed examination of the returns clearly indicate the fundamental causes of the protracted industrial depression and the tide of unemployment, the report says:

"Continued unsatisfactory conditions of transportation, with freight rates in many instances considered almost prohibitive; lack of anything like a normal foreign market; the present low value of farm produce; stagnation in iron and steel; high costs of construction and general dullness of the retail trade stand out prominently as leading factors in the situation."

It is stated that there are indications at some points of resumption of building operations, though for the most part on a restricted scale. Industry generally is declared to be optimistic, and while the likelihood of a dull summer in most lines is fully recognized, the tendency is to count on employment improvement by fall and a healthy, though not spectacular, business revival by the spring of 1922. Twenty-six states scattered over all sections of the country reported employment increases in some lines, while 39 showed decreases in employment for the month of June.

The following table is from the Bureau of Labor Statistics:

Month	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
May, 1921.....	119	118,802	$5,957,985	$50.15
June, 1921.....	117	111,540	4,896,331	43.90
June, 1920.....	117	184,537	13,989,510	75.81
Automobiles				
May, 1921.....	44	93,296	*3,126,958	33.52
June, 1921.....	47	96,254	*3,154,773	32.77
June, 1920.....	47	154.082	*5,230 496	33.95
Car Building and Repairing				
May, 1921.....	54	39,276	2,545,577	64.80
June, 1921.....	56	37,945	2,515,988	66.31
June, 1920.....	56	64,965	4,084,912	62.87

*Weekly.

Cost of Living Slowly Falling

Wholesale prices declined 2 per cent during June, according to figures of the Bureau of Labor Statistics. The heaviest declines were of 4.35 per cent in metals and metal products and 4.55 per cent in house furnishing goods. Only one group (farm products) is now lower than metals and metal products; one year ago, metals and metal products were lower than any other group. House furnishings are still 2½ times 1913 prices and building materials more than double their 1913 level, although all commodities, combined, show but 48 per cent above 1913 prices. Except for the last line, the following table represents wholesale prices.

Index Numbers of Wholesale Prices, by Groups of Commodities
(1913 equals 100)

	1920 June	1921 May	1921 June	Decline in One Year, Per Cent	Per Cent of the Advance Over 1913
Farm products.....	243	117	113	53.5	90.9
Food, etc.	279	133	132	52.7	82.1
Cloths and clothing....	335	181	180	46.3	66.0
Fuel and lighting.....	246	194	187	24.0	40.4
Metals and metal products	190	138	132	30.5	64.5
Building materials.....	337	202	202	40 0	57.0
Chemicals and drugs..	218	166	166	23.9	44.1
House furnishing goods	362	262	250	30.9	42 7
Miscellaneous	247	151	150	39.3	66.0
All commodities.....	269	151	148	45.0	71.6
RETAIL FOOD COSTS	219	145	144	34.2	63.0

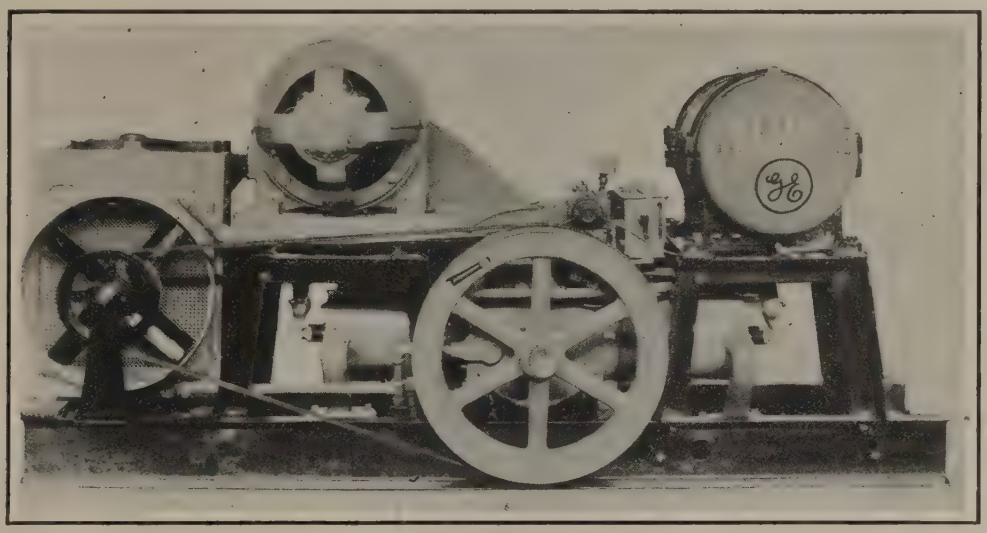
Continued rapid progress is being made in the construction of the plant of Durant Motors, Inc., in Lansing, Mich. Flooring work is now being done. Deliveries have been started on 300,000 brick by the Briggs Co. of Lansing, which also has supplied 65 tons of reinforcing steel.

The Stahleisen Publishing Co., Düsseldorf, Germany, publisher of *Stahl und Eisen*, has acquired the publishing rights of *Das Ferrum* which suspended publishing in 1916 on account of the war.

New Portable Arc Welding Sets

The General Electric Co., Schenectady, N. Y., has placed on the market two types of gas engine driven arc welding sets, one for medium, or intermittent duty, and the other for heavy duty. Both outfits are adapted to industrial plants where the work to be done is located in odd places and where installation of permanent equipment is not warranted. Their particular field, however, is in places where electric power is either unavailable or inconvenient or costly to secure, such as marine work, or for welding experts who own their set, and travel about in localities where there is no electric power.

The medium duty equipment was designed particularly for intermittent duty. The generating unit consists of a type WD 10-4 kw. 1200 r.p.m., 60-20 volt 200 ampere generator directly connected by a flexible coupling to a Matthews, Model F, 4 cylinder, 4 cycle, 20 hp. gasoline engine. The engine, radiator, generator and welding panel are assembled on a rigid cast iron base, which, in turn, is mounted on wooden skids. The set is 86 in. long, 28 in. wide, and has a net weight of about 2000 lb.



The Arrangement of the Various Units of the Portable Arc Welding Set, Compactly Mounted on a Structural Steel Base, Makes It Flexible for Work in Odd Places

The heavy duty equipment can be arranged to supply either one or two welding circuits. It consists ordinarily of a 20 hp. 2 cylinder opposed Reliable Heer, model 00, gas engine, a type WD 9 generator and welding panel, the whole mounted on a welded structural steel base with a net weight of 2400 lb. for the single-operator equipment and 3200 lb. for the double operator equipment.

Declared a Common Carrier

WASHINGTON, July 19.—The Benwood & Wheeling Connecting Railroad, owned by the National Tube Co., and operating along the Ohio River at Benwood, W. Va., where it performs terminal switching services to and from trunk lines, is a common carrier, according to an opinion handed down last Saturday by the Interstate Commerce Commission. Having been officially given this status, the commission states that the railroad is entitled to receive divisions out of joint rates or absorptions of switching charges under appropriate tariff provisions. The privileges given the road were sought in a complaint it made against the Pittsburgh, Cincinnati, Chicago & St. Louis Railroad, et al.

A finding of unreasonableness and an order of reparation have been issued by the commission in connection with a complaint of the Illinois Steel Co. vs. Elgin, Joliet & Eastern Railroad. The commission held that a rate of $5 per car plus 15c. per net ton on movements of coke from the ovens to unloading points in complainant's plant at Gary, Ind., was unreasonable to the extent it exceeded $6.50 per car. Reparation is to be made on the basis suggested on 15,448 carloads of coke shifted from the ovens to blast furnaces in the period between June 25 and Sept. 22, 1918.

Great Bridge Proposed

SAN FRANCISCO, July 8.—J. Vipond Davies and Ralph Modjeski, distinguished tube and bridge engineers, have just issued their preliminary report on the proposed structure to join San Francisco and Alameda counties, in which a combined mole, bridge and tunnel are recommended. It is estimated that four years will be required to complete it, at a cost of around $40,000,000.

The proposed plan involves a tube passing from San Francisco beneath the bay channel at a depth of at least 40 ft. below mean low water and rising thence to connect with a bridge of 40 short spans; this in turn to be continued to the Alameda shore by a trestle and solid fill. There would be 3500 ft. of tube, 11,500 ft. of bridge, 3600 ft. of pile trestle and 12,000 ft. of fill or mole. The crossing would provide for two railroad tracks and a vehicular roadway through the tube 20 ft. in width. Provision would be made for the future construction of a second tube to meet the bridge, over whose span, as well as on the trestle and fill, the driveway would at once be constructed at a 40-ft. width.

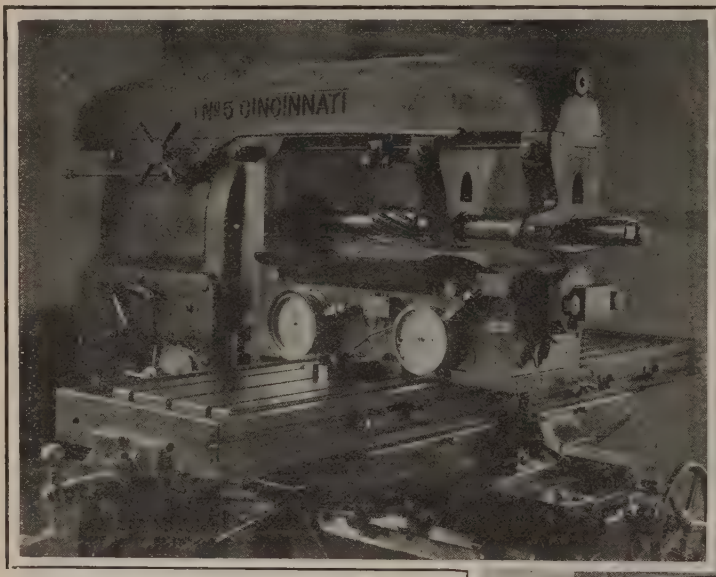
A comparison calibration of the 2,000,000-lb. chain testing machine located at the Boston Navy Yard has been completed using the calibration bar extensometer method. In this case a large 5¼-in. bar of nickel steel was used, the deformation of which was measured by means of a special extensometer. The bar was first loaded in the large Emery testing machine of the Bureau of Standards and the elongation measured for 10,000 lb. increments of load. The bar and extensometer were then taken to the Boston Navy Yard and 6 loadings to 1,000,000 lb. were made in a similar manner. A comparison of the results obtained from the two machines indicated that the chain testing machine was reading about 3.4 per cent higher than the large Emery machine.

To prevent accidents when oiling and repairing crane trucks, as well as to save time and labor, the Illinois Steel Co. has provided safety platforms at its South Chicago works, a platform being located at each end of a crane and attached to the crane girders, according to the *National Safety News*. Formerly temporary scaffolds had to be built, or the men lay across the tracks, serious accidents resulting. The platforms are guarded by railings, toe boards and a center bar. Two or three hours are saved on each job of changing brasses or truck wheels.

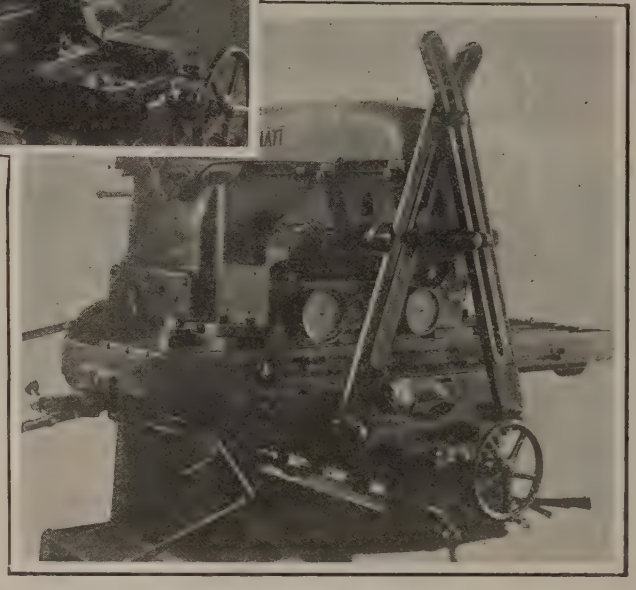
Milling Machine Dynamometer

A dynamometer for determining the pressures exerted by a milling cutter on the various working parts of a milling machine, although it is also adaptable for making tests on planers, shapers and with slight variations, drill presses, has been built by the Cincinnati Milling Machine Co., Cincinnati, from the designs of R. Poliakoff. The instrument provides a means for reading the pressures exerted on any milling cutter while at work, in two directions, the readings being taken directly from the dials shown in the accompanying illustrations.

The value of accurate knowledge of the pressures in question to designers of milling machines as well as to designers of fixtures and cutters for use on them has been long recognized. Accurate knowledge of this kind is also of assistance to designers of machine parts which are to be milled because in the final analysis the pressure of the cutter is first exerted on the piece itself and transmitted from it first to the fixture and then to the milling machine. In determining these pressures the makers state that the Poliakoff dynamometer has proved accurate and reliable.



The Vertical Downward or Upward Pressure of Cutter Is Read from Left Hand Dial



For Crosswise Pressure the Dynamometer Is Mounted as Shown and Readings Taken from Right-Hand Dial

The dynamometer is shown attached to a milling machine taking a heavy cut in steel. The vertical downward or upward pressure of the cutter is read direct from the left hand dial, the longitudinal pressure from the right hand dial. If it is desired to obtain the crosswise pressure, i. e., the pressure in line with the machine arbor, as for example the end-thrust pressure of a spiral milling cutter or a face milling cutter, the instrument can be mounted crosswise on the table and readings taken from the right hand dial.

The instrument consists of a working table supported by a base plate which is in turn bolted to the table of the machine. The work platen is supported at each end by a wide Emery plate fulcrum, their lower ends resting on two levers which carry a definite portion of the vertical load on the platen to a hydraulic chamber placed centrally under the work table. The hydraulic chamber is connected with the left hand gage which is graduated by trial in terms of the vertical load in pounds.

The horizontal load is transmitted through bars which are flexible vertically to the crosshead which in turn transmits the load to the hydraulic chamber. Heavy springs are used to put initial loads on each chamber so they will show loads in either direction. The Emery plate fulcrums carrying the loads to the levers are rigid against vertical and cross loads but flexible to horizontal loads, neither system interfering with the action of the other. Guards are provided so that any lubrication or flooding of the cutter may be used.

The working surface of the table is 18 in. long and 10 in. wide and is provided with three T-slots. The height of the working table above the bottom of the base is 8 in. The total size of the base is 35 in. long x 14 in. wide. The dynamometer has the capacity to withstand loads of 25,000 lb. longitudinal, and also loads of 4000 lb. in the opposite direction, vertical downward pressures of 10,000 lb. and upward pressures of 7000 lb.

In offering the instrument the makers point out that its value is not confined to manufacturers of milling machines and milling cutters but is valuable as well for automobile, experimental and other shops where milling operations are studied and given proper attention.

The instrument is also of value to technical schools and colleges, problems attending standardization of machines and milling cutters being more readily solved with its aid.

The Apex Motor Corporation, Ypsilanti, Mich., is looking about for a suitable plant to be used for the manufacture of motors, to be used in the production of the Ace motor car, which is manufactured by the company. The present capacity is only 50 motors a week, but this is to be increased. The company would like to purchase a plant building already erected.

The Motor and Accessory Manufacturers' Association will hold its 1921 credit convention in Detroit on Sept. 14 to 16, at the Hotel Statler. Detroit was selected because of its convenient location to the 400 parts manufacturing concerns affiliated with the association. It is planned to bring to the convention speakers of national importance in the automotive industry, banking, industrial and government circles.

Objects to Giving Information on Costs

Federal Trade Commission Indicates Informally Its Position in Regard to Furnishing Statements of Facts to Members of a Business Association

WASHINGTON, July 19.—Supplying by trade associations of information to its members relating to manufacturing costs and lists of given work, showing costs, based on tests in plants of members, is looked upon by the Federal Trade Commission as being a means to lessen competition "and to restrain trade, even to create monopoly."

The attitude of the commission was made known in a letter written by Acting Chairman Nelson B. Gaskill of the commission, made public yesterday, in reply to a letter received from F. J. Moss of the American Sash & Door Co., Kansas City, who had asked for an opinion as to the legality of the formation of the proposed Millwork Cost Information Bureau. The reply of Mr. Gaskill is exceptionally interesting and is important in view of the attitude of business interests generally and many Government officials, including Secretary of Commerce Hoover, who have expressed the belief that the commission should be given authority to make rulings in advance as to legality of trade association so as to do away with uncertainties as to their standing in law. The commission is opposed to the granting to it of such authority, as has been stated by Chairman Thompson, who was quoted recently by THE IRON AGE on this matter. The willingness of the commission, however, to give a statement on the subject as to the general principles involved, but with the distinct understanding that it is merely an informal opinion, is made plain by the reply of Mr. Gaskill to Mr. Moss and has come as something of a surprise. It had been doubted that the commission would even attempt to give an informal opinion. The reply therefore is accepted as establishing a new policy of the commission which may be far reaching in character and act as a guide for performances of trade associations and perhaps revision of present practices, even though the Gaskill reply specifically does not commit the commission to any stated policy that would establish a precedent. But with a set of general principles and in "proper cases," as the Gaskill letter indicates, business interests apparently will be given co-operation by the commission to the extent of its ability. The Gaskill letter, therefore, is considered to be a valuable contribution to the subject involved and definitely gives the views of the commission toward the educational work of trade associations in connection with cost accounting, despite the fact that the commission has no legal power to approve or disapprove of such projects as that named by Mr. Moss while in its present stage.

Doubt as to Legality of Bureau

"Its opinion in the matter must be apparent," Acting Chairman Gaskill points out, after stating his serious doubt as to the legality of the proposed bureau. "One thing is sure. If you do not publish a uniform cost list nor endeavor to educate your membership to the use of a standard cost, you will so far as this subject is concerned, be within the law."

In substance the commission, the pioneer governmental organization to urge adoption of a uniform system of cost accounting for business interests of the country, holds that the proper function of a trade association is to educate in proper methods so that the member may know as accurately as possible and compete with knowledge of his own business. But its desirable purpose, so far as the public good is concerned, stops there, and it is for each member to make his own price list and not for an association to issue to members price lists, costs, etc.

Mr. Gaskill points out to Mr. Moss that Congress purposely struck out of the law the power to make authoritative rulings so as to remove in advance legal uncertainties of proposed cost accounting associations.

"The commission is desirous of co-operating with business, however," Mr. Gaskill states, "and in proper cases, where it can by the expression of what is merely an opinion stated in general principles, contribute to the elimination of legal uncertainties, does not hesitate to do so. The application of these principles, however, to particular cases as they arise, must depend upon the facts adduced in the particular case. And the expression in such a letter as this is not to be construed as a judgment in any particular case.

Proposal to Incorporate

"It seems from your letter that the Millwork Cost Information Bureau is a group of planing mill houses which submit to a central agency their actual costs on completed products from which average or standard costs are computed. There is compiled and published a book containing the items or products and their costs for the use of estimators in planing mills.

"Sample pages submitted show such captions as the following:

" 'Flush doors—Veneered' and after specifications the following: 'Basis list price per square foot. Figure square footage—breaking on 2 in. each way, at the following prices, and add for each door, $2.50.' Then follow prices for different size doors of different woods.

"You now propose to incorporate 'Millwork Cost Bureau' and your proposed charter among other purposes states that the bureau is to furnish from time to time information to its members relating to the manufacturing and distributing costs of various kinds of mill work . . . to supply its members with suitable schedules or lists of mill work, from time to time, showing the cost thereof, based on tests made in the factories of its members.

"You state in your letter that this list is subject to such discount as a member may see fit to apply.

"The issue of this list seems to be open to question because of its tendency to induce those who use it to disregard their actual and individual costs and to adopt a standard or average which does not relate to their business and upon this uniform basis, to add the margin. The result is a trend toward uniformity of selling price and the lessening of competitive sales on the basis of efficiency. The effect might be—in the absence of an ability to forecast consequences, we cannot say it will be—to characterize the bureau as a combination to lessen competition and to restrain trade, even to create monopoly.

"One of the most valuable functions of a trade association is education in proper methods of cost accounting so that the member may know as accurately as possible and compete with knowledge of his own business. He must make its own prices. And any concerted effort to substitute for the individual's actual cost what may be to him a highly arbitrary and uniform cost basis, seems to be a dangerous misuse of the bureau's processes. It takes away the necessity for individual cost accounting by creating an arbitrary cost standard. It deprives the efficiency of the competitive advantage which efficiency gives and tends to raise the selling price to the consumer. Furthermore, the pressure toward the arbitrary use of standard costs disregards the fact that these costs vary continuously not only with the several mills but with the whole industry, and that those changes cannot be reflected to the consumer under the uniform cost list as promptly as by the individual producers each working from his own mill."

In a terrific wind and rain storm which struck Sault Ste. Marie, Ont., July 13, No. 1 ore bridge of the Algoma Steel Corporation was blown down, causing damage to the extent of $300,000.

Air-Operated Forging Hammers

The experience of a steel mill in Italy with air operated forging hammers has been reported by the Chicago Pneumatic Tool Co., New York. Although the cost of coal in the United States was far below coal prices prevailing in Italy at the times the figures were compiled, the following data may prove interesting from a comparative standpoint.

Air Operated Hammers

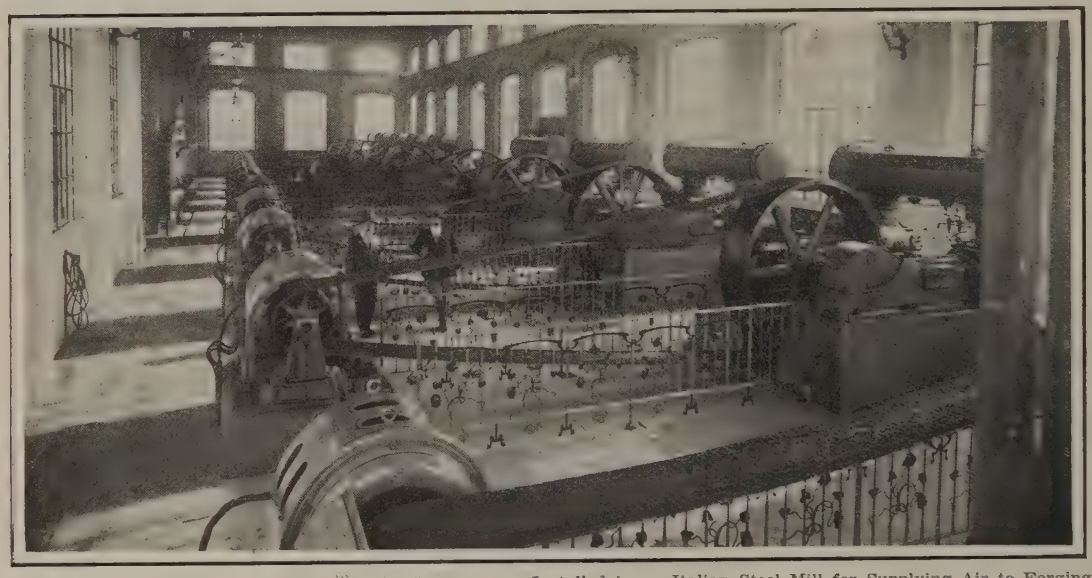
	Lire
New plant cost, including buildings, air compressors, and motor transformers	1,200.000
Electric energy consumed (hydro-electric supply) 1500 kw. for 300 days of 8 hr.	276,000
Labor, 2 men (1 electrical, 1 mechanical) @ 20 lire per day	12,000
Water (circulation), 432 cu. m. per day	13,000
Maintenance	20,000
Lubricating oil	36,000
Depreciation of plant	100,000
Annual cost	457,000

Steam Operated Hammers

Boilers had heating surface of 11,250 sq. ft. (1050 sq. m.)

Consuming 28 gross tons per day—8500 tons per annum @ 300 lire per ton	2,550,000
Labor, wages of 22 firemen @ 20 lire per day	132 000
Water	2 500
Insurance and maintenance of boilers	36,000
Maintenance of steam hammers	44,000
Annual cost	2,765,500

Whether such economies can be effected in other steel mills is a matter depending, it is pointed out, upon the abundance or scarcity of coal as a fuel, the size of the steel mill, the distance from the source of power to the forging hammers operated, labor costs, manufacturing methods, etc.



Nine Chicago Pneumatic Belt-Driven Air Compressors Installed in an Italian Steel Mill for Supplying Air to Forging Hammers

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At the July meeting of the Pittsburgh section of the Industrial Cost Association, Morgan B. Schiller, American Foundry & Construction Co., Pittsburgh, gave a graphic talk on "Practical Cost Problems," in which he outlined a cost system for a steel pipe plant, with special reference to the matter of determining the machine hour rate, and problems of depreciation. At the August meeting of the local section, the question of "Idle Plant Facilities and Handling Abnormal Overhead Expenses," which has been under discussion at the meetings of the section for the past three months, will be voted upon.

The Hinkley Motors Corporation, Detroit, has purchased seven and one-half acres in Ecorse, Mich., a down river village adjoining Detroit, on which to build a plant. Plans have been drawn and the excavating work has been started.

Will Confer with Trade Organizations

WASHINGTON, July 19.—Following a conference between Secretary of Commerce Herbert Hoover and President John E. Edgerton of the National Association of Manufacturers, Director of the Census William M. Steuart has asked the association to assemble a conference of representatives of trade and craft organizations to discuss the manner and methods of carrying out Section 32 of the Census act of March 3, 1919, by "such schedules as in his judgment may be necessary" to collect and publish for the year 1921 "statistics of the products of manufacturing industries." Secretary Hoover has also given directions to the Director of the Census to collect current commodity statistics under the provisions of Section 8 of the act of Congress of Feb. 14, 1903, which authorizes the secretary to make such special investigations and reports "which he, himself, may deem necessary and urgent." The primary design of this conference, the association has announced, is to determine the character and form of the schedules to be used in the collection of the census of 1921, which work begins Jan. 1, 1922, and to relate such work to the collection of such current commodity statistics as are desired by the Secretary of Commerce and which may be useful to the industries of the country.

The conference will be of the same general character as that assembled by the National Association of Manufacturers at the invitation of the Director of Census in 1919 and which proved of such value as to call for commendation of the director in the annual report for the year 1920.

President Edgerton will promptly issue a call for the conference which, it is stated, may result in the working out of a method of direct co-operation between trade and craft organizations with the Bureau of the Census, whereby they may collect for and on behalf of the census and themselves the figures relating to their industry and improve the legitimate activities of such organizations, particularly as related to statistical work. It is expected that the Bureau of the Census will bring to the conference tentative forms and schedules for discussion by the representatives of organizations assembled.

Wage reductions were put into effect last week by the Central Iron & Steel Co., Harrisburg, Pa. The reductions, in every case, brought the rate down to the scale now being paid by the Bethlehem Steel Co. The rate for common labor was reduced from 32c. to 27c. an hour, and adjustments were made in the payroll of all department employees. Every employee is affected by the reduction, officials have announced.

Courts Liberal to Injured Workmen

Loss of Use of Members As Well As Loss of Members Being Compensated Under Workmen's Compensation Acts

BY CHESLA C. SHERLOCK*

THE workmen's compensation acts, among other things, provide relief for an injured workman who has sustained injuries in the course of his employment which cause the "loss" of a member such as finger, hand, arm, toe, foot or leg, or any appreciable portion thereof.

These injuries are technically known in the compensation service as "scheduled injuries" for the reason that they are specifically set out in a schedule incorporated in the acts themselves, which define down to the penny the actual amount of compensation which an employer owes to a workman for a certain specified loss.

It should be kept in mind by employers that the acts impose liability upon them because the workman has suffered a loss in earning capacity. In all cases where there is not a clear schedule injury the burden of proof is upon the workman to show that his earning capacity is, in fact, impaired or lost beyond recovery.

But in the case of scheduled injuries, as where a workman loses a finger, the law steps in and presumes that the workman's earning capacity has been impaired to the extent specified by the law, and the employer must pay this compensation regardless of whether the loss of that finger has in any way impaired the workman's usefulness in the particular employment. Proof, then, is beside the question, for the presumption of the law is greater than the fact in the case.

Distinction Between "Loss" and "Loss of Use"

Ordinarily, we might mention the schedule of injuries in the average compensation law and pass on. Anyone could look up the schedule and determine in a few seconds' time just where he stood, but the courts have only recently commenced to draw a new construction around this point in the law. They have, in fact, come to a new idea in the matter, and instead of compensation wholly along the old line of the "loss of a member," they are commencing to draw a distinction between "loss" and "loss of use" of the member, which seems to be so far-reaching in its effect upon the employer's liability that an extended examination of recent decisions seems advisable.

A workman in Connecticut had lost two phalanges of a finger and had been incapacitated for three months following the injury. The Connecticut court said: "The word 'loss' is used in the sense of deprivation. It designates the handicap under which the employee will suffer in the future. Compensation is based upon this loss. It is not measured as are the other injuries resulting in partial incapacity by impairment of earning power. Each class of injuries results in partial incapacity, but the compensation for each is based upon a different theory. To support the respondent's claim, 'loss' in some cases must be construed to mean disability, and in other cases disability plus deprivation. These two classes are distinct classes of partial incapacity. *There is no reason why an injury under each class should not be compensated,* and, if the injuries in question be as the respondent insists, the loss of the use of the two phalanges and the loss of two phalanges, these are two independent injuries for each of which compensation is provided, measured as to amount and duration. The loss of two phalanges carries a named compensation, and the loss of the use of two phalanges carries a similar compensation. *There is nothing in the act which prevents compensation for any number of several injuries specifically provided for.* Payment for one does not pay for any but the one injury. And if there has been a partial incapacity followed by the loss of a member, there is nothing in the act which forbids the award of compensation for each. And whether the loss of a member follows an injury to a member resulting in a loss of its use or follows an injury to some other member, is quite immaterial; the injuries are equally distinct."

Formerly, the courts made no distinction between "loss" and "loss of use" of injured members so far as awarding compensation for each as a distinct injury was concerned. It was recognized, however, that where there was a total loss of use of a member that it amounted to the same thing as if the member had been amputated, and compensation was then awarded on the basis of loss of the member.

In one instance that came under my personal attention, where the incapacity of a workman who had suffered an injury to his right foot, exceeded the statutory limitation fixed for loss of the foot, he was awarded additional compensation, not for loss but for partial incapacity, as the best medical evidence available testified that in time he would regain the use of the foot. But, at that time, this decision was considered revolutionary and in contravention of the expressed intention of the law and the employers raised a great racket about it.

Double Compensation to be Awarded in Future

The compensation theory is extending its influence every day, and there can be no getting away from the fact that the above decision, and those quoted later, mark a new milestone in the employer's liability under that theory. It means that double compensation, so far as we have previously understood the compensation law, is going to be awarded in the future for what looked like, under the old way of looking at things, as only a single injury.

In a New York case it was shown that the injured workman had suffered the loss of the index, second and third fingers, and the fourth became stiff and practically worthless. Compensation was allowed for the specific injuries and later the industrial commission made an award for the loss of use of the *hand.* The employer contended that the commission was without power to make more than the awards specifically provided for by the New York compensation act for loss of fingers. The Appellate Court affirmed the award.

Many times commissions have said that the mere fact that an injury incapacitated a man from doing his regular employment did not entitle him to extra consideration. If he could work at all, in any kind of employment, even though foreign to his trade or calling, that fact was taken into consideration and compensation adjusted accordingly. Thus machinists who lost one hand were deemed capable of running elevators or other similar light work, and the probable earning capacity they might have in other fields of endeavor was taken into consideration in arriving at a basis for an award.

The compensation laws clearly draw a distinction between the loss of fingers and the loss of a hand. The practice, however, is growing to allow compensation on the basis of a loss of the hand where the fingers are gone or rendered useless.

A hand may not be worth much if the fingers are gone; still a workman who has the palm intact is considerably better off than the workman who loses the hand at the wrist, as the acts seem to contemplate in the scheduled compensation awarded. Then, again, a

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workman may be injured so that all the fingers, even though intact, are rendered stiff and useless. He might be better off had the fingers been amputated. To say that he should receive compensation only for partial disability would not be just to him nor just to the employer. Such a case inevitably forces the impartial mind to the admission that there is some ground for the wider latitude the courts are giving the commissions in respect to "loss" and "loss of use."

In a New York case the industrial commission found that the workman had lost "all the fingers of his left hand except his thumb, and including the entire metacarpal bones of the middle, ring and little fingers, and the major portion of the metacarpal bone of the index finger, thereby removing the entire palm from the hand," by reason of which the loss of use of the left hand occurred. Judgment was affirmed by the Appellate Court.

Loss of Principal Fingers Equivalent to Loss of Hand

In another New York case the workman lost the first, second and third fingers of the right hand and the first phalanx of the fourth finger. It was agreed that the loss was equivalent to the loss of the hand, "from a vocational point of view."

Said the court: "The fact, if it existed, that the injuries barred the claimant from the employment or the particular occupation or vocation he was engaged in where he received them does not, in and of itself, tend to prove that the hand or the use of it was lost. It is not within the letter or the spirit of the law or the legislative intention that an injury to a hand or member of an employee incapacitating him for a particular employment should establish that he was incapacitated for employment permitting or involving the use of the limb or member as injured. It is a matter of common observation and knowledge that a hand, arm, foot or leg incompetent, through injury, for certain employments is competent and useful for other employments. The expressions 'loss' and 'loss of use,' as used in the law, should be given their unrestricted and ordinary meaning. In the case at bar, the hand, or the use of it, was not lost, provided it could fulfill, in a degree fair and worth considering, in any employment for which the claimant was physically and mentally fitted or adaptive, its normal and natural functions.

"In case the hand was destroyed by amputation, directly or indirectly, caused by the injuries, to such an extent that it could not thus fulfill its natural functions, it was, within the purview of the law, lost. While the loss of a hand naturally involves the loss of use of it, and the loss of use of a hand does not involve the actual loss of the hand as a physical member, a distinction the law recognizes and observes. The question here is whether the first or second rate of compensation should be awarded. The uncontradicted evidence established that the hand was not lost and that the first rate should be awarded."

In a case involving fracture of a leg the court held that the fact that the plaintiff had sustained a compound fracture of the leg between the ankle and knee does not create a presumption that he has permanently lost the use of the member, but that the burden is upon him to prove it.

"A permanent loss of the use of a foot," said the court, "was not shown under the Workmen's Compensation Act, as a result of the compound fracture of the lower leg; was not shown where the testimony of physicians differed as to the extent of the disability, and it appeared that the claimant had some use of the foot, although he would be unable to continue his former occupation of house painting."

A question naturally arises as to what extent the law may be construed as forcing men injured in the course of their employment out of that employment in order to seek some means of livelihood. While it would not appear just to compel the employer to pay compensation in such a case as this one for permanent disability where some use of the injured member still remains; on the other hand, the fact that the loss of use, although not sufficient to amount to a loss, in fact drives a man out of his trade, is coming in for some recognition at the hands of the courts.

The workmen's compensation acts, as we have repeatedly pointed out in these discussions, seeks to share the loss occasioned to a workman in his earning capacity by reason of the accidental injury. If an accident forces a workman out of his chosen trade or calling permanently, even though it does not deprive him of the total efficiency of a limb, he certainly ought to come in for more consideration and a more liberal award than in the case of a man similarly injured but who has not been forced to give up his occupation or trade.

Cases Pertaining to Loss of Vision

It is interesting to note an Illinois case, where a workman, while wiring an automatic staple machine, was injured by a piece of wire flying from the said machine, striking his eye so as to destroy the crystalline lens. He could, as a result, only distinguish light and moving objects. It was held that there was a complete destruction of vision in that eye.

In another case, however, loss of 80 per cent of the vision in one eye was not considered as a total loss of vision. Said the court:

"Here the claimant can make use of the sight remaining in his right eye in many ways. He may not be able to follow any vocation which requires reading or other relatively fine work, as the evidence is, but he can pursue some calling similarly situated to that in which he was engaged when injured."

There can be no hard and fast rules for the determination of cases under the compensation acts, for the simple reason that these cases, in their very nature, defy classification. Each case must be decided "by the facts and circumstances immediately surrounding it," by the application of principles rather than by the application of precedents.

But the trend of the courts is changing on the question of loss and loss of use, and that means that the decisions of cases involving this point in the future are going to change. The trend is toward the broader and surer ground, not because there is a looser conception of the employer's liability, but because simple justice demands it.

Tractors Again Reduced

The International Harvester Co., Chicago, has announced a further reduction in prices on all sizes of tractors, in anticipation of the fall plowing season. The reductions range from $100 to $200 and constitute the second cut made this year. The Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has made a reduction of 10 per cent on practically all motors and motor control apparatus. This is the second 10 per cent cut in motor prices this year.

Pig Iron in New South Wales

WASHINGTON, July 19.—Increased production of pig iron in New South Wales is reported by the Mines Department for 1920, according to advice received by the Bureau of Foreign and Domestic Commerce. The total production was 26,096 tons, valued at $3,181,939, which represented an increase of 17,155 tons, valued at $974,649, over 1919.

Erroneous impressions appear to prevail as to the functions of the Bureau of Standards, Washington, as indicated by requests that certain devices be tested by the bureau and placed on its "approved list" for such appliances. Because of this apparent impression, the bureau has issued a statement pointing out that it does not have any regulatory function. In other words, it has no police power and while it might issue an approved list of appliances, such a list would not in any way be binding.

The California Metal Trades Association announced on July 15, a wage reduction effective Aug. 1, affecting approximately 50 classes of workers and averaging 10 per cent less than the wage scale now in effect. More than 25,000 men in the shipyards and other industries will be affected.

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Wage Rates and Commodity Prices

When the world makes progress through the adoption of improved methods and appliances in production, people are entitled to receive more in commodities for the service they render. How the matter is expressed in dollars is merely a detail. If one works with the same energy and ability as his father displayed, and the father was able to buy a bushel of wheat with the proceeds of a day's labor, the son should be able to buy more than one bushel. If he does not want more than one bushel he can spend the extra money on a phonograph record, something the father did not get. The rule applies only as improvements in production occur, only as there is an increase in efficiency in converting service into commodities.

It is impossible, in general, to secure higher wages or larger salaries, measured by what the remuneration will purchase, in any other way. Some agitators have preached that "capital" should divide more with labor. The difficulty, or rather impossibility, about that is that what capital gets or is able to retain is so small in proportion to the total salaries and wages paid that to take a larger percentage from what capital has hitherto retained would add only a small percentage to the wages and salaries.

Investigations made by Dr. Ralph G. Hurlin, statistician of the Russell Sage Foundation, have carried index numbers of commodity prices in the United States back to the year 1810, and average wage rates of common labor and five classes of artisans back to 1820. These presentations enable one to see whether the rule has worked out and which has varied in dollar value, the wages or the commodities. Cutting out the period of fancy prices just after the war of 1812 and the similar period of the past few years, or in other words making the comparison approximately between 1820 and 1910, commodity prices declined a very few per cent while wages nearly tripled. A week's wages would buy about three times as much of the representative commodities in 1910 as in 1820. The increment was not of course perfectly steady during the period, but it was moderately uniform.

The period is so long that there must be something important in the showing. The greater reward for services is due to productive methods and appliances being improved. It cannot be due to employers giving their employees three times as big a share in 1910 as was done in 1820. The practical question now is whether much progress in methods and appliances, or in efficiency, has been made in recent years, and the next question, seeing that the answer to the last question cannot be very encouraging, is how much progress can be made in future.

While the general or average rate of compensation, in the form of salaries and wages, cannot vary greatly from a standard when measured by purchasing power of the money received, there can be rearrangements between classes of employment. It might be that in 1914, after paying for food, etc., the coal miner could buy more phonograph records than the railroad engineer, but that in 1922 the railroad engineer could afford to buy the larger number of records, or vice versa. That changes in the division between workmen are probable is suggested by the fact that the men who do the least work in a year, such as coal miners and bricklayers, have been receiving particularly high rates per unit of work. As we are passing into a period of years of hard work all around, modifications in distribution among classes of workmen are to be expected.

A very interesting point shown by Doctor Hurlin's wage investigation, already cited, is that in a whole century the ratio between common labor and skilled labor (five classes — carpenters, house painters, machinists, blacksmiths and compositors —being taken) remained practically constant, at 100:180. Great changes in industry, in immigration and other things occurred in that century, hence it is a reasonable inference that a human element is involved, for all other things have changed. Most recent cases of particularly high wages being secured by one class or another of so-called "skilled" labor can be identified as cases in which it was found that the particular service involved could be made a commodity, and a sort of trust formed for the commodity—as with coal mining, bricklaying or holding a job under the

"national agreements" of the railroads. Such trusts need to be broken up for the benefit of wage earners in general.

Machine Tool Improvements

Contrary to a belief expressed now and then in recent months, it does not appear that we are on the threshold of epoch-making departures in machine tool design. To be sure a new grinding machine doubling previous capacity is one development, and a gear hobbing machine which all but thinks has been created, but instead of many new and wonderful things being about to burst upon the machine tool world, we are simply in the midst of unusual activity in the refinement of design, consequential though this is. The improvements are being carried along more or less conventional lines, but they are important not alone in the promise of greatly increased efficiency but, so far as the machine tool builders are concerned, in giving them an outlet for their manufacturing facilities, in that it will pay many metal-working establishments to scrap old equipment and purchase the new.

Unsold stocks of machine tools will come under the handicap of competitive machines equipped for greater output and they will undoubtedly be disposed of largely on the basis of long time credits, particularly for export where such accommodation is demanded. Such seems a likely way of liquidating the accumulations, in that the home market will be confined for some time to replacements based on the increased efficiency of the new tools.

The betterments which designing departments are expected to offer are in part as follows: Greater accuracy, this in many cases meaning greater rigidity. Better lubrication, preferably of an automatic character. Elimination in the notably powerful tools of the excessive physical endurance sometimes required of the operator. So far there is still a clinging to expensive grades of material where that is not always necessary; but keen competition may modify the tendency. Large plants conspicuous for mass production will continue to be supplied with single purpose machines. All in all, machine tool builders are showing what recent months of survey, analysis and investigation are doing toward getting their business on a healthy basis.

Steel and Other Outputs

Some statements concerning the rate of pig iron and steel production in the United States have given an exaggerated idea of the existing depression, unparalleled as it is. In June some published estimates put the activity at iron and steel works at about 20 per cent of capacity. Pig iron production last month averaged 35,494 gross tons per day, equivalent to a yearly rate of 12,946,310 tons. That figure is 32.8 per cent of the greatest year's output of pig iron—39,434,797 tons in 1916—and 25.8 per cent of the country's theoretical blast furnace capacity—50,222,400 tons—shown by the American Iron and Steel Institute at the close of 1919—a capacity much beyond possible attainment in output under practical working conditions.

The steel ingot production in June, as indicated by returns from 30 companies, was at a rate equivalent to 14,824,000 gross tons for a year of 311 working days. This is 34 per cent of the greatest output of steel ingots—43,619,200 tons in 1917—and 27 per cent of the country's theoretical capacity in open-hearth and Bessemer steel, as given by the American Iron and Steel Institute—54,250,760 tons at the end of 1919, a figure, like that for pig iron, well beyond attainment, with due allowance for repairs and breakdowns and the unbalanced relation of connected rolling mill capacity.

In this connection it is interesting to note the estimates prepared by the Federal Reserve Bank of New York, covering not only the production ratios of pig iron and steel ingots, but also of anthracite and bituminous coal, cement, cotton, sugar, flour, wool and the slaughtering of meat. In each case the figures given show the percentage which each month of 1921 bears to the average for the corresponding months of 1919 and 1920.

Commodity	Jan.	Feb.	March	April	May	Aver.
Anthracite coal mined	103	137	122	118	100	116
Bituminous coal mined	88	85	75	80	86	83
Cement production ...	88	92	115	121	112	106
Cotton consumption...	64	83	87	78	85	80
Wool machinery active	46	79	91	96	104	85
Sugar meltings	56	73	117	87	79	82
Wheat flour milled...	76	82	95	100	89	88
Meat slaughtered	84	99	96	100	93	94
Pig iron produced....	77	66	49	46	46	57
Steel ingots produced.	73	63	53	50	53	56
Average	76	86	90	88	85	85

It is evident from the above table that both pig iron and steel show an activity far below any of the other products, and hence cannot be regarded as a close index of the business conditions prevailing in the United States to-day. The fact that practically all of the items show a marked reduction from the average of the two previous years merely points to the general stagnation of industries, and indicates in some measure the extent of that stagnation. The figures given, however, emphasize the fact that too broad deductions cannot be drawn from the excessive slump in iron and steel lines.

The Value of the Dollar

The purchasing power of the dollar continues on its course toward the pre-war level, though it will not travel the whole distance in anything like the near future. A distinction must be made between the purchasing power of the dollar, when used to buy commodities or engage the services of employees, and its value when used to represent the worth of real or personal property. Bonds, mortgages, life insurance policies and things of that sort are in essence expressed in gold, and relative to these things the value of the dollar did not greatly change. When a thousand dollars would buy only one-third or one-half as much material or labor as before the war it would still buy a thousand-dollar bond or pay a thousand-dollar mortgage or be a full settlement of a thousand-dollar life insurance policy.

For a time there was a question in some men's minds whether the dollar in all aspects had not decreased in value; whether if a dollar would buy

only one-half as much in commodities and service, the wealth of the country, the buildings, mines, bridges, factories, etc., had not doubled in nominal or dollar value, but so many things have a fixed value, as just indicated, that these would tend to swing the general value of the dollar back toward its former position.

In this department of THE IRON AGE of Jan. 30, 1919, reference was made to this influence, in a discussion of the general trend of commodity prices. Noting that an argument for the continuance of high prices was that wages were up and could not be reduced materially, it was observed: "As to wage rates and commodity rates having the ability to support each other, that is a case of 'the blind leading the blind.' Neither has an element of stability. . . . There is another factor, however, that in the long run always has a very great influence, and that is the wealth of the country, expressed in the real and personal property of the people. At pre-war valuation, this stands at $200,000,000,000 or $250,000,000,000."

The Chamber of Commerce of the United States having made a pronouncement (THE IRON AGE, June 23, 1921, page 1699) that the wealth of the United States in 1920 was $290,464,000,000, it is of interest to compare this with previous statements by the Bureau of the Census. Since 1900 the bureau has computed the wealth in a non-census year. The last statement was made for 1912 and the next is set for 1923. The average annual increase in wealth from one statement to the next has been as follows, in per cent:

1850-1860	8.52
1860-1870	6.40
1870-1880	3.80
1880-1890	4.07
1890-1900	3.13
1900-1904	4.88
1904-1912	7.27
1912-1920	5.60

These percentages conform quite closely with the commercial history of the periods involved. There are low rates of increase between 1870 and 1880 and again between 1890 and 1900, decades embracing long periods in which there was much unemployment and therefore lessened production of wealth. Probably there has been some revaluation because of changes in commodity prices, but the change in valuation can have been only slight. To illustrate: commodity prices were not much more than half as high in 1890 as in 1870, and if properties had been valued in proportion there would have been shown scarcely any increase at all in "wealth" in the 20 years. The Chamber of Commerce statement of wealth in 1920 seems to be in logical sequence to the census statements of preceding years.

An idea of the weight that the wealth of the country can throw into the scale to make the dollar find its level, so that it will be of equal value whether buying commodities, labor or property, may be had by comparing the wealth with the wage and salary income of the people. The wealth in 1920, according to the statement cited, was about 290 billions. Estimating incomes in 1910, and allowing for increase in population against the number reported engaged in gainful occupations in 1910, the wage and salary income of the people of the United States in 1920, with full employment but at 1910 rates of remuneration, would be between 30 and 40 billions. The total value of commodities produced would be somewhere in the same neighborhood. Obviously "the wealth" of the country is going to have a great deal to do with determining the value of the dollar.

Electric Steel Last Year

Several striking developments in the progress of the American electric steel industry in 1920 appear in the statistics of the country's steel output, compiled by the American Iron and Steel Institute. The production of steel ingots and castings in electric furnaces was next to the largest ever recorded. At 502,152 gross tons it was only 18 per cent less than the war-time high record of 511,364 tons in 1918 and nearly 10 times the production 10 years ago of 52,141 tons.

As between ingots and castings the larger expansion has been in castings. Electric steel ingots made last year totaled 346,956 tons, or 8.48 per cent of the total ingot output, as against a percentage of 9.36 in 1918, the record year. Ten years ago ingots made in electric furnaces amounted to only about 2 per cent of the total or 52,141 tons. Significant, however, has been the progress made in electric steel castings. Last year the output exceeded all records, even the war years, at 155,196 tons. Of the total of all grades of steel castings last year electric furnace castings constituted 12.4 per cent as contrasted with 11.4 per cent in 1919 and only 4.50 per cent in 1917. The marked progress in this branch of the industry is emphasized by the fact that 10 years ago only 1320 tons was made, or an expansion in the decade of over 100 fold.

Still more important as well as significant is the growing use of electric alloy steel. Here again last year's output of electric alloy steel ingots was only exceeded in 1918 at 287,885 tons against 233,862 tons last year but in the case of electric alloy castings the contrast is sharp. From 1916 on, the making of electric steel alloy castings has made rapid strides. In that year only 926 tons were made but in 1920 this total was 11,710 tons or 17.1 per cent of the total electric alloy steel against 1.3 per cent in 1916. Even in one year the percentage of electric alloy castings of the total of alloy castings by all processes increased 4 per cent.

Our annual review of the electric steel industry in January showed an increase of 10 per cent over 1919 in the number of electric furnace installations. The production data reveal even more remarkable progress, the feature of which is not only the large total of electric ingots and castings but the marked advance in the foundry phase of the industry. The most important development, however, is the rapid growth of the demand for high-grade alloy steel castings made in such furnaces. The record made in 1920 by this comparatively new industry under peace conditions is prophetic of what may be expected when more normal conditions return to the country and the world at large.

CORRESPONDENCE

Cancellations and the Large Stocks of Surplus Steel

To the Editor: After reading over your article on "Cancelitis" on page 91 of this week's issue of THE IRON AGE, I feel impelled to write you on the same subject.

As far as the steel business is concerned, the writer's impression is that the cancelling of orders was not as severe as many of us were led to believe some months ago. There were some adjustments made between steel makers and their customers and as far as my knowledge goes the adjustments were satisfactory, in the main, to both sides. When the buyer is confronted with a situation which calls for his placing purchase orders from four months to a year ahead of his possible requirements, he is most certainly going to protect himself as far as possible. When business slumped over night as it did last year, he was further going to protect himself as far as possible by making such adjustments with his source of supply as was agreeable to both sides. The writer can speak rather freely on this subject, because in a normal year he would purchase from 3000 to 4000 tons of bars, plates, structural shapes, shafting, etc. When the slump came last year his adjustments of steel orders with the steel makers totaled considerably less than 100 tons and some of this tonnage had only been specified a few days when the adjustment was made, while on the remainder the shipping dates requested by the writer had been exceeded by the mills. In fact, on the majority of the tonnage promises of shipment by the mills had been exceeded. At that time we had a considerably larger amount of steel specified and which we accepted in the usual way when shipped. This steel was shipped inside of the date promised by the mills, and the writer felt that the proper thing to do was to accept the shipment even though it caused a surplus stock of certain items.

So having cleared my skirts as to cancelitis, as I cancelled no tonnage outright, but had arrived at a basis of agreement with several mills, (the amount was considerably less than 100 tons, but I never figured it out exactly), I wish to state that I believe that the larger part of the excessive surplus of steel that seems to be available to-day was caused by speculation and hoarding, possibly assisted by stocks which our Government and foreign governments have thrown on the market.

I know of a certain lot of steel bars now available and which was rolled by one of the leading independent steel companies. I inspected this steel this week, or at least I inspected part of it, as I did not take the time to go over the whole area. The bars of steel are scattered along for possibly a half mile. There are ½-in. rounds, ⅝-in. rounds, ¾-in. rounds, angles, flats, billets, etc. I believe some of the material has been sold, but not so long ago the list totaled somewhere around 5000 or 6000 tons. On this steel are the figures in white paint, "3-17-19," which would indicate March 17, 1919. Also other figures for April and May, 1919. In other words, this steel was available during the steel shortage. At one time there were 600 tons of one size, namely, ⅝-in. round, from 0.16 to 0.22 carbon, in bars 15 to 20 ft. long. As far as yearly tonnage is concerned, these 6000 tons would be a drop in the bucket, but how many other piles were there scattered through the United States?

In the last paragraph of your article you state that the steel maker did not complain as loudly about cancelitis as did many others; and my experience through the beginning of the depression period was that there were few complaints from the steel makers outside of those relating to the cancellations from the automotive industry.

One of the cries that have been set up by the so-called reformers has been that the American people were too extravagant, and as far as that point of view is concerned I heartily concur. But to-day the majority of the American people are practicing enforced economy and that applies both to public and private life. And an economical state of mind, in public and private life, does not produce prosperity in the country, because even when we are in an uneconomical frame of mind we produce approximately 40 per cent more than we can possibly consume. And when this economical state of mind, among buyers and users of steel products, is coupled with an excessive surplus of steel bars, etc., then it would not seem possible for the steel mills to have another period of prosperity until we get out of the economical state of mind and the excess stocks of steel have been absorbed. At this moment it does not look as though we could export very much in the line of bars or other mill products or finished machines of which the steel would be a part.

We shall probably remain in this economical state of mind until we wake up some morning and decide that the readjustment period has about reached the end; but that will not be until we have ironed out many wrinkles that still exist. To-day's is strictly a buyer's market as far as the manufacturing end of the game is concerned. It is also a buyer's market as far as the factory selling end is concerned; that is, on a great many products. The wholesaler is possibly on the same basis. But what transpires between the wholesaler and the retailer is outside of the writer's ken. What transpires between the retailer and the customer is plain to any of us who have our eyes open and wish to use them for the purpose of seeing and comparing.

H. A. RUSSELL.

York, Pa., July 15, 1921.

A New Journal of Management

The first number of *Management Engineering*, a monthly, sub-titled *The Journal of Production*, has been issued by the Ronald Press Co., New York. The editor is Leon P. Alford, who was for a number of years editor of the *American Machinist* and later of *Industrial Management*. His experience, both in journalism and in the practice of engineering, equips him in an unusual way for his new work. It is the announced purpose of the new journal "to help executives—the men of management—better to discharge their duties in preparing, organizing and directing industry to secure maximum production." The 64 pages of this first number impress the reader as much more than a preliminary flourish; they give evidence of plans well thought out and of a purpose to occupy a field that has been well surveyed. The featured articles are "The Pioneer Spirit in Engineering," "Training as a Factor in Reducing Labor Costs," "The Essentials of Storekeeping," "'Yield Value' Variations in Woodworking," "The Unexpected Trend in Accident Prevention," and "Basic Principles of Cost Reduction."

Courage must be added to the other requisites in bringing a new industrial publication into being at such a time as this; but the sponsors for *Management Engineering* evidently sense an opportunity in the country's crying need of greater production in all industry.

The Iron Age and Its Readers

The metal schedule of the Fordney tariff bill has been published in many ways by many periodicals and newspapers, but in only one place has it been published in full, with the proposed new rates presented in comparison with the rates of the present Underwood law and those of the Payne-Aldrich act; that is, in the columns of THE IRON AGE.

In THE IRON AGE of July 7 the new tariff bill was analyzed by our Washington correspondent from the standpoint of iron and steel interests; next a page and a half was devoted to the explanation of the metal schedule as made by Chairman Tilson of the sub-commitee; then the metal schedule was given in full, including complete comparison of rates as above stated. The progress of the tariff bill, with particular reference to the metal schedule, has been closely watched and reported from week to week.

BETTER TONE IN GERMANY

But Pig Iron and Ore Decline—French and British Plan Agreements With German Mills

(*Special Correspondence*)

BERLIN, GERMANY, July 1.—German export interests estimate the present iron and steel consumption of Holland, Italy, Switzerland and other iron and steel consuming countries of Europe at about 25 per cent of the pre-war tonnage, a fact that must be considered in German exports. The volume of inquiries from abroad is satisfactory, but competition is keen and there is active price cutting by other Continental producers. A change for the better has evidently taken place, the reports from the wire market being particularly illustrative of the change in the tone of the market.

Negotiations with Argentina for delivery of 9500 tons of rails and track supplies have not been successful, the contract being booked by La Providence company in Belgium. The Argentine railroads are reported to be arranging another call for bids on 10,000 tons of rails and supplies, and should the German mark remain at its present low level, the German industry will undoubtedly stand a good chance of getting the contract. The recent order for 60,000 tons of rails placed by the Russian Soviet Government was booked at $47 per ton, 20 per cent cash in gold and the balance against documents. Shipment of the first part is now being made. Recently negotiations were entered into at Berlin for another order of 100 locomotives, 3000 cars and 150 tons of rails.

Plans are being made for joint action of British and German companies in working the German market; representatives of the Vickers and Armstrong companies recently arrived and started negotiations with certain German interests. Negotiations are also pending between the French Schneider-Creuzot concern and a rival concern of the Hugo Stinnes group, but no details have been given out as yet. The recent locomotive awards have given increased employment to some mills and several large rail orders for Swedish account have also been secured.

Finished Material Improves and Pig Iron Slumps

Some deals in wire rods have been closed with Belgian customers probably as the result of the prolonged strike at the Ougrée-Marihaye works. On the other hand, export of wire products to Spain has slumped badly owing to the high provisional import duty. In general, export prices are being figured on a basis of bar iron at 78 to 80 Dutch florins per metric ton.

Pig iron is still dull, and whether the announced reduction of certain grades will influence the tone of the market remains to be seen, as the decision on the coal tax increase is still pending. The pig iron syndicate has reduced prices for Siegerland iron and steel-making iron, poor in copper, by 50 m. per ton and for spiegeleisen 6 to 8 per cent and 8 to 10 per cent Mn. by 75 m. per ton, from July 1. Other prices remain unchanged. Imports of Luxemburg iron are on a very small scale, with prices limited to 1000 m. The steadily depreciating exchange will probably render this price obsolete within a few days. Blast furnace ferrosilicon is already offered at 1900 m. compared with the official quotation of 1980 m.

In the finished material market there is a decided improvement in wire and a growing disinclination of producers to make price concessions. Terms of delivery have been extended in some departments, though generally sufficient material is on hand to effect delivery within 2 to 3 weeks from date of order. Works have resumed the issuance of warehouse stock lists of large quantities of assorted grades and shapes, which has not been done for several years past.

Coincident with the relief of the finished material market, offers of semi-finished products are less pressing. We quote 1250 m. for ingots, 1350 m. for cogged blooms, 1400 to 1500 m. for billets and 1450 to 1550 m. for sheet bars. Contradictory reports are being received from rail mills, some parties reporting very satisfactory employment while other works are curtailing production. Terms of delivery average 4 weeks. Heavy rails are quoted at 2300 m., while 1850 m. is named for light rails for mines, all f.o.b. maker's mill. Business in structural shapes is relatively light. It is assumed that the winter orders of the State railroads will stimulate the market, especially in car shapes. Prices have receded to 1700 to 1750 m. Business in bar iron is "hand-to-mouth," quotations fluctuating around the 1800 m. level. The situation in the sheet market is reflected by the dissolution of the heavy sheet syndicate. Prices exhibit a softening tendency. We quote heavy sheets, regardless of gage, at 1700 to 1800 m., base, Essen; medium sheets at 1750 to 1850 m. and light plates at about 1800 m., f.o.b. maker's mill. Warehouse stocks may be had at lower prices without guarantee of condition and quality. High-grade sheets are offered at the light plate price plus, according to quality. Black sheets bring 2200 m., sheets for stamping, double planished, 5000 to 5250 m., according to gage.

Wire Rods Active

The wire rod market has been improving rapidly during the past fortnight, especially in export sales. Prices are rather erratic, and while speculative lots may still be obtained at about 1650 to 1700 m., the majority of works are now naming 1800 to 1850 m. per ton and the latest export quotations range between 1950 and 2000 m., f.o.b. Rotterdam or Amsterdam. This price is obviously for overseas shipments since quotations given for other countries are on the inland market level. The wire convention has at last been dissolved, having lost its official character by being transformed into a commercial association. Prices have been given free since July 1. Business at hoop iron mills leaves much to be desired. Hot rolling mills report sluggish business, the best grade of hoops being offered as low as 2000 m. per metric ton.

Low Continental Steel Prices Quoted in England

The extent of the competition which British iron and steel companies are likely to meet from Continental steel is indicated by the following quotations on typical products recently made in response to British inquiry. The quotations are f.o.b. Antwerp or other Continental port and were made by manufacturers in the three countries named. The conversion has been made from British money into dollars and cents on the basis of recently prevailing exchange. The billet price is per gross ton and the other prices per 100 lb.:

	Belgium	France	Germany
Billets	$22.26	$24.11	$22.26
Structural steel	1.36	1.36	1.24
Bars	1.40	1.40	1.20
Tube strip	1.32	1.49	1.49
Plates	1.24	1.36	1.24

The description of plates is not stated. British ship plates were quoted recently at the equivalent of about $52 per gross ton, maker's works; beams at about $49; bars, $49; billets, $39 to $40. Some purchases of Continental rail blooms by British mills have been reported recently at £7 10s., c.i.f.

Officials of the Continental Motors Corporation, Detroit and Muskegon, Mich., have confirmed the recent report that a very large order for engines has been placed with the corporation by Durant Motors, Inc. Corporation officials will not state the size of the order, but report has it that it is for 100,000 engines. The four-cylinder Durant engine will be made at the Muskegon plant.

The Baltimore & Ohio Railroad Co.'s commercial development department, Baltimore, has just issued a very attractive series of pamphlets, giving a large amount of information in regard to natural resources of the districts through which the lines of the company pass. The pamphlets are edited by G. P. Grimsley, geologist.

Only Minor Changes in Metal Schedule

Despite Attacks Upon Duty on Ferromanganese, It Was Adopted Tuesday by the House—Congressman Tilson Disclaims Responsibility for Some Unpopular Features

BY L. W. MOFFETT

Washington, July 19,
THE IRON AGE BUREAU,
816 Fifteenth Street.

WITH only comparatively unimportant amendments made to it, the metal schedule of the permanent tariff bill was disposed of in the House late this afternoon after discussion of less than an hour and a half, duties on ferromanganese constituting the chief points of attack. Those assailing the duties not being Republican members of the Committee on Ways and Means, were unable under the rules to offer amendments and consequently did not try to do so. The amendments adopted, about 20 in all, were offered by Representative Tilson and principally were in phraseology in order to correct clerical errors. The bill will be passed Thursday.

One amendment classifies spiegeleisen as an alloy containing less than 45 per cent manganese and ferromanganese as an alloy containing 45 per cent manganese or more. In paragraph 305, the required content of molybdenum in order to get the additional duty of $1.25 per pound, was changed from 1 to 1½ per cent, and a similar change was made with regard to tungsten content before application can be made of the additional duty of 72c. per lb. The wire paragraph, 316, was broadened so that all wire coated by dipping, galvanizing, etc., shall pay a duty of 1c. per lb. additional to the rate imposed on the wire of which it is made.

In replying to numerous attacks on ferromanganese duties, Representative Tilson made vigorous denial that they were suggested by the Steel Corporation and said that, contrary to the charges, the Steel Corporation's representative had opposed the duties. Among those attacking the ferromanganese duties were Representative Cooper, Republican, of Wisconsin, and Representative Carew, Democrat, of Arkansas. Representative Burton, Republican, of Ohio, attacked the rates on ferrosilicon and ferrotungsten.

The Duty on Ferromanganese

Before the metal schedule was taken up to-day, a number of attacks had been made on it. Some had been directed against the duties on ferroalloys and had come from Republican members who will vote for the bill. Among Republicans attacking the duty on ferromanganese was Representative Stafford of Wisconsin. He stated that he had received many protests from machine manufacturers and foundry interests of the country against the duties of 2 1-5c. per lb. on ferromanganese of more than 1 per cent carbon and 2 1-5c. per lb. and 28 per cent ad valorem on ferromanganese of less than 1 per cent carbon, the duties being based on the manganese content. He inquired of Representative Tilson, chairman of the subcommittee in charge of the metal schedule, why the committee had recommended the ferromanganese duties carried. The reply of Mr. Tilson showed plainly that the duties were not placed upon his personal recommendation, but were adopted against his vote and upon the suggestion of others.

"In view of what took place in the committee and the attitude on this particular matter of the member of the committee now being interrogated by the gentleman from Wisconsin (Mr. Stafford), I prefer that he ask some other member of the committee to explain it," said Mr. Tilson. "I fear that I could not do so satisfactorily."

The Preliminary Debate

It was expected that the ferroalloy duties would be the object of greatest controversy in the metal schedule, and this expectation was fully realized this afternoon. Until to-day, however, the discussion of the metal schedule had been relatively slight and of a decidedly general character. Nothing like a close analysis of it had been made on the floor. This, of course, was partly due to the short time that had been given to the tariff in the House. Other schedules, such as those relating to chemicals, oils, cotton and lumber, received most attention and discussion became heated over them. Administrative features, drawn largely by the Tariff Commission, also came in for considerable argument, this being particularly true as to the American valuation plan.

Hurried Through the House

It can be safely stated, though members of the House resent it, that there is a rather widespread belief that the House bill is being hurried through with the knowledge that it will be greatly changed by the Senate. Some members of the House, for instance, who have received many complaints of the ferroalloy duties, have not even brought them to the attention of that branch of Congress, but are expecting that the Senate Committee on Finance will revise the rates considerably. It is evident, however, that those supporting the rates will ask the Senate to grant duties which are considered necessary to build up a domestic industry. Some who have sent protests against the duties on ferromanganese have declared that those now proposed are "indefensible," but that they favor a moderate protection for the domestic furnace interests.

In the course of a brief discussion of the metal schedule last week, Representative Tilson exhibited a tabulation of imports and domestic prices of products carried in that schedule, covering the years 1913 and 1920. The charts were prepared by the Tariff Commission and give the import value for the two years mentioned, so far as practicable, and the domestic prices of these articles at the time the charts were prepared.

Structural Steel Rate Attacked

Representative James W. Collier, Democrat, of Mississippi, attacked the rate of 7/20c. per lb. carried in paragraph 312 on structural steel. He sought to make a comparison between the imports and exports of structural steel, stating that the former were relatively slight, and that inasmuch as domestic steel was used almost exclusively for the construction of the merchant marine, navy, commercial building, etc., the tariff would be a tax on this work. He went so far as to say that the increase would be so great that perhaps a deficiency bill would have to be brought in, and that the duty would actually destroy the merchant marine. His line

of argument was fairly representative of that made against the metal schedule rates and denotes the lack of information of an illuminating character, and for that reason it was not taken seriously.

Chairman Fordney of the Ways and Means Committee replied that there has never been "under a Democratic free trade tariff bill or any other, a pound of steel brought into this country and put into a bridge that was ever built since the foundation of the Republic."

American Valuation Plan

Representative Longworth, a member of the Committee on Ways and Means, explained at some length the operation of the American valuation plan and denied vigorously that it would result in prohibitive duties. He said that rates in the Fordney bill had been lowered under the Payne-Aldrich rates in order to make allowance for the American valuation plan in the case of ad-valorem duties and to bring the revenues contemplated under the plan to the basis of those of the Payne-Aldrich act. Under the plan, ad valorem duties would be assessed on "home values" in the principal markets and bring about a uniform assessment for the same class of importations from countries having different costs of production. It was asserted by Mr. Longworth that the need for such a plan becomes "infinitely more pressing in these days of chaos in foreign exchange." The price on which the duty is to be assessed will be that prevailing on the date of exportation of the products imported at which comparable and competitive products of the United States were ordinarily sold or freely offered for sale in the usual wholesale quantities. In other words, it would be the general market price of similar articles in the United States. It does not involve the particular price that may prevail at a particular port of entry due to transportation costs or otherwise. In the case of steel, for instance, the price would be that prevailing in the principal market, or on the Pittsburgh basis. Assuming that there was an ad valorem duty of 15 per cent on steel plates and the Pittsburgh price was 2c. per lb. or $40 per net ton, Pittsburgh, and the steel was imported at $30, New York, the importer would pay 15 per cent of the American price, or $6 a ton. The $6, together with the $30, or $36, would represent the cost to the importer to bring the steel plates to New York. In other words, he still would have an advantage of $1.60 per ton over the Pittsburgh maker in the New York market, for the latter would have a rate of 38c. per 100 lb. or $7.60 per net ton to overcome, making the cost of the shipment from Pittsburgh equal to $37.60.

Bargaining Features

Representative Longworth spoke favorably of the bargaining clause carried in the Fordney tariff which authorizes the President to reduce the conventional duties 20 per cent in the case of foreign nations with which he may negotiate trade agreements in return for the United States receiving the benefits of their minimum tariffs on given American products. Mr. Longworth said he could conceive of nothing which will have a more beneficial effect upon the enlargement and retention of American export trade than the bargaining tariff. He said that if other nations know that the President has it in his power to give them certain special advantages in the United States market in return for certain special advantages in theirs, he has every confidence that instead of discrimination against American exports there will be encouragement of them.

Upon passage of the bill by the House, the Senate Committee on Finance will arrange for hearings, lasting a month or six weeks, it is expected, and they probably will begin soon.

MORE MILLS ACTIVE

Schedules of Mills in Mahoning Valley Show Improvement

YOUNGSTOWN, OHIO, July 18.—Independent steel mill schedules in the Mahoning Valley are appreciably improved this week, especially finishing capacity, due in measure to accumulation of tonnage resulting from recent slack production.

Sixteen of the 51 independent open-hearth furnaces are fired, 35 of 105 sheet mills are active and 19 tin mills. Strip mill and pipe furnace schedules are likewise on a larger scale.

The Trumbull Steel Co. has the best operating schedule in many weeks—two open-hearths, two jobbing mills, six sheet and 19 tinplate mills.

Five of the tube mills of the Youngstown Sheet & Tube Co. are active and two of the Republic Iron & Steel Co.

Both the 84-in. and 132-in. plate mills of the Brier Hill Steel Co. are partially engaged.

Plant Operations

The Chicago, Burlington & Quincy Railroad Co. has added about 2300 men to its forces since July 1, 1300 of them to be used in car repair work and the remainder on maintenance of way.

The Nash Motors Co., Kenosha, Wis., has resumed production in the four cylinder car division works at Milwaukee with a force of 750 men, the same number engaged at the time the factory closed down May 31 for balancing of stocks. The entire crew is working on an 8-hr. a day schedule.

The Erie Railroad Co., Buffalo, has resumed operations at its local car and locomotive shops after a shut-down of several months giving employment to about 800 men. The company has also placed its shops at Hornell, N. Y., in service, effective July 11, with a working force of about 1000 men.

The Great Northern Railway has reopened the machine shop department of its division headquarters at Superior, Wis., which was closed May 27 for an indefinite period. About 225 men have returned to work at a reduction in wages. The shops handle most of the new construction and repair work on cars and locomotives used in the ore carrying trade between the Minnesota mines and the Great Northern docks at Superior.

Follansbee Bros. Co., Pittsburgh, is planning to resume operations at its plant at Follansbee, W. Va., in the week of July 25. This plant has been down since June 30.

According to S. W. Wakeman, general manager Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., a further reduction in working forces is in order. A total of 2500 employees will be laid off indefinitely and the remaining 1500 will be put on part time. This reduction follows an announcement from the Navy Department that its allotment of funds for 1921 naval work has been reduced materially under the amount required to carry on work as originally laid out.

The New Departure Mfg. Co., Bristol, Conn., ball bearings, etc., normally employing more than 4000, reports increased orders and consequently re-employment of about 90 per cent of the force engaged in ball-bearing manufacture. The Meriden, Conn., plant remains closed.

The Champion Horse Shoe Co., Pawtucket, R. I., has closed its plant until after Labor Day. Repairs to the furnaces necessitated this move rather than the depression of business. The plant has been operating on an 80 per cent basis and employing 150.

The Cutaway Harrow Co., Higganum, Conn., plows, harrows and other farm implements, normally employing approximately 100 skilled hands, has closed its plant for an indefinite period.

Steel Makers Oppose Duties on Manganese

Free Ore Urged, with Conservation of Domestic Supply—Ferromanganese Duty Could Then Be Lowered and Still Be Protective

WASHINGTON, July 19.—So far as the steel trade has been heard from concerning the proposed duties on manganese ore and ferromanganese, its attitude is one of strong opposition to both duties. Expressions so far made indicate that a determined effort will be made to restore manganese ore to the free list and to secure a very substantial reduction in the duty on ferromanganese. Steel manufacturers are opposed also to the duties on magnesite as excessive. The Metal Schedule of the new tariff bill as reported to the House last week provides for a duty of ¾c. per lb. on calcined magnesite including dead burned and grained, and ½c. per lb. on crude or ground magnesite. The opposition of the principal independent steel producers of the country to the manganese ore and ferromanganese provisions of the new tariff bill is indicated in a statement presented on their behalf to the Ways and Means Committee of the House. Extracts from this statement are given below. It is understood that similar representations will be made to the Finance Committee of the Senate. It will be seen that emphasis is put upon the difference between the position of the United States Steel Corporation as an importer of its own manganese ores and a producer of its own ferromanganese and the position of the independent steel companies, which for the most part are buyers of ferromanganese in the market:

Advantage of the Steel Corporation

"The principal alloy used in the manufacture of steel is ferromanganese, the smelted product of manganese ore. This item furnishes a fair example of what is contemplated by way of a burden upon the cost of producing steel in the plants of the independent steel works of the country. This proposed increase in duty will amount to approximately 33c. per ton of steel, as a duty tax, or an increase in the cost of steel of approximately $6,600,000 per annum, calculated at 33c. per ton on 20,000,000 tons of annual output from these independent plants, not including the output of the United States Steel Corporation.

"Furthermore, this tax upon the independent producers would be in effect a direct benefit to the United States Steel Corporation, our principal competitor, by nearly the full amount of the tax proposed, because the Steel Corporation produces and imports its own manganese ores and manufactures its own ferromanganese. Therefore the proposed duty of 1c. per lb. on the manganese content of manganese ore, which ore averages approximately 48 per cent, would call for about 2.2 tons of ore for the production of one ton of ferromanganese, so that the increased cost on account of the duty paid by the Steel Corporation on imported manganese ore would amount to only about 7c. per ton increased cost of steel produced by them, whereas the independent or smaller producer of steel, who does not consume enough ferromanganese to justify its manufacture by importation of manganese ore, and who therefore must purchase ferromanganese subject to the 2¾c. per lb. duty [The committee later changed this duty to 2.2c. per lb.—EDITOR] would have his cost of steel increased about 33c. per ton, because it requires not less than 15 lb. of ferro per ton of soft steel, and we do not hesitate to say that this added burden to the independent steel producers' cost, taken in connection with their present disadvantages, would seriously weaken their competitive position and drive them into combinations for the manufacture of ferromanganese, to the general detriment of all interests.

"Aside from the discrimination which would result in favor of the United States Steel Corporation, very great injustice would also result to all producers of steel and pig iron, viewed from the standpoint of equitable taxation, because the proposed exorbitant and destructive rates are all out of proportion to the general rates proposed on finished iron and steel under Schedule C.

Iron and Steel Duties Much Lower

"The schedule of duties now recommended by the steel people, based on current values for steel, averages on an ad valorem basis, from pig iron to finished steel products, approximately from 8 to 20 per cent for the principal iron and steel products, whereas the alloy manufacturers, whose product is our raw material (which product has a low labor cost) ranges in duty, on an ad valorem basis at present values, from 48 to 200 per cent. This comparison fairly indicates the injustice of the alloy schedule, as there can be no justification for maximum rates of duty on raw materials carrying minimum labor costs, whereas the highly refined, rolled or forged steel products are entitled to maximum rates, because they carry maximum labor costs.

"We would further state that ferromanganese is a blast furnace product like pig iron; but the manufacture of ferromanganese requires about three times as much coke and about four times the labor cost of pig iron, while the output per furnace is about one-third that of pig-iron, and the cost of ferromanganese, above the manganese ore charge, is about four times that of pig iron. So that it is fair to say, a relative rate of duty on ferromanganese, based on a pig iron duty of $2.50 per ton, would be $18 per ton. With iron ore on the free list, no duty should be placed on manganese ore, because it costs no more to mine domestic manganese ore than to mine domestic iron ore, and therefore there should be no discrimination. Furthermore, as we must import most all of our manganese ore, no obstacle should be placed in the way of a free movement.

"As a further illustration we would state that the proposed duty on ferromanganese of 2¾c. per lb., calculated on the manganese content of ferromanganese, equals about $44 per ton, while the duty proposed on wire nails is 4/10c. per lb. or $8 per ton. In other words, wire nails made from pig iron, then into steel, next into wire rods and finally nails, after undergoing four distinct processes of manufacture, is listed to receive less than one-fifth protection contemplated for ferromanganese, which is part of the raw material required to produce a wire nail.

Protection, But Not High Protection

"Another phase of the situation which we would bring to your attention, although the records speak for themselves, is that when the Payne-Aldrich bill was under consideration, in response to the general sentiment throughout the country for lower duty, the steel manufacturers of the United States recommended to the Ways and Means Committee radical reductions downward in the Dingley bill, which action on their

part resulted in a cut of about 50 per cent of the Dingley schedule and the enactment of the Payne-Aldrich bill. In contrast with the attitude of the steel manufacturers, manufacturers in many other lines urged and obtained unfair rates of duty, which outraged public sentiment, and as a result the Republican party went down to defeat.

"Free raw material is a Republican principle and has been written into the Republican tariff measures. To revoke that principle now, through the substitution of prohibitive rates on alloys and refractories, would not only be politically unwise, but unwise from the standpoint of conservation of our raw materials, because this country's supply of these raw materials is not only meager in quantity but lean in character, and everything that can be done should be done to conserve these meager reserves, by encouraging the importation of these materials, so that in times of national peril home supplies of not only alloys but refractory materials can be more fully depended upon for purposes of national defense."

Lower Duty Urged on Magnesite

The continuance of the Underwood duty of 10 per cent on magnesite is urged on behalf of the manufacturers of steel in the following communication which was addressed to Chairman Fordney of the Ways and Means Committee:

"Steel manufacturers, while advocating the application of the protective principle for the protection of all American manufactured products, do not believe that the proposed rate of $15 per ton on magnesite is necessary for protective reasons, because this rate per ton is nearly 50 per cent of the selling price of magnesite at the Atlantic seaboard; furthermore, we question whether any increase in duty over that of 10 per cent provided under the present law is necessary for protective purposes, because during the year 1920 our total imports of magnesite were not in excess of 50,000 tons, whereas our domestic production was close to 300,000 tons, and it is therefore quite apparent that domestic trade has not suffered any serious competition, even under the Underwood bill.

"We therefore urge that your committee, in fixing the rate of duty, give full consideration to the thought that magnesite is one of the raw materials used in the manufacture of steel, and should be rated like other raw materials, either on the free list or on a revenue basis. Otherwise, cost of manufacturing steel will be unnecessarily increased. Inasmuch as our domestic reserves of magnesite are somewhat limited, importation of part of our requirements is in harmony with the policy of conservation and therefore will strengthen our national position in time of war, and our world's competitive manufacturing position in time of peace.

"With the iron ores of Michigan and other States on the free list, the question may be fairly asked, Why should magnesite production of Oregon and California be entitled to preferential treatment unless for revenue purposes?"

FILLING OLD ORDERS

New Business Light in Mahoning Valley—Price Cutting on Sheets

YOUNGSTOWN, OHIO, July 19.—Considerable tonnages of steel products have been accumulated by Mahoning Valley producing interests recently, accounting for a substantial enlargement in active productive capacity. W. E. Manning, vice-president and general sales manager of the Youngstown Sheet & Tube Co., states that incoming business is in insufficient volume to warrant a statement of general improvement.

It is the consensus of opinion among leaders of the industry in the Mahoning and Shenango Valleys, however, that the low point in the period of depression has been passed, especially in the steel industry. An important manufacturing consumer of various steel lines believes that steel prices in some lines are virtually at the bottom, and that buyers may be expected to come into the market from now on to satisfy their requirements.

Prices are not as firm under the new schedule on some products, however, concessions being offered on sheets and plates. An important district maker reports that 3.25c. and 4.25c., respectively, are being quoted on black and galvanized sheets, which is $5 per ton below the recently stabilized price level in each instance. The lower prices have served to create considerably more inquiry, though actual business placed has been for small tonnages.

Owing to season conditions and the fact that automobile models are being changed at this season, automobile makers are curtailing their full-finished sheet requirements. Producers, as a consequence, who have been virtually operating at full capacity for an indefinite period, are preparing to modify their operations and may fully suspend within a short time.

Tank Plate Orders

Plate business before the trade is largely confined to small-lot orders of tank plates, with the price around 1.90c., which compares with the nominal market quotation of 2c.. Negotiation of important car repair contracts is expected to lead to business from these quarters, which will have to be placed, though, at bottom prices to meet the terms of such contracts.

Some improvement is noted in wire and nail buying, the further reduction in prices serving to bring buyers into the market for current needs at least. The market is holding at 2.50c. and 2.75c. on plain wire and nails, respectively. An inquiry involving upwards of 1000 tons of rods has been before the trade and is expected to lead to business. A concession price is anticipated.

Reduction in the price of strip steel has brought out some tonnage, enabling makers in this territory to maintain output at 50 per cent. While a large part of current production is for automobile uses, other buyers are entering the market.

Concessions on tinplate from the $5.75 price are reported. Somewhat more than ordinary activity is reported in this market.

Low Prices on Basic

Weakening of basic pig iron prices brings a hint of $18 for Valley iron, and a sale of 2000 tons at $18.50 by a Valley steelworks interest, which has been purchasing its iron requirements rather than start its own furnace, is reported to have been made. Low phosphorus iron was recently quoted at $35 by a district interest. Bessemer iron has been offered at $21, though the ruling price continues to be $21.50.

Pipe buying is still confined chiefly to the smaller sizes and only in volume sufficient to maintain production at 20 per cent.

The semifinished market is naturally stagnant, with sheet bars available at less than the $35 quotation. Small billets are being quoted at $34 and slabs at $33. The minimum on forging billets appears to be $40, with independent production at less than 10 per cent.

A large fabricator of fireproofing and metal furniture reports increased inquiry, some of which is expected to materialize into business. Fabricators of steel reinforcing materials are getting demand for materials for public buildings, highway and industrial developments. Such buying is maintaining operations at 60 per cent.

Though an occasional carload is moving, the old materials market is lifeless. Railroad scrap is down about 50c. per ton, bringing the market range from $11.50 to $13, depending upon the nature of the material.

Prime Western spelter is quoted at 4.30c., which is down 5c. from the recent level.

JAPANESE ACTIVITY

Orders for Structural Steel, Tin Plate, Sheets and Copper—Canceled Material at New York

NEW YORK, July 19.—The Japanese market continues to be about the only foreign market showing any noticeable activity. The recent bridge inquiry totaling 1500 tons for the vicinity of Tokio has been placed with Mitsui & Co., which also received the previous order for about nine bridges. Takata & Co. has been awarded the order for 5000 boxes of tin plate for the Imperial army. Buying of copper continues, one New York exporter having recently booked an order for about 200 tons of copper ingots for a Japanese consumer. Sheet buying is still a fairly large item from Japan. An American exporter dealing with Japan is quoting on about 100 tons of light gage black sheets and a large Japanese house recently placed an order with a mill, which has never before been in the market to roll sheets for about 400 tons of black sheets, No. 31 gage, packed for export. The inquiries for short mileages of 12-lb., 25-lb. and 30-lb. rails for Japanese consumers have not yet been placed.

Light buying continues by the South Manchurian Railroad, and there is some inquiry and purchasing of electric units and equipment in the Far East. One Japanese house is now quoting on 700 Shelby seamless steel poles, tapered from 2-in. to ¾-in. at the top for use on an electric trolley line in Japan.

Quantities of canceled material are still available at the port of New York. Lots of bars, angles and tees in good condition are reported offered as low as 1c. per lb. This material was originally consigned to South American markets and canceled. One exporter has been negotiating for the purchase of a lot of electrical sheets, which have been offered at 4c. per lb., against an average market price of 7.50c. per lb. These sheets were originally purchased for shipment to an Italian consumer.

The Ulen Contracting Corporation, 120 Broadway, New York, is reported to have a contract from the Bolivian Government for the construction of a new railroad line in that country, extending from Villazon to Atoche, 128 miles, with cost estimated at $10,000,000. The contract is to be completed in 5 years. The specifications call for the installation of American type of track equipment, with similar motive power. Railroad shops and other features are included. This report is not confirmed.

The Cie Centrale de Construction, Haine St. Pierre, Belgium, informs THE IRON AGE that it is interested in hearing from American manufacturers of shapes, steel castings, buffers and drawing bars, couplers, tires, axles, springs, forgings, car hardware, car lighting systems, brakes, car heating systems, reversible and fixed seats and all other rolling stock specialties.

The Chinese Government railroads are reported to have placed an order in Belgium for 30 prairie type locomotives and 6 British type locomotives. Chinese railroads have also placed orders for 300 freight cars with the American Car & Foundry Co. and 600 freight cars with the General American Car Co.

Ajuria y Aranzabal, Barcelona, Spain, has purchased a 1-ton electric furnace for the production of steel castings, from the Pittsburgh Electric Furnace Corporation, Pittsburgh. This is the second electric furnace purchased by the Spanish company from the Pittsburgh company.

AUSTRIAN TARIFF QUESTION

Protection Held Unnecessary by Consumers, Farmers and Labor—Germany Active in Mergers

(*Special Correspondence*)

VIENNA, AUSTRIA, June 22.—Attention has been called to the attempts of the iron producing industry to reintroduce customs duties on pig iron and semi-finished material and increase the present rates on finished products. Consumers as well as the trade and labor opposed this plan and the Government, hard pressed from both parties, eventually submitted the whole question to a committee composed of representatives of producers, consumers, farmers and labor. The producers pointed to the high cost of production and urged the necessity of protection against foreign competition The Government, however, was impressed by the argument that the proposed protection would result in an advance in the cost of raw products by 40 per cent and nullify all attempts that have been made to bring down prices. Representatives of the iron working industry declared that tariff protection would cause a serious crisis affecting as it would 250,000 workers, and the idea of a protective tariff for a country exporting 80 per cent of its production was held to be absurd.

Germany Active in Austria

Germany is as active in the Austrian market as ever. Aside from mere competition, there is "peaceful penetration" in the merging of interests. A joint-stock company for railroad material has been established by the large merchant firm of Otto Wolff at Cologne with the co-operation of the Rheinische Stahlwerke and the Vienna firm of Biedermann & Co. The capital stock amounts to 20,000,000 kronen. Another company recently established is the "Mannesmannröhren-und Eisenhandels Gesellschaft m.b.H.," which is a merger between the Mannesmann tube works and the Freistadt Steel & Iron Works for the purpose of selling tubes in Austria. The black sheet syndicate at Cologne is represented by a newly established company at Vienna and another firm catering to the sheet and rolled material markets is Dobbertin & Co., exporters, Hamburg, with a separate company in Vienna.

Very little activity is noted in the market—the pressure of German supplies accounting for the subdued tone. Demand is light, consumers anticipating further price concessions. Several of the smaller rolling mills have laid off men and price cuts by other works are proving ineffective against German competition. Fabricators are offering large stocks at prices frequently below warehouse or mill prices.

The Demming Co., Salem, Ohio, has resumed operations in its plant which has been shut down about three months.

The American Metal Products Co., Detroit, has let contracts for the construction of a new brick and steel carbide generator plant.

Contracts have been let by the Timken-Detroit Axle Co., Detroit, for the erection of a brick and steel power house on Clark Avenue.

The Herbrand Co., Fremont, Ohio, manufacturers of drop forgings has resumed plant operations with 250 men. The plant had been shut down for some time.

The United States Screw & Stamping Co., 91 Exchange Street, Worcester, Mass., recently incorporated with a capital of $25,000 to manufacture screw products, metal stampings, etc., does not expect to build but will buy more equipment shortly.

United States production of sulphuric acid increased from 2,338,280 tons in 1914 to 3,296,270 tons in 1919, a gain of 41 per cent, according to the Census Bureau. The value of product was $15,395,100 in 1914, or $6.58 per ton; in 1919, $35,638,200, or $10.81 per ton.

Iron and Steel Markets

PRICE CUTTING GENERAL

More Concessions in Plates, Shapes, Bars and Sheets

Sharp Competition in the Chicago District—Railroad Buying Increasing

Cutting of the steel prices announced early in July has been more general in the past week, particularly in plates, structural shapes, reinforcing bars and sheets. The favorable feature has been that more business has come up. In the eagerness of producers to get a share of it prices suffered.

Railroad and construction demand are responsible for most of the week's activity in plates and shapes and the accompanying concessions of $3 to $5 per ton in the prices of the two products. The buying was not such as to indicate any change in the general situation, much of it having been in sight recently awaiting favorable prices.

Steel works operations are on a smaller scale in some districts and in others practically unchanged. The Youngstown district in particular is at a low rate.

Aggressive competition between Steel Corporation and independent steel has been seen in the Chicago market. Pittsburgh basing has gone by the board in that district and on a small plate order from a railroad 1.80c., Chicago, was done. Presumably lower prices were made on 3000 tons of steel for car repairs, 2600 tons placed by one fabricating company and 1200 tons by another. The week's transactions at Chicago show that the extent to which the announced prices are cut depends entirely on the size and character of the order and the hunger of the mill.

At Philadelphia a 5000-ton order for plates and shapes for a fabricating company went at 1.75c., Pittsburgh, for the plates and 1.80c. for the shapes, whereas both are presumably 2c., Pittsburgh. Several lots of about 1000 tons, reported in the New York market, brought out prices of 1.80c. and 1.85c. and in one case 1.70c.

In concrete reinforcing bars 1.70c. has been reported for soft steel. A round volume of such bars is under active negotiation, including 3800 tons for export.

Considerably more car repair work is ahead. The Lehigh Valley's repair and rebuilding program includes 5000 freight cars and the New York Central will do much in both car and locomotive repair. The Illinois Central is expected to buy 140 locomotives.

Sheets have been sold in the past week at $3 to $5 per ton below the so-called stabilized basis. Buying is better and mill operations have increased about 10 per cent.

The wire trade shows little movement either in agricultural or jobbing lines, but there is little disposition to go below the 2.75c. basis, in comparison with what is happening in heavy steel products. Recent mill operations have been around 30 per cent.

A 4000-ton girder rail order has been placed with the Lorain, Ohio, mill by the Chicago Surface Lines.

Cast iron pipe lettings have been above the average in the past week and some attractive business is ahead, including 5700 tons for Detroit and 3000 tons for Hammond, Ind. Prices continue to settle.

Eastern Pennsylvania furnaces have taken the lead in reducing pig iron prices, reductions of from $3.50 to $4 per ton having been made in the past 10 days, the most precipitate drop since the decline began. This has been due largely to keen competition from furnaces at Buffalo, where very low quotations prevail. In other centers, new concessions of from 50c. to $1 have been made. In Alabama, although there is now only one merchant stack in blast and stocks are declining, the market is weak with the tendency still downward. Belgian iron is being offered in this country and a sale of 100 tons has been made at $30, delivered San Francisco, but buyers are slow to place orders in a declining market for foreign iron for which deliveries are uncertain.

In the export trade the most significant fact is that Belgian steel mills, which have been especially aggressive in outside markets, are now filled up for some months ahead. The German works, whose low prices have been an unsettling factor in South America and elsewhere, are also booked to a degree that will make them less of a menace to American mills.

A 12,000-ton rail inquiry from the Chilean Government, withdrawn late last year, is coming up again next month. German mills were low bidders before.

The high manganese ore and ferromanganese duties in the new tariff bill having passed the House against the protests of steel producers, a determined effort will now be made by the industry to secure their reduction by the Senate.

Pittsburgh

PITTSBURGH, July 19.

Although the iron and steel market here is weak and there has been no material increase either in business or in plant activities, the situation sentimentally is better than it has been. The idea is fairly prevalent that the stocks of usable material in consumers' hands as of Dec. 31, 1920, have been pretty well liquidated and that the jobbers' stocks, though still fairly large, constitute less of a hindrance to mill business now than they did a few weeks ago. Consequently, hopes are stronger that orders soon will begin to show some increase.

If anything, price concessions have been more frequent in the past week than they were just following the last effort at stabilization. This development, however, is regarded as a constructive step in that when actual negotiations are started there is not likely to be a wide gap between buyers' and sellers' price ideas to hinder a speedy consummation of deals. Quotations on sheets in the past week of from $3 to $5 per ton below the stabilized prices have been common and tentative inquiries for plates against some of the tank business which recently has been placed have developed a definite quotation of 1.85c., Pittsburgh, and one buyer claims to have been quoted even less. In connection with the shading of quotations, there are reports from reliable sources that the Steel Corporation is disposed to meet competition at least on the major products.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 19, 1921	July 12, 1921	June 21, 1921	July 20, 1920
No. 2X, Philadelphia‡	*$21.85*	$25.50	$25.50	$48.15
No. 2, Valley furnace†	*19.50*	20.50	21.50	45.00
No. 2 Southern, Cin'ti†	24.50	24.50	26.50	45.60
No. 2, Birmingham, Ala.†	20.00	20.00	22.00	42.00
No. 2 foundry, Chicago*	*18.50*	19.00	20.50	45.00
Basic, del'd, eastern Pa.	*21.25*	23.50	25.00	44.40
Basic, Valley furnace	19.50	19.50	20.50	46.00
Bessemer, Pittsburgh	*22.46*	22.96	24.46	47.40
Malleable, Chicago*	*18.50*	19.00	20.50	43.50
Malleable, Valley	*20.50*	21.00	22.50	45.00
Gray forge, Pittsburgh	21.46	21.46	22.96	44.40
L. S. charcoal, Chicago	36.00	36.00	37.50	57.50
Ferromanganese, del'd	70.00	70.00	70.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	33.00	33.00	37.00	65.00
O.-h. billets, Pittsburgh	33.00	33.00	37.00	65.00
O.-h. sheet bars, P'gh	35.00	35.00	39.00	70.00
Forging billets, base, P'gh.	38.00	38.00	42.00	85.00
O.-h. billets, Phila	38.74	38.74	42.74	69.10
Wire rods, Pittsburgh	*42.00*	43.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh	2.00	2.00	2.00	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.10*	2.15	2.25	4.75
Iron bars, Chicago	*1.90*	2.00	2.20	3.75
Steel bars, Pittsburgh	*1.80*	1.90	2.00	3.50
Steel bars, New York	*2.18*	2.28	2.38	4.02
Tank plates, Pittsburgh	*1.80*	1.90	1.90	3.25
Tank plates, New York	*2.18*	2.28	2.28	3.77
Beams, etc., Pittsburgh	*1.85*	2.00	2.00	3.10
Beams, etc., New York	*2.23*	2.38	2.38	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 19, 1921 Cents	July 12, 1921 Cents	June 21, 1921 Cents	July 20, 1920 Cents
Sheets, black, No. 28, P'gh.	*3.25*	3.50	3.75	7.50
Sheets, galv., No. 28, P'gh.	*4.25*	4.50	4.75	9.00
Sheets, blue an'l'd, 9 & 10.	*3.50*	2.65	2.85	6.00
Wire nails, Pittsburgh	2.75	2.75	3.00	4.00
Plain wire, P'gh	2.50	2.50	2.75	3.50
Barbed wire, galv., P'gh.	3.40	3.40	3.85	4.45
Tin plate, 100-lb. box, P'gh.	$5.75	$5.75	$6.25	$7.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$12.50*	$13.25	$13.25	$35.50
Carwheels, Philadelphia	16.00	16.00	18.00	38.00
Heavy steel scrap, P'gh	12.00	12.00	12.75	26.00
Heavy steel scrap, Phila.	11.00	11.00	11.00	22.50
Heavy steel scrap, Ch'go	10.00	10.00	10.50	24.00
No. 1 cast, Pittsburgh	16.00	16.00	16.50	40.00
No. 1 cast, Philadelphia	**17.00**	16.00	17.50	38.00
No. 1 cast, Ch'go (net ton)	12.50	12.50	12.50	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	14.00	33.00
No. 1 RR. wrot, Ch'go (net)	*9.00*	9.25	9.50	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$17.00
Foundry coke, prompt	4.00	4.00	4.50	18.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.75	12.75	12.75	19.00
Electrolytic copper, N. Y.	12.62½	12.62½	12.75	19.00
Zinc, St. Louis	*4.25*	4.30	4.45	7.95
Zinc, New York	*4.75*	4.80	4.95	8.30
Lead, St. Louis	4.35	4.35	4.20	8.50
Lead, New York	4.40	4.40	4.40	8.75
Tin, New York	*27.00*	28.50	28.75	49.50
Antimony (Asiatic), N. Y.	*4.65*	4.75	5.12½	7.50

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 19, 1921, Finished Steel, 2.407c. per Lb.

Based on prices of steel bars, beams, tank plates, open-hearth rails, plain wire, black pipe and No. 28 gage black sheets — These products constitute 88 per cent of the United States output of finished steel.

July 12, 1921,	2.493c.
June 21, 1921,	2.607c.
July 20, 1920,	3.974c.
10-year pre-war average,	1.684c.

Orders for sheets, at least with the leading interest, are a little heavier than they have been and this company has increased its operations in the past fortnight by about 10 per cent. Generally, however, the trading situation is one of jockeying by buyers and sellers over prices without much business resulting. Pipe makers who would meet the prices being offered by the oil companies, would have to go pretty low to secure an order. It also is noted that, on a recent inquiry for plates, shapes and bars for the Washington Navy Yard prices quoted by jobbers were well below those named by several large mills. Actual business in pig iron is light, but every advantage offered by freight rates is seized by middle men. The result is an unsettled and indefinite market.

We note the sale of round lot of basic iron at a delivered price of $19.60 to a Pittsburgh district melter, the iron going from a furnace having a lower freight rate than is enjoyed by Valley furnaces. Figured on a Valley furnace basis with $1.96 per ton freight, this business would mean $17.64 at Valley furnaces. The same condition, more or less, is true of foundry iron.

There continues to be considerable agitation for a cut in railroad freight rates on materials entering the manufacture of iron and steel and in addition merchant producers of high-grade iron are beginning to seek concessions from the present nominal quotations on ore. With lower ore prices, blast furnace interests declare that they might be able to compete with the steel companies on present high iron prices.

Pig Iron.—Outside of a couple of fair-sized sales of basic iron carrying a delivered price of $19.60, business has been entirely of carload lots, and even these have not been especially numerous. The market on Valley basic iron does not appear to be quotable at less than $19. Iron of that grade has been offered at $19, furnace, without takers, but at the moment the price is about as low as any of the steel companies, or merchant producers in that district who have iron for sale, are willing to go. Bessemer iron generally is held at $21, Valley furnace, but it is doubtful whether sales could be made at above $20.50, and we revise quotations accordingly. Some producers still are holding No. 2 at $20.50, Valley furnace, but $20 is about as high as any business has been done lately, and $19.50 in the past few days has become the going base.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.50
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.50

Iron and Steel Bars.—Very little demand is developing for merchant steel bars in this district, and prices are entirely nominal. Western mills appear willing to take tonnages at less than 1.90c., Pittsburgh, and naturally buyers here do not think the latter price is likely to hold. The Navy Department will open bids Aug. 5 against a fairly large tonnage of soft steel bars for the several navy yards throughout the country. Reinforcing bars rolled from billets are encountering stiff competition on prices from rerolled rail bars. Iron bars are dead and a quotation is merely what is asked by makers.

We quote steel bars rolled from billets at 1.90c.; reinforcing bars, rolled from billets, 1.90c. base; reinforcing bars rolled from old rails, 1.75c. to 1.85c.; refined iron bars, 2.50c., in carloads f.o.b. mill, Pittsburgh.

Billets, Sheet Bars and Slabs.—Business still is at a standstill and quotations are untested and nominal. It is evident, however, that the stabilized quotations are not being strictly adhered to, as a Cumberland, Md., maker of tin plate recently was able to buy about 1500 tons of sheet bars at around $35 delivered, which is

equivalent to about $33, Pittsburgh. It is said that the business was taken by a western Pennsylvania manufacturer.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $33; 2 x 2-in. billets, $35; Bessemer and open-hearth sheet bars, $35; slabs, $34; forging billets, ordinary carbons, $38, all f.o.b. Youngstown or Pittsburgh mills.

Ferroalloys.—Inquiries are few and rarely are for more than a carload of material. Actually there is so little business that it is impossible to do anything more than name approximations of what might be done if there was business. Makers' quotations are the same as they have been for several weeks, but there is no question that real orders would develop concessions.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Wire Rods.—The price of $42, Pittsburgh, for the base size of soft rods, recently announced by the American Steel & Wire Co., has been adopted by independent makers. Very little demand is noted even at this concession of $6 per ton from the April 13 base. The margin between wire rods and plain wire is now $12 a ton and while this is a comfortable margin for the integrated plant, it is said to be cheaper for the non-integrated mills to buy wire. Prices are given on page 171.

Structural Material.—Structural awards with shops here still are few and mostly of less than 200 tons. The Engineer's Office, Nashville, Tenn., recently awarded two barges for Mississippi trade to the Tredwell Construction Co., Midland, Pa., and three to the Marietta Mfg. Co., Point Pleasant, W. Va. About 1000 tons of steel will be required for these barges, and it is said that successful bidders are well covered. The Jones & Laughlin Steel Co. has taken 125 tons for a machine shop for the Clearfield Machine Shop, Clearfield, Pa., while the McClintic-Marshall Co. reports 150 tons for a coke bin and conveyor for the Seaboard By-product Coke Co., Jersey City, 150 tons for three machine shops for the Amy Supply Base, Brooklyn; 150 tons for a truss span and suspension bridge placed by the Baldwin Locomotive Works, for erection in Colombia, and 350 tons for four schools in Johnstown, Pa. Plain material still is inactive and the quotation of 2c., Pittsburgh, is merely an asking price. Buyers regard 1.90c. as maximum, and believe that if they had a sizable tonnage to place they would be able to get an even lower price. Plain material prices are given on page 171.

Wire Products.—Jobbers anticipating a good fall business are showing more interest in the market, at least to the extent of trying to find out if present prices are to be maintained over the remainder of the year. None of the manufacturers will give this assurance, however, and consequently, purchases continue of a hand-to-mouth order. There is no tangible evidence of important deviation from the stabilized bases, but the market is extremely quiet.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Steel Rails.—The official quotation of 2c., Pittsburgh, for light rails is finding little or no basis in sales. Inquiries are rather few and usually for small tonnages, and it is reported that rails rolled from new steel have been offered as low as 1.90c. The lowest price reported on these rails rolled from old standard sections is $40 per gross ton, but that price figures back to about 1.80c. per lb.

We quote 25 to 45-lb. sections, rolled from new steel, 2c.; rolled from old rails, 1.80c. to 1.90c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—No appreciable improvement yet is noted in the demand for nuts and bolts and quotations are largely nominal. Track bolts appear to have definitely settled to $4 per 100-lb. base for lots of 200 kegs or more. For lots of less than 200 kegs, there is an increasing disposition among makers to revive the card of extras adopted in December, 1917, which provided for an extra charge of 1c. per lb. Such a charge is made for small lots of rivets, and bolt makers feel they are entitled to the same advance on small lots. Rivets still are inclined lower and there is not much basis in sales for prices of more than 2.65c. for large structural and ship rivets and 2.75c. for large boiler rivets. Prices and discounts are given on page 171.

Spikes.—The railroads are specifying more freely against old orders for large spikes and a fair amount of interest is being shown in small spikes, particularly by jobbers serving the coal companies. Business is better, but still far from active, and does not provide a real test of the revised quotations. Prices are given on page 171.

Cold-Finished Steel Bars.—There are two "official" quotations, the American Steel & Wire Co. naming 2.75c. base, and the independents 2.80c. The latter price is reported to have ruled on several carloads taken by one maker in this district, but on sizable orders it is doubtful whether buyers would have to pay more than 2.75c., if, indeed, they would have to pay that price. The absence of price cutting may be explained by the fact that inquiries run generally to small and unattractive proportions and also because makers who have to buy their hot-rolled bars have found it hard to interest the mills in orders at less than 1.90c. base.

Hoops and Bands.—The market is quotable from 2.50c. to 2.60c. base, Pittsburgh. The higher price is that of the Steel Corporation, while the independents are quoting 2.50 and 2.55c. So little is going on that quotations are entirely nominal.

Cotton Ties.—Although harvesting of the new cotton crop has started in the more southerly parts of the producing area, demand for the ties remains disappointingly small. Makers are quoting $1.35 per bundle of 45-lb., Pittsburgh, for July shipment, and are indisposed to shade this price to meet German competition.

Plates.—Several fair-sized inquiries are before makers that are slow to close because of the difficulty buyers and sellers have had in getting together on prices. About 2000 tons will be required for seven tanks recently placed with the Riter-Conley Co. by the South Penn Oil Co., and the Pittsburgh-Des Moines Steel Co. has not yet covered on the plates required for the tanks recently awarded it by the U. S. Shipping Board. These tanks call for about 2800 tons of plates, but the company has some in stock and some Government stocks also are available and the actual tonnage now sought is 1200 tons. A definite quotation of 1.85c. has been made on plates and there are intimations that as low as 1.75c. would be made to secure an order involving a couple of thousand tons.

We quote sheared plates ¼ in. and heavier, tank quality, at 1.80c. to 1.90c. f.o.b. Pittsburgh.

Iron and Steel Pipe.—Business does not improve appreciably despite the recent price cuts, and until the oil situation becomes more settled and there is more building throughout the country, it is doubtful whether demand will increase much because there is considerable shifting and sizing up of stocks among jobbers and the oil companies seem to have ample supplies for immediate production requirements. Some line pipe inquiries are reported to be out, but they are regarded as feelers in view of the fact that most of the important oil producers have surplus stocks which they are offering at substantial concessions from the mill quotations. If there is any price cutting by the mills, it is largely in line pipe in competition with resale offers. Discounts are given on page 171.

Sheets.—The American Sheet & Tin Plate Co. has enjoyed a fairly good increase in orders and specifications, and mill operations are at least 10 per cent heavier than they were a fortnight ago. Sheet mill

operations in general are somewhat heavier than they have been, as some business was secured or had accumulated during the recent period of suspension by a number of mills operating under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers. Concessions of $5 per ton in black and galvanized sheets have been rather freely offered by some makers and it is currently stated that even less than 3.25c. on black and 4.25c. on galvanized could be done on really sizable orders. On blue annealed sheets the more common quotation now is 2.50c. for the base gage. Prices are given on page 171.

Steel Chain.—Effective July 18, leading manufacturers have revised prices, the new quotation showing declines of 75c. per 100-lb. in proof, BB, and BBB grades in sizes 3/16-in. to ½-in.; of 35c. per 100-lb. in sizes from 9/16-in. to 1¼-in.; 75c. per 100-lb. in wagon chain, and 50c. per 100-lb. in steel loading chain. The new base for 1-in. proof coil chain is $5.90 per 100-lb., with the old differentials applying on sizes from 9/16-in. to 1¼-in., while on the sizes from ½-in. down the differentials have been cut 40c. per 100-lb. The new prices f.o.b. Pittsburgh, per 100-lb. follow:

	Proof	BB	BBB
3/16-in.	$10.25	$11.75	$12.75
¼	9.25	10.75	11.75
5/16	7.75	9.00	9.50
⅜	6.50	7.75	8.25
7/16	6.25	7.50	8.00
½	6.00	7.25	7.75
9/16	6.65	7.65	8.15
⅝ to 11/16	6.55	7.55	8.05
¾ to 13/16	6.40	7.40	7.90
⅞ to 15/16	6.15	7.15	7.65
1-in. to 1¼-in.	5.90	6.90	7.40

Cut Nails.—Prices have been revised by leading makers in keeping with the recent decline in wire nails. Carloads now are quotable at $3 to $3.25 per 100-lb, keg f.o.b. mill, or $3.50 delivered Pittsburgh.

Hot-rolled and Cold-rolled Strips.—Independent makers of cold-rolled strips have met the price of $4.25, base, recently announced by American Steel & Wire Co. The market on hot-rolled strips is quotable from 2.50c. to 2.60c. base, with most makers quoting the higher figure. Extra for pickling hot-rolled strips, 1½-in. and wider, has been cut 15c. per 100-lb. Narrower stock does not share in this change. Extra for annealing has been reduced from 50c. to 30c. per 100-lb. Quantity, cutting and slitting differentials have not been changed. The reduction in pickling and annealing charges is expected to stop price concessions, as it is stated that sales recently made at 2.35c. and 2.40c. merely anticipated this change, which it seems has been under discussion for some time. Business is rather spasmodic.

Steel Skelp.—The new base of 2c. does not appear to be stimulating the demand and makers who have quoted this price against the small inquiries which have been current have failed to obtain the orders, the report being a lower price has been quoted.

Boiler Tubes.—Leading makers of charcoal iron boiler tubes have adopted new discounts, effective July 14, cutting prices from $14 to $20 per ton. The change has been accompanied by a regrouping of the sizes to conform more closely with those employed in quoting steel boiler tubes. Manufacturers in this district are doing very little business, but it is reported that Eastern makers are fairly busy. One important Eastern producer has been running for about two months at 66 per cent capacity and has a sufficient number of orders to maintain this rate of operation for several weeks. The National Tube Co. has not yet made public the new discounts on seamless tubes and for this reason no discounts are published on these tubes on page 171. Other discounts are given on page 171.

Tin Plate.—Demand for tin plate for perishable food containers still is purely hand to mouth and the indications are that the year is going to be a very lean one in this kind of material. Manufacturers supplying tin plate for other kinds of containers are getting a fair amount of business and there is an impression that last quarter of the year will develop a fair amount of general line business. There is general observance of the stabilized base of $5.75 per base box, Pittsburgh, for standard coke.

Coke and Coal.—The recent inquiry of Wickwire Spencer Steel Corporation, Buffalo, for 30,000 tons of furnace coke for August and September shipment still is under negotiations. The impression prevails that this business will be placed at not over $3 per net ton oven and may possibly go under that price, because producers look upon these months as likely to be lean ones and are pretty anxious for the business. There is no change in the spot furnace coke situation, the market being quotable from $2.75 to $3 per net ton oven. Large operators are not disposed to go below the latter price, but the smaller producers seem able to keep going presumably because of a very favorable wage scale and to take business at 2.75c. Spot foundry coke is quotable generally from $4 to $4.25, but occasionally some loaded cars can be bought as low as $3.75, while on the other hand $4.50 is the price to consumers on some choice brands. Eastern by-product plants are finding it difficult to compete with Connellsville coke at present prices because of the high freight rate on coal. Meanwhile, some of the steel companies having by-product ovens have such heavy accumulations of coke that it is reported that some made sales were made as low as $1.25 a ton at oven. The coal market still is dull and weak, especially on by-product grades, which lately have sold as low as $1.50 per net ton, from non-union districts, and rarely commands more than $1.65 for run of mine grade. Non-union steam coal is quotable from $1.50 to $2 and gas coal from $2.25 to $2.50.

Old Material.—No material change is noted in the general situation. Interest in the market on the part of melters is extremely light and dealers seem unwilling to add to their stocks, in the lack of any tangible evidence of increased steel plant and foundry operations in the near future. There is so little business doing that prices of necessity are nothing more than appraisals of what might possibly be done.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to 16.50
Railroad malleable	12.00 to 13.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	14.50 to 15.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	12.00 to 12.50
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	12.00 to 12.50
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

For use in designing and detailing roof construction the Federal Cement Tile Co., Chicago, has published a pamphlet of 20 blueprint sheets of standards on a scale suitable for use in the drafting room. The company has also issued an unusually attractive booklet covering the various styles of tiles which it makes for the so-called "indestructible roof." This publication includes the interior and exterior views of plants showing various applications, and also construction diagrams. The roofing tiles are made of pre-cast stone concrete reinforced.

Chicago

CHICAGO, July 19.

The new steel prices announced two weeks ago are no longer holding in this territory. Weakness is more pronounced in some commodities than in others. Last week a public letting of 164 tons of plates by a Western railroad brought out the unusually low price of 1.80c., mill, or the equivalent of 1.45c., Pittsburgh. At the present moment there does not appear to be a ruling market price on either plates or structural shapes, and sheets likewise are soft, although not in such a pronounced degree. Some shading is also reported on mild steel bars, but some business is still moving at 1.90c., Pittsburgh. The new wire prices are holding rather firmly, but without bringing out much business.

The trend of pig iron prices is still downward, a further slump of 50c. a ton having taken place this week.

There have been few changes in the operating situation. The Illinois Steel Co. continues to operate eight blast furnaces and is producing steel at 30 per cent of capacity. The Inland Steel Co. did not blow out a blast furnace last week as intended, but expects to take such action within the next few days unless there is an unexpected turn for the better in bookings. At present, however, it still has two out of three furnaces in blast while its steel output is on a 25 per cent basis. Its rail carbon steel bar mill at Chicago Heights is idle this week, as is the mill of the Calumet Steel Co. at the same place. The Interstate and Republic bar iron mills at East Chicago are both inactive this week, but expect to resume operations soon. The South Chicago steel works and bar mill of the Interstate Iron & Steel Co. are operating on a fairly satisfactory basis, while the Wisconsin Steel Works has one out of three blast furnaces and about 25 per cent of its mill capacity active.

Pig Iron.—Buying is light and going prices are about 50c. below those of a week ago. In fact, many melters regard present furnace quotations as at the bottom or so close to bottom that little risk would be involved in placing orders for iron. It is true that the average price for the 10-year period before the war was $2 or $3 under the present quotation, but there were two years in that decade when prices were considerably higher than they are now. A further factor to consider in judging the present level of the market is the added burden of increased freight which enters into the costs of pig iron producers as it does in the costs of all other manufacturers. Notwithstanding the fact that price considerations no longer deter buying, purchases of size are not being made. This fact merely indicates that melters have little work ahead and therefore have no reason to buy much iron. Until the industrial readjustment now going on results in increased foundry operations, the hand-to-mouth buying which has characterized the pig iron market for months will continue. The fact that the liquidation of pig iron prices is completed, or nearly so, means, however, the one important obstacle to the revival of business has been removed. The Beloit Iron Works has not yet closed for 150 tons of 3 per cent foundry and 75 tons of charcoal. The American Radiator Co. is reported to have bought 3000 tons of iron for its Western and Northern plants, but confirmation is lacking. A carload of resale copper free low phosphorus has been sold at $40 delivered Chicago.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.00 to $36.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.00 to 19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.50 to 19.00
Northern high phos	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25	26.67
Malleable, not over 2.25 sil	18.50 to 19.00
Basic	18.50 to 19.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	35.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—A carload of resale spiegeleisen has been sold at less than $37, delivered, Bettendorf, Iowa. Generally all of the ferroalloys are exceedingly quiet.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $80 delivered; spiegeleisen, 18 to 22 per cent, $36 delivered.

Structural Material.—Lettings of steel work have been fairly heavy the past two weeks, but without having a sustaining effect either on the prices of the mills or of the fabricators. Plain material has been bought at 1.80c., Pittsburgh, and on some tonnages even lower prices are reported. Fabricating bids are also low. On 1200 tons for a local job, the successful bid was $61 per ton delivered. On the Ohio State University stadium involving 4500 tons of steel, less than $80 per ton erected has been bid. An award is expected this week. On 2600 tons for the United States Window Glass Co. plant at Shreveport, La., the fabricating award of which was announced last week, the successful bid was $70 delivered. The erection was let at $12 per ton, while the erection of about 800 tons of old work was awarded at $14 per ton. The steel for the Shreveport job will be rolled by a local mill and 1200 tons for the repair of the Armour Grain Co. elevator, Chicago, will also be supplied by a Chicago mill. Fabricating awards include:

Chicago & Northwestern Railroad elevator, Armour Grain Co. lessee, Chicago, 1225 tons, to Morava Construction Co.

Federal Reserve Bank, Minneapolis, foundation work, 835 tons, to Minneapolis Steel & Machinery Co.

Lake Shore Trust & Savings Bank, Chicago, 339 tons, to Union Foundry Co.

Pressure tank, Los Angeles, Cal., 144 tons, to Baker City Iron Works.

A. M. Castle Co., Chicago, warehouse, 330 tons, to Milwaukee Bridge Co.

Joseph Schlitz Brewing Co., Milwaukee, Commercial Building and reconstruction Schlitz Palm Garden, 270 tons, to Milwaukee Bridge Co.

Pending business includes:

Joliet High School, Joliet, Ill., 800 tons, Hansell-Elcock Co., low bidder.

Missouri Pacific Railroad, two 100-ft. deck turntables, 175 tons.

Mark Mfg. Co., new roof, butt-weld pipe mill, Evanston, Ill., 120 tons.

Orpheum Theater, Wichita, Kan., 140 tons, general contract awarded to Vaughan Construction Co., Omaha.

The mill quotation is 1.80c. to 2c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.03c. for materials out of warehouse.

Plates.—The stabilized prices generally adopted two weeks ago are rapidly becoming nominal so far as this section is concerned. In a public letting of 164 tons of tank plates and 13½ tons of structural shapes by the Burlington Railroad last week, the successful bid on the plates was 1.80c. f.o.b. Western mill, while the structurals were awarded at 2.18c., delivered Chicago. The fact that such low prices were brought out by a small tonnage emphasizes the pronounced weakness and uncertainty of the market. It is evident that competition is keen for such business as is appearing and that the extent to which mills will deviate from the prices announced a fortnight ago depends on the size of the tonnage offered and the character of the specifications. At present writing, it is impossible to name a ruling going price on tank plates. A local mill has been awarded 3000 tons of steel, principally plates, to be used on the repair of 400 gondola cars for the Illinois Central by the Haskell & Barker Car Co. That considerably more car repair work may be looked forward to as a source of steel tonnage is indicated by the fact that the New York Central has issued an inquiry for figures on the repair of 10,000 freight cars of various types. Oil companies continue to undertake work involving plates. The Magnolia Petroleum Co., Beaumont, Tex., is in the market for three storage tanks requiring 600 tons, while the Standard Oil Co. is taking bids on stills for Whiting, Ind., involving about 450 tons. Other inquiries include one from the Allis-Chalmers Mfg. Co. for 350 tons of plates.

The mill quotation is 1.80c. to 2c. Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.03c. for plates out of stock.

Bolts and Nuts.—The market continues weak and the prices quoted on page 171 are to be regarded as

the top of the market rather than as ruling discounts. The tendency of sellers is either to revise the discounts downward or to waive part or all of the freight from Pittsburgh. Revisions of discounts include small rivets, which some makers are quoting at 70 and 10 off list; large machine bolts, which have been quoted at as low as 70 and 5 off, and large carriage bolts, on which 65 and 10 off has been named. The railroads continue to figure in the market. The Louisville & Nashville has bought 700 kegs of nuts and the Illinois Central is inquiring for 300 kegs of rivets. The Ford Motor Co. is reported to have placed a large order for bolts and nuts last week. Jobbers are buying sparingly and the agricultural implement makers remain out of the market.

Jobbers quote structural rivets, 4.03c.; boiler rivets, 4.13c.; machine bolts up to ⅜ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅜ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Prices on mild steel bars are as ill-defined as those on plates and structural shapes. Demand is of much the same character as heretofore. Car repair business is steadily growing larger in scope as indicated in other paragraphs, and there continues to be a fair amount of reinforcing work. A Masonic temple at Davenport, Iowa, will require 500 tons and a grain elevator for the Burlington Railroad at St. Joseph, Mo., 200 or 300 tons. Railroad purchases of bar iron are still small, involving 100 to 200 tons or less. A current inquiry from the St. Paul Railroad calls for 150 tons. Prices range from 1.90c. to 2c., Chicago, and even lower prices have been reported. There has been no material change in the demand for rail carbon steel bars, and prices have slumped to a maximum of 1.90c., Chicago. Bed manufacturers are prominent among present buyers of hard steel bars.

Mill prices are: Mild steel bars, 1.85c. to 1.90c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.90c. to 2c., Chicago; rail carbon, 1.90c. to 2c., mill or Chicago.

Jobbers quote 2.93c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.35c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—The market is weak and going prices are below those generally announced two weeks ago. On No. 28 galvanized, 4.25c., Pittsburgh, is rather commonly quoted, while 4.10c. has been done. On No. 28 black, 3.25c., Pittsburgh, is the ruling quotation and as low as 3c. has been named. On No. 10 blue annealed, 2.45c., Pittsburgh appears to be the market. Demand is still subnormal, but compares favorably with that for plates, shapes and bars. One important Western maker is employing about two-thirds of sheet mill capacity. Japan continues to buy light gage sheets; in fact, more of this class of business is being offered than local mills care to take.

Mill quotations are 3.25c. for No. 28 black; 2.45c. for No. 10 blue annealed and 4.25c. for No. 28 galvanized, all being Pittsburgh prices subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Railroad Rolling Stock.—The Mather Stock Car Co. is contemplating entering the market for 500 steel center sills for stock cars.

Warehouse Prices.—Further price adjustments by jobbers include reductions on chain and charcoal iron boiler tubes. Chain has been reduced 75c. for sizes 3/16 in. to ½ in. and 35c. for sizes 9/16 in. to 1¼ in. Prices are now $11.88 on 3/16 in., $7.63 on ½ in., $7.93 for 9/16 in. and $7.53 for 1¼ in. Charcoal iron boiler tubes have been reduced 3½c. per foot, 4 in. now being quoted at 59½c.

Cast Iron Pipe.—Prices have settled to a maximum of $40, Birmingham, for 6-in. and larger. Lettings have been fairly heavy during the past week and some attractive business is in prospect. Detroit is preparing to ask for figures on 4200 tons of 42-in. and 1500 tons of 8-in. Hammond, Ind., will ask bids soon on 3000 tons of 36-in. This week Akron, Ohio, receives bids for a third time on 6500 tons of 48-in. Recent lettings include:

Fort Wayne, Ind., 470 tons, to United States Cast Iron Pipe & Foundry Co.

Forest Lake, Minn., 200 tons, to United States Cast Iron Pipe & Foundry Co.

Faribault, Minn., 100 tons, to James B. Clow & Sons.

Dubuque, Iowa, 150 tons, to United States Cast Iron Pipe & Foundry Co.

Evansville, Ind., 100 tons, to National Cast Iron Pipe Co.

Pending business includes:

Akron, Ohio, 1000 tons, 4 to 16-in., National Cast Iron Pipe Co. low bidder.

Duluth, Minn., 600 tons, Lynchburg Foundry Co. low bidder.

Decatur, Ill., 100 tons, bids from general contractors, in July 18, to be sublet to pipe manufacturer.

Harrodsburg, Ky., 200 tons, original bids rejected, new bids in July 29.

Detroit, 250 tons of 24-in., July 22.

Milwaukee, 275 tons of 16-in., July 25.

Two Rivers, Wis., 150 tons of 4- and 6-in., July 28.

Manitowoc, Wis., one carload 6-in., July 28.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $52.10; 6-in. and above, $49.10; class A and gas pipe, $3 extra.

Rails and Track Supplies.—As forecast last week, tie plates have been reduced, the new price being 2.30c Chicago mill. The demand for fastenings and car wheels improves slowly as the railroads gather their car repair and maintenance of way programs under way. The Illinois Central has bought 4000 kegs of track spikes. The Chicago Surface Lines have ordered 4000 tons of girder rails from the Lorain Steel Co.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.90c. f.o.b. makers' mills.

Standard railroad spikes, 3c., Pittsburgh; track bolts with square nuts, 4c., Pittsburgh; steel tie plates, 2.30c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.30c., f.o.b. makers' mills.

Wire Products.—Considering the fact that summer is a dull season, present demand is of fair proportions. Jobbers, however, continue to hold back, notwithstanding the fact that their lack of stocks often handicaps them in filling the orders of their customers. As fall approaches, more generous buying is looked for. Railroad purchases continue small. For mill prices see finished iron and steel f.o.b. Pittsburgh, page 171.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Old Material.—Consumers continue to hold aloof from the market and prices of some grades have again declined. Such purchases as have been made by users confirm the quotations given below. A large local foundry bought 500 tons of selected heavy melting at $10.50 per gross ton. A bar iron mill purchased 700 tons of No. 1 busheling at $8.25 and $8.50 per net ton. Railroad lists include the Rock Island, 3750 tons; the St. Paul, 1200 tons, and the Chicago & Alton, 550 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.25 to 13.75
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	8.75 to 9.25
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Steel knuckles and couplers	10.25 to 10.75
Coil springs	11.50 to 12.00
No. 1 machinery cast	12.50 to 13.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	9.75 to 10.25
Railroad malleable	11.25 to 11.75
Agricultural malleable	11.25 to 11.75
Country mixed	7.00 to 7.50

New York

NEW YORK, July 19.

Pig Iron.—Following the increased inquiry reported last week, the market dropped back to the dullness which had characterized many weeks. The sales made within the last few days have been few and at low prices. There is keen competition between Buffalo and eastern Pennsylvania irons. The latter is selling as low as $20 furnace base, and the former at $19. A sale of 500 tons was made to a Connecticut melter for prompt delivery on a basis of about $20 eastern Pennsylvania furnace. A sale of 800 tons is about to be closed at $21.50, eastern Pennsylvania furnace, for No. 2X. A marked feature of the limited buying is that foundries are urging prompt shipment. Some Belgian iron has been offered at low prices, but this iron does not seem to be attractive to anyone. One reason given is that the iron is not of satisfactory analysis, being high in phosphorus, but a more important reason is that melters hesitate to place orders for foreign iron on a declining market when time of delivery is uncertain.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.02 to $25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 24.52
East Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—There is so little inquiry for ferromanganese and spiegeleisen that the market is not well defined. Nominally ferromanganese is quoted at $70, delivered, for the domestic and $70, seaboard, for the imported, but these prices would be shaded if any real business were to be had. Spiegeleisen is available at $26, furnace. Ferrotungsten is quoted at 42c. to 43c. per lb. of contained metal, duty paid; ferrovanadium is lower at $4.50 per lb. of contained vanadium. Manganese ore cannot be sold at any price, but the nominal quotation is 22c. per unit, seaboard. We quote prices as follows:

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$70.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Ferrotungsten, per lb. of contained metal	42c. to 43c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00
Manganese ore, foreign, per unit, seaboard	22c.

Cast-Iron Pipe.—The volume of small orders is satisfactory and prices remain about the same. We quote, f.o.b. New York, carload lots, as follows: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Warehouse Business.—The market shows no change despite the recent reduction of prices in this district. No change in prevailing prices is reported this week, but some shading of current quotations is reported in special cases. Warehouses handling wrought iron and steel pipe, boiler tubes, etc., have not yet issued any official revision of prices to meet the reductions of the mills on both wrought iron and steel pipe. Quotations on inquiries are proportionately lower since the mill reduction, but until the market becomes more stable, probably no official schedule will be issued by these warehouses. We quote prices on page 186.

High-Speed Steel.—The market continues extremely inactive with few orders and considerable shading of prices. We quote 18 per cent tungsten high speed steel at 90c. per lb., with sales reported at 85c. per lb. With the new tariff in force, it is believed that there will be a slight increase in prices, as with the protection afforded, the cost of tungsten will undoubtedly increase.

Finished Iron and Steel.—Specific orders of large size have brought out low prices, as was expected. On 1120 tons of structural shapes 1.85c., Pittsburgh, was done and on 1200 tons, 1.80c. On 900 tons of plates for locomotives the contract basis was 1.70c., Pittsburgh. On 300 tons of bars the basis of the purchase was 1.70c., Pittsburgh. A round volume of bars largely for reinforced concrete work is under active negotiation, one lot of 1100 tons, another of 400 and an export order said to total 3800 tons. Not much as yet has materialized in the way of railroad business in the East. The Lehigh Valley is in the market for part repairs and part rebuilding of 5000 cars, principally box cars; 400 additional cars are to be repaired by the Haskell & Barker Car Co. for the Illinois Central. It is expected that the New York Central will come into the market for considerable locomotive repair work. The Illinois Central, taking prices on 500 tons of forgings for the repairs and rebuilding of locomotives, is expected also to buy 140 new locomotives. Little new work has appeared in fabricated steel lines, but the following awards are noted: For a coal breaker for the Lehigh Coal & Navigation Co., 2200 tons, to the Bethlehem Steel Bridge Corporation; for the Boston & Maine, 125 tons, to the McClintic-Marshall Co.; for the Dental and Oral College, East Thirty-fourth Street, 250 tons, to the Hinkle Iron Co.; for the Rhinelander apartment, Lexington Avenue and Ninetieth Street, 900 tons, to the Hay Foundry & Iron Works, and for the New York Telephone Co., at 146th Street and Convent Avenue, 600 tons, to the Hinkle Iron Co.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.18c. to 2.28c.; plates, 2.18c. to 2.38c.; structural shapes, 2.18c. to 2.38c.; bar iron, 2.28c.

Old Material.—There are no signs of improvement in the scrap market, the chief activity being in heavy melting steel, pipe and stove plate. Dealers in scrap do not look for more activity until steel mills start operating at greater capacity.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$6.50 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.00 to 10.50
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3.50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Boston

BOSTON, July 19.

Pig Iron.—Buying of eastern Pennsylvania iron silicon 1.75 to 2.25, by the Gurney Heater Co., Framingham, Mass., for last half delivery, featured the market the past week. The company is credited with taking 2000 tons, half at $21 furnace or $25.06 delivered, and half at a slightly higher price. Some furnaces could not meet manganese and phosphorus requirements. Other eastern Pennsylvania iron sales include 200 tons, silicon 2.25 to 2.75, to a Massachusetts foundry, third quarter delivery, at $21 furnace, and 300 tons, delivery next three months, to another Massachusetts melter at the same price. Differentials in these cases were ignored. No. 2X iron is offered as low as $20.50. The best price obtained this week was $25.75 furnace or $29.81 delivered, for No. 1X, August delivery, by a furnace with $1 differentials, from a Massachusetts foundry. Sales of Buffalo are confined to car lots, third quarter shipment, on a basis of $21 furnace for No. 2X Buffalo. No. 2 plain is offered at $20.50. The Griffin Wheel Co., Chelsea, Mass., wants 300 tons, silicon 2.25 to 2.75, third quarter delivery, and about a dozen other melters 100 to 300 tons, mostly No. 2

plain or No. 2X. A Connecticut foundry bought 100 tons malleable at $24 furnace. Malleable is offered at $22, with a long freight, to $26 furnace. A small tonnage of Alabama, silicon 2.75 to 3.25, was taken by a Massachusetts melter at $36.02 dock, Providence. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$25.06 to $28.81
East. Penn., sil. 1.75 to 2.25	24.56 to 28.31
Buffalo, silicon 2.25 to 2.75	25.96 to 28.96
Buffalo, silicon 1.75 to 2.25	25.96 to 28.46
Virginia, silicon, 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	32.16 to 32.66
Alabama, silicon 1.75 to 2.25	31.66 to 32.16

Warehouse Business.—Black and galvanized sheets have been cut 50c. per 100 lb. to $5 and $6 respectively. Small iron rivets are 10 per cent lower in some instances, the market being 50 to 60 per cent discount, while structural are generally down to $5 per keg base and in light demand. Wire nails have dropped 25c. per keg to $3.85 base, and bolt and nut quotations have been revised according to mill lists recently issued. Barbed wire is 25c. per 100 lb. cheaper. Consumption of iron and steel, if anything, is less than previously reported and warehouse interests are not making fresh mill contracts at any price.

Jobbers now quote: Soft steel bars, $2.98 per 100 lb. base; flats, $3.98 to $4.08; concrete bars, $2.50 to $3.25¼; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.63 to $4.08; steel hoops, $4.33; toe calk steel, $5.25; cold rolled steel, $4.35 to $4.85; structural steel, $2.98 to $3.13; plates, $3.08 to $3.28; No. 10 blue annealed sheets, $3.83; No. 28 black sheets, $5; No. 28 galvanized sheets, $6; refined iron, $2.98 to $5; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—The reduction in prices announced a week ago by the New England producers of foundry coke, bringing spot and forward deliveries down to $10.91 delivered where the local freight does not exceed $3.40, failed to cause much of a ripple in the market. Virtually no increase in spot buying is noted and signing up of last half contracts has proceeded in about the same ratio as heretofore. About 40 per cent of contracted coke a year ago remains unbooked. New England by-product ovens in operation have not increased in number since last reports. One broker reports a sale of 15 cars, prompt shipment, Connellsville coke at $4.50 f.o.b. ovens, which is a few cents below the base price on New England made fuel.

Old Material.—A partial revival of pig iron buying by the New England foundries the past month or so has not been followed by increased interest on their part in machinery cast, stove plate or other old material, as was anticipated by scrap dealers. The withdrawal of Pennsylvania steel mills from the market for heavier grades of scrap has but added to the unsatisfactory local situation. There is, perhaps a slightly easier market for stove plate, but prices have little opportunity to change in the absence of transactions. A Massachusetts melter took one car brake shoe scrap at $11.50 delivered, and others, scattered car lots of No. 1 machinery cast at prices ranging from $15.50 to $16.90 delivered. A broker bought a car of turnings at $2.50 f.o.b. shipping point, against an old mill contract, while New York brokers paid $4.65, shipping point, for selected chemical turnings and is inquiring on 100 tons additional, but expects to buy for less money. The old material market otherwise is devoid of trading features. Yard owners are not trying to push sales inasmuch as much of the material on hand was bought at prices well above those ruling to-day.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $17.50
No. 2 machinery cast	15.50 to 16.00
Stove plate	14.50 to 15.50
Railroad malleable	14.00 to 15.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Buffalo

BUFFALO, July 19.

Pig Iron.—The total sales last week were 2700 tons but with the three sellers now active, inquiry seems to have fallen off. Improved shipping on old contracts by one furnace has brought about a withdrawal as to 1.75 to 2.25 silicon iron and this furnace for new business is now concentrating on lower silicons. Its sales last week—about 700 tons—were booked at prices ranging from $20 to $23 base. The most active competitor in the district sold 1500 tons at the same range; 100 tons of malleable was sold at $23 and a quantity of iron (silicon almost 4 per cent) was booked at $25. The first ore to be delivered at this port arrived last week and coupled with the fact that the consignee is known to be in the market for a considerable tonnage of coke, it is speculated that a furnace will be blown in August 1. Part of an order of 2200 tons bought by the largest buyer in this vicinity, went to a furnace here at $19.75 base, silicon 1.25 to 1.75. Only three furnaces are in blast and one of these may be blown out the first of August. One seller has several small inquiries and no sales. The campaign to sell a steel-maker's iron seems to have come to a finish—no new inquiries and sales slightly under 500 tons.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75 to $22.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75 to 22.00
No. 2 plain, 1.75 to 2.25 sil.	20.00 to 21.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—Improvement in inquiry with respect to volume and variety brings a better feeling, but orders have not improved to any appreciable extent. Previous price reductions this year did not bring out the optimism that recent reductions have developed. Consumption of material is certainly in excess of production and that long-looked for period of absolute liquidation of stocks is closer to hand. Bids have been opened in Albany within the week for a new State normal school at Cortland, N. Y. Operation is less than the preceding week—one open hearth now represents the entire program of a mill which has been fairly busy all year. Several small rail orders have been booked—one of 300 tons for the Toronto street railway system and another of 200 tons for the International Railway Co., Buffalo. Small orders for piling engage one mill. Railroad inquiry has not developed but improvement in the structural situation with particular reference to Buffalo is looked for with the settlement of the ironworkers' strike—the men agreeing to take a wage cut. Fair bar business developed with new prices; one order for 400 tons in three or four sizes and several orders for lesser tonnages. Two inquiries for pipe aggregate 1200 tons. No betterment in sheets came with new prices.

Warehouse Business.—Price changes have brought out a number of orders which apparently were held back awaiting the announcement. Dealers are not over enthusiastic as to the improvement, not seeing any permanency. Inability of mills to supply small tonnages continues to help warehouse business, in one instance the mill directing a prospective purchaser to the warehouse with a resulting order. Railroad inquiry, expected with the reopening of shops and the urgent need of repairs to rolling stock, has not developed into the order stage. In fact, there is but little railroad inquiry in hand and the instructions to purchasing agents not to buy seem to be still in effect.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.05c.; plates, 3.05c.; plates, No. 8 gage, 3.65c.; soft steel bars and shapes, 2.95c.; hoops, 3.65c.; blue annealed sheets, No. 10 gage, 3.70c.; galvanized steel sheets, No. 28 gage, 5.80c.; black sheets, No. 28 gage, 4.80c.; co'd rolled strip steel, 7.15c.

Coke.—Inquiry is better and there is a disposition in evidence that buyers are willing to buy ahead. One inquiry calls for delivery of 800 to 1000 tons per month.

Old Material.—If possible, dealers say, the market

is slower than any time this year. There is a particular weakness in cast scrap and a great surplus on the market. In heavy melting steel, the largest consumer has indicated a willingness to buy small tonnages but refuses to pay more than $10 and insists that if his offer is taken, the material must be first grade.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$11.50 to $12.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Cincinnati

CINCINNATI, July 19.

Pig Iron.—The market was very quiet during the week. Inquiries and sales have been confined almost entirely to carload lots. The Lunkenheimer Co. has been in the market for 150 tons and it is reported that a cash register company has entered the market for 160 tons of Southern iron of special specification. The Alabama Co. put out its Etowah furnace at Gadsden July 19, leaving but one merchant furnace active in the entire South, and it may blow out at any moment. The Globe Furnace of the Globe Iron Co., Jackson, on account of a mine tipple burning down, will be blown out about Aug. 1.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.00
Ohio silvery, 8 per cent sil	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	23.52

Tool Steel.—Pickup business is about the only activity. High speed steel, 18 per cent tungsten, is being quoted at $1 per lb. base.

Finished Material.—Buying continues light, orders being for the most part small and for immediate delivery. There is still no stimulation to be observed as a result of the recent price reductions and it appears doubtful as to whether the lower prices will initiate increased activity. The 600 tons for bridges for the Kanawha & Michigan Railway Co., previously reported, went to the Mt. Vernon Bridge Co. Bids for the 450,000 tie plates aggregating about 2500 tons, recently called for by the Big Four Railroad, were opened July 18. It is understood that 100 tons of reinforcing bars will be given out shortly by the E. H. Latham Co., Columbus, general contractor, for the construction of the stadium of Ohio State University, and other tonnages will be placed as the erection proceeds. Bids will be received up to July 28 for the proposed new passenger station at Covington, Ky., to cost about $80,000 and to be erected jointly by the C. & O. and L. & N. railroads. Specifications calling for bids on approximately 1200 tons of black sheets, issued by the Bureau of Supplies and Accounts, Navy Department, have been received by a mill in this district. The mills of the American Rolling Mill Co., Middletown, have been operating during the week and are expected to continue next week. The plant of the Newport Rolling Mill Co. is still shut down.

Warehouse Business.—Local jobbers report good volume of orders but quantities light. It is felt by some that further price reductions may stimulate more activity, others are of the opinion that general conditions are the governing factor. New prices went into effect July 12, prices being now as follows:

Iron and steel bars, 3.15c. base; hoops and bands, 3.85c. base; shapes, 3.25c. base; plates, 3.25c. base; reinforcing bars, 3.22½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, 4.92c.; No. 28 galvanized sheets, 5.92c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.10 per 100 lb.

Coke.—Inquiries for coke during the week were light, but there has been some carload business, one inquiry for 900 tons and two for 300 tons, previously reported, are expected to be placed at end of the week. Prices remain unchanged.

Old Material.—Activity in the scrap market is at a standstill. Prices are, if anything, tending to lower levels, but in the absence of trading remain unchanged by most dealers. One dealer, however, is now quoting as follows: Bundled sheets, $4 to $5; cast borings, $2 to $3; steel turnings, $1; iron axles, $15 to $16; pipes and flues, $4 to $5.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.00 to $5.00
Iron rails	11.00 to 12.00
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.00 to 11.00
Heavy melting steel	8.50 to 9.50
Steel rails for melting	9.00 to 10.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	2.00 to 3.00
Steel turnings	2.00 to 2.50
Railroad cast	11.00 to 12.00
No. 1 machinery	12.00 to 13.00
Burnt scrap	6.50 to 7.50
Iron axles	15.00 to 16.00
Locomotive tires (smooth inside)	8.50 to 9.50
Pipes and flues	4.00 to 5.00

St. Louis

ST. LOUIS, July 18.

Pig Iron.—Three sales of Northern malleable were made this week that are considered of consequence in these days when orders are few and far between. A southern Illinois melter bought 500 tons, an eastern Kansas foundry bought 300 tons, and 100 tons went to a Belleville, Ill., stove factory. Some little carload business was done, and four or five inquiries for carloads were out.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern malleable	$22.80 to $23.30
Basic	22.80 to 23.30
Southern foundry, sil. 1.75 to 2.25	25.74 to 26.24

Finished Iron and Steel.—Recent reductions so far have not had the effect of stimulating business, and such orders as are being placed are not attributed to lowering of prices. The Unit Construction Co., St. Louis, has sublet the contract for the concrete work for the University of Kansas Stadium at Lawrence to J. P. Sprague & Co., Kansas City, 200 tons of reinforcing bars being involved. Inquiries were received here from the Southern Wire & Iron Co., Dallas, Tex., for 500 tons of reinforcing bars for a job in Galveston, Tex. The Mississippi Valley Bridge & Iron Co., Leavenworth, Kan., got the order for the structural steel (1100 tons) for the motor transport division of the Army there, which St. Louis fabricators eagerly sought. The Lincoln Steel & Forge Co., St. Louis, received an order from the Missouri Pacific Railroad for 500 sets of underframes, involving 320 tons of structural steel. Inquiries from railroads were confined to less than carload lots, being material for filling in, such as car wheels, axle bars, etc. Warehouse business is dull.

For stock out of warehouse we quote: Soft steel bars, 3.02½c. per lb.; iron bars, 3.02½c.; structural shapes, 3.12½c.; tank plates, 3.12½c.; No. 10 blue annealed sheets, 3.77½c.; No. 28 black sheets, cold rolled, one pass, 5c.; No. 28 galvanized sheets, 6c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, $4.12½ per 100 lb.; boiler rivets, $4.22½; tank rivets, 7/16 in. and smaller 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Coke.—Very little business is being done in coke, and that little is being handled by the local and Granite City by-products plants. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, Granite City by-products meeting this price, while Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered in the St. Louis industrial district.

Old Material.—Trading in old materials has been very light, even transactions between dealers being almost entirely suspended. There were no railroad

lists before the market this week. The trend of prices is still lower, although the nominal prices of last week remain unchanged, except No. 1 railroad heavy melting steel, which is $1 lower at $10 to $10.50.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

Per Gross Ton

Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Relaying rails, standard section, subject to inspection	27.00 to 29.00
Cast-iron car wheels	12.00 to 12.50
No. 1 railroad heavy melting steel	10.00 to 10.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	11.00 to 11.50
Ordinary bundled sheet	4.00 to 4.50

Per Net Ton

Heavy axle and tire turnings	5.00 to 5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	9.00 to 9.50
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.00 to 9.00
No. 1 dealers' forge	6.50 to 7.00
Cast iron borings	6.00 to 6.50
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.50 to 4.00
Railroad grate bars	7.00 to 7.50
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.50 to 7.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.00 to 10.50
Railroad brake shoes	7.50 to 8.00

Birmingham

BIRMINGHAM, ALA., July 19.

Pig Iron.—By the end of last week the Birmingham iron market was on a $20 base. Car loads were selling at $20.50, but $20 was the admitted schedule for any real buying. Some disturbance of the $20 base was caused by the appearance in the market of some resale iron, how much is not known, but it was encountered in more than one direction. This iron was offered at $19.50. That seems to be the lowest that is reported anywhere. Melters and makers appear to be nearer a common agreement that prices of iron are lower than they have yet been and there is less disposition on the part of the melter to hammer the market. Only one foundry stack is in blast in Alabama, the Woodward Iron Co. having blown out its Gadsden stack to-day. There will be another reduction of merchant iron stocks this month. Strategically Alabama iron is stronger than in some time. The going business is in small lots, with the sanitary pipe shops coming in regularly for immediate requirements, while one sanitary pipe interest recently ordered 2000 tons to cover requirements of several months. Southern iron makers are insistent in their demand for lower rail rates to competitive points, asking for a compromise between the pre-war rates and those now in existence. For instance, they ask an $8 rate to the East compared with a pre-war rate of $6 and the present rate of $10.26. Other requests are on the same base. The Southern iron melt is increasing owing to greater activity at stove plants and other foundries. The total volume of business last week was not great, but indications of an increasingly steady buying movement are much better.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$20.00
Basic	19.00
Charcoal	35.00

Cast Iron Pipe.—Anniston shops of the United States Cast Iron Pipe & Foundry Co. have resumed after being down two weeks for repairs. The National Cast Iron Pipe Co. received an order for 140 tons from Minneapolis, but no large bookings were made. There is a fairly active inquiry for pipe for industrial purposes. The sanitary shop of the Emory Pipe Co. at Anniston resumed during the week and promises full operations. Sanitary pipe is at about 50 per cent of productive capacity. The base is $40. The real base of high pressure pipe is about $40.

Finishing Mills.—The Gulf States Steel Co. has notified its workers of a reduction of bonus from 25 to 15 per cent. It is operating at less than 30 per cent in finishing mills and idle in other departments. The Tennessee company is operating the plate mill and rail mill and car plants. The car plant has turned out its first car, doing so exactly one month after the plant started. It was a 100,000-lb. capacity steel low-side gondola for the Louisville & Nashville, which has ordered 600 cars.

Coal and Coke.—The Cotton Belt route has placed its Texas coal tonnage of 12,000 a month with Walker County mines. Domestic coal has begun appearing in Birmingham at $5 from nearby mines, hauled in trucks over hard roads. Standard foundry coke has receded 50c. and sells at $6 to $6.50. Semet-Solvay Co., at Ensley, has reduced operations since the Alabama Co. blew out at Gadsden and quit taking coke. The National Cast Iron Pipe Co. was the successful bidder on 1000 tons of water pipe for Akron, Ohio, Friday. This plant is at near capacity of operations.

Old Material.—Scrap was never duller and prices are nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Philadelphia

PHILADELPHIA, July 19.

A few occurrences within the past week lend interest to an otherwise dull iron and steel market. One of the most important in its effect on steel prices was the purchase of 5000 tons of plates and shapes by the Belmont Iron Works from an Eastern steel company at prices reported to be 1.75c. for the plates and 1.80c. for the shapes, Pittsburgh. In addition the Belmont Works bought 1000 tons of surplus shipyard structural steel, 1500 tons of black corrugated sheets and a small tonnage of bolts and nuts. On all items there was keen competition for the business, with marked sacrifices in prices. The sheets are reported to have been placed at a price close to 3c., base, Pittsburgh, with usual extras. Although makers of bolts and nuts had reduced prices only last week, the competition for about 50 tons of bolts and nuts brought out still lower figures.

A better inquiry for pig iron also caused a scramble for business at the expense of prices. Not since the decline in pig iron started in October, 1920, have prices dropped so precipitously as within the past 10 days. Eastern furnaces, which only recently were holding for $24, base, for shipment into this district are now quite willing to sell at $20 to $20.50, a drop of $3.50 to $4. The encroaching competition of Buffalo furnaces is partly responsible for the decline, but the determination of some pig iron companies to reduce their inventory, even at a considerable loss, is also a factor.

There was also a flurry in steel scrap when news leaked out that an Eastern steel company had bought a tonnage at $12, delivered, which was $1 higher than was generally obtainable last week.

There are indications from several directions that consumers are beginning to take more interest in the market, but such indications are not yet well enough defined to become the basis for any optimistic predictions as to early recovery in business. However, it is significant that the sales departments of steel and pig iron companies are more hopeful than they have been at any time in months.

Pig Iron.—For some weeks the makers of foundry pig iron in eastern Pennsylvania have been actively competing with Buffalo furnaces for business in New

England and in the New York territory, and on such inquiries they have made quotations considerably lower than they were willing to make for delivery at Philadelphia or vicinity. Within the past week, however, the Buffalo furnaces have encroached further into this territory. An inquiry for about 200 tons from a Flemington, N. J., foundry, for example, brought out such low prices that the market again was wide open, and the Eastern furnaces abandoned the efforts that had been made to hold No. 2 plain iron at $24, furnace, for shipment within this immediate district. Quotations as low as $20 to $20.50, furnace, for No. 2 plain and $21 to $21.50, furnace, for No. 2X have been made within the past few days. Carload lots do not command quite such low prices as larger tonnages, one selling office having sold No. 2X iron on the same day at prices ranging from $21 to $23, furnace, depending on the tonnage and the competition to be met. Basic iron has declined with foundry grades. A sale of 1000 tons of basic was made to a Harrisburg consumer at a price reported to be about $20, furnace. Whether this was the actual selling price or not, basic iron is to-day available at $20, furnace, and on a large tonnage for immediate shipment, even lower might be done. There has been better inquiry and more active buying of iron within the past week. Sales have totaled several thousand tons. One office within the week sold 3500 tons, which exceeded in quantity the business booked in the whole month preceding. Among the individual sales worthy of note was one of 1000 tons of No. 2 plain iron and another of 300 tons of the same grade; in addition to which was the 1000-ton lot of basic mentioned above. There was keen competition among Eastern furnaces for two New England orders, one of which, that of the Crane Co., Bridgeport, Conn., for 500 tons was placed with a Buffalo furnace at a price reported to be about $22.60, delivered, for No. 2 plain. This iron will be moved by canal from Buffalo. The decline in eastern Pennsylvania foundry iron prices for the week is about $3.50 to $4, the largest on record within any similar period since prices started downward in October, 1920.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.85 to $21.25
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.85 to 22.75
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	21.25 to 22.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—The market is dull, with no inquiry of consequence to test prices. Domestic ferromanganese is available at $70, delivered, while British alloy can be made at $70, seaboard, or possibly lower. Spiegeleisen is available at $26, furnace.

Semi-Finished Steel.—The N. & G. Taylor Co., Cumberland, Md., bought 1500 tons of sheet bars from an Eastern steel company at a price reported to be at least $1 or $2 a ton below the $35 quotation recently established. There is little or no demand for billets, which are unchanged in price at $33, Pittsburgh, for rerolling quality and $38 for forging quality.

Plates.—Though there is little business, the plate market has shown further evidence of weakness, particularly in the competition for the order of the Belmont Iron Works, consisting partly of plates. These plates are reported to have been taken at 1.75c., Pittsburgh, but on ordinary quantities, such as are now being quoted upon, the usual quotations are 1.80c. to 1.90c., Pittsburgh. At least one mill is willing to take business, even in carloads, at the former figure, while some other mills quote 1.85c. or 1.90c. The Lehigh Valley Railroad is asking for bids on repairs to 4000 miscellaneous freight cars.

Structural Material.—Of the 5000 tons of plates, shapes and bars placed by the Belmont Iron Works with a leading independent mill, a large part was structural shapes, on which a price of 1.80c. is reported to have been made. On small lots, buyers would now have no difficulty in obtaining quotations of 1.85c. The Belmont purchase included 1000 tons of surplus shipyard material, on which a price somewhat lower was made. The latter order went to a local steel broker. All of this steel was bought for the fabrication of airplane hangars for the Government, on which the Belmont Works was low bidder.

Sheets.—The Belmont Iron Works bought 1500 tons of black corrugated sheets last week at a price reported to be close to 3c., base, Pittsburgh, with usual extras. Prices on sheets are being generally shaded. Blue annealed have been quoted at 2.50c., black at 3.25c. and galvanized at 4.25c., Pittsburgh, these prices being $3 a ton on blue annealed and $5 a ton on black and galvanized below the so-called "official" prices named by some companies just recently.

Bars.—Some shading of the 1.90c. bar price is reported, and the fact that the price is holding as well as it is said to be is due largely to the fact that there have been few inquiries attractive enough to induce the mills to cut. Makers of bar iron have taken off $1 more from their price, the quotation now being 1.75c., base, Pittsburgh.

Wire Products.—A substantial improvement in purchases of wire products, particularly nails, by jobbers has been noted within the past week. This enlarged buying by jobbers also applies to some other steel products. Prices of wire products appear to be holding more firmly than are prices on other steel products. We quote plain wire at 2.50c. and wire nails at 2.75c. per lb., base, Pittsburgh.

Warehouse Business.—No price changes have occurred within the past week. We quote for Philadelphia delivery as follows:

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ in. x ½ in., 3.20c.; round edge steel, planished, 3.95c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.50c.; galvanized sheets, No. 28 gage, 5.50c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.75c.; 3/16-in., 4.95c.; ⅛-in., 5.05c.; spring steel, 4.40c.; round cold-rolled steel, 4.50c.; squares and hexagons, cold-rolled steel, 5c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.60c.; iron bands, 4.20c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 6.50c.; toe steel, 4.50c.

Old Material.—Purchase by the Bethlehem Steel Co. of a tonnage of steel scrap at $12, delivered Bethlehem, was the only activity of note in the scrap market during the week. This price was $1 per ton higher than was generally obtainable from Eastern mills a week ago. Dealers have offered $11 to $11.25 in covering on this contract. A 500-ton sale of No. 1 cast scrap was made at $17, delivered. Pipe is slightly higher. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.00 to $12.00
Scrap rail	10.00 to 10.50
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	8.50 to 9.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	No market

The Muskegon Piston Ring Co., Muskegon, Mich., has been organized by George W. Olson, Joseph A. Kitzinger of Muskegon, and John R. Nix of Muskegon Heights, Mich., to manufacture piston rings of iron and steel.

The plant of the Elliott-Fisher Co., manufacturer of bookkeeping and accounting machines, located at Harrisburg, Pa., has been closed for several weeks because of the general dullness of trade.

Cleveland

CLEVELAND, July 18.

Iron Ore.—The Ford Motor Co., which recently sent out an inquiry for ore to a number of producers, has finally placed 135,000 tons with a Cleveland ore firm. This is the only sale reported during the week and no new inquiries have come out. Owing to the absence of orders, shippers are unable to keep in operation all the boats that have been running and several lake freighters were laid up during the week. A cargo of Swedish ore offered for sale at 8c., as reported in THE IRON AGE several weeks ago, is now reported sold at 7½c., seaboard.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market which showed a little spurt for a few days lapsed back into the usual dullness during the week. Sales were limited to a few small lots of foundry iron. One lake furnace interest sold 900 tons in lots of 200 tons and under. One broker booked only 100 tons. The only inquiry of any size that came out was from the Studebaker Corporation for 500 to 1,000 tons of foundry iron. This inquiry, however, indicates an uncertainty whether the order will be placed One inquiry for 100 tons of silvery iron is pending, on which the schedule price has been quoted. The market has virtually settled down to a $20 price for No. 2 foundry iron, but one lake furnace made a few carlot sales during the week at $20.50. For basic iron, $19 is generally considered the market price, although there have been no recent sales in this territory to establish a price for this grade. A western Pennsylvania consumer, on an inquiry for 300 tons of basic iron, reports that he was quoted a price of $19.75 delivered, which figured back to a Valley basis, would mean a $17.79 Valley furnace price. Furnaces have received a few releases of shipping orders from automobile foundries this month, but as a whole July shipments will show a falling off as compared with June. Some of the malleable foundries that cater to railroad work are getting a better volume of business from that source, but this has not brought out any demand for malleable iron.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96 to $21.46
Northern No. 2 fdy., sil. 1.75 to 2.25.	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	36.00 to 37.00

Finished Iron and Steel.—The demand for finished iron and steel has improved somewhat during the past few days, but the market is weak and unsettled. The recently established prices are not being maintained. On small lots of steel bars, plates and structural material, sales are being made at regular prices, but desirable inquiries are bringing out concessions the amount of which depends on the size of the order. An Ohio fabricating shop is inquiring for 2500 tons of plates, bars and structural material, which has brought out some extremely low quotations and reports indicate that this business is likely to be placed around 1.75c. The improved activity is more pronounced in plates, for which there is a better demand from boiler and tank shops, but plate prices are weaker than bars and structural material, 1.90c. being quite commonly quoted for plates. However, low prices are being named on soft steel reinforcing bars for work on which either soft or hard steel bars can be used. On one inquiry of that character for 100 tons, a quotation on soft steel bars of 1.70c. or lower is reported as compared with 1.75c. for hard steel bars. Encouraging reports are coming from the automobile field. Michigan automobile plants are reported to be operating at an average of 70 to 75 per cent of capacity and expect to be able to keep going at their present schedules through August. There is improvement in inquiry for small lots of steel from automobile makers. A Detroit car builder is inquiring for 120 tons of chrome vanadium and 175 of open-hearth spring steel. Structural work is dragging. Owing evidently to the declining steel prices, much of the pending work is being refigured and some has been held up until fall. The 2300 tons for the Ohio State University stadium, Columbus, is expected to be placed Wednesday. The only award reported is 300 tons for the Harter Bank, Canton, to the Canton Bridge Co. School work in northern Ohio now pending aggregates about 2000 tons in lots of 200 and under. Railroad inquiry also shows improvement. The New York Central Lines are in the market for a large lot of track bolts, angle bars and tie plates and the Wheeling & Lake Erie Railroad is inquiring for 10,000 angle bars.

Jobbers quote steel bars 2.79c.; plates and structural shapes, 2.89c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.44c.; cold rolled rounds, 4c.; flats, squares and hexagons, 4.50c.

Sheets.—Weakness has again developed in the sheet market following the recent price reductions. Concessions of $2 to $5 a ton are being made. On galvanized sheets 4.25c. is being quoted, a concession of $5 a ton, and on blue annealed sheets quotations of 2.40c. to 2.50c. have appeared. Black sheets are firmer than other grades, the largest concession reported on these being $2 a ton to 3.40c. A western Pennsylvania tank shop is inquiring for 300 tons of heavy sheets for mine castings for the Navy Department.

Coke.—Although The Wickwire-Spencer Steel Corporation, Buffalo, has inquired for 30,000 tons of furnace coke, it is reported that this interest will probably buy some pig iron instead of starting up a blast furnace and consequently will not purchase the coke. Foundry coke is very quiet with quotations ranging from $4 to $4.50 for Connellsville brands although a few producers are still asking $5 and carlot sales are reported at the higher price.

Bolts, Nuts and Rivets.—The demand for bolts and nuts has improved. Some large orders were placed during the week by the Ford Motor Co., which recently sent out an inquiry for 8,000,000 bolts and nuts. Some carload orders were placed by railroads and jobbers and inquiries for several million bolts have come from jobbing houses. These are taken to indicate that jobbers think that prices may not go lower and they will stock up. Some releases on suspended shipments have also come out. Prices are being well maintained. Rivets are very dull and irregular. There are large quantities of resale rivets, formerly owned by the Emergency Fleet Corporation, on the market and it is claimed that some of the recent low quotations have been on these resale rivets. Carlot prices are 2.75c. for structural and 2.85c. for boiler rivets, but these can probably be shaded.

Old Material.—The market continues almost at a standstill. There was a little trading during the week between dealers who have small unfilled orders for compressed steel and machine shop turnings for Weirton and other consuming points, but no consumers are in the market. Some of the dealers are trying to get mills interested in buying scrap and laying it down at the present low prices, but without success. Prices are unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings (nominal)	7.00 to 7.50
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

San Francisco

SAN FRANCISCO, July 14.

Pig Iron.—A single sale of 100 tons of Belgian iron is practically the only evidence of activity in the Coast market at this time. The price paid for this lot, which was No. 1 grade, was $30, ex-ship, San Francisco. Recent developments indicate a decided softening tendency in pig iron; this week one interest received an offer of a large quantity of Belgian iron on the basis of about $26, c.i.f. San Francisco. Of course, much of the iron was not highest grade, but some of it contained 3 per cent silicon. Foundry operations continue very greatly restricted and the general situation is dull. There is nothing to report on coke, with the exception of the narrow routine demand, and the arrival of occasional carlot quantities.

Old Material.—A local interest recently purchased 100 tons of heavy melting steel at $9 gross ton, delivered. Still greater weakness is indicated by recent sales, in small lots, of cast iron scrap, which have been reported around $20, with one instance of a considerably lower price. The market generally is unsettled and dull.

Cast Iron Pipe.—Interest in this market has narrowed somewhat during the past week, as indicated by the volume of offerings. Redwood City, Cal., asked bids for 63 tons of 4-in. pipe, and Yuba City is in the market for 48 tons of 8-in., 32 tons of 6-in. and 9 tons of 4-in. pipe. Inquiries from private sources are similarly light. The market remains steady.

Finished Iron and Steel.—Depression still prevails in building construction in San Francisco, although there are indications that point to alleviation of the situation; there is a determined stand for the open shop, which, however, the Building Trades Council is opposing vigorously. A few days ago, an attempt to re-open the planing mills failed in 19 out of 22 cases, and the three had been running with an irregular crew. Since the recent price cuts by the Steel Corporation, the steel market on the Coast has been quiescent, the tendency apparently being to wait for developments. It is understood that there is some independent cutting on plates and shapes. The export market appears slightly more encouraging, with some little demand for sheets and rails from the Orient.

British Iron and Steel Market

Full Prices Still Prohibitive—Pig Iron Higher —Bars and Tin Plate Lower

(By Cable)

LONDON, ENGLAND, July 19.

Blast furnaces are very slow in re-lighting, only four now working in Cleveland. Fuel costs are still prohibitive, and furnace owners will not resume operations until these costs are greatly reduced.

There is plenty of general inquiry for steel, but the bulk of the business goes to the Continent. German billets are being sold at £5 15s. ($20.59) f.o.b.; French sheet bars at £7 ($25.06) c.i.f.; German merchant steel bars at £10 10s. ($37.59) to £11 ($39.38) c.i.f. For Japan, ¼-in. plates are quoted at £8 ($28.64) f.o.b.; 8-gage wire at £15 ($53.70) c.i.f. Japan. German works are getting well booked ahead. Jessops of Sheffield has been closed down indefinitely, and customers have been requested to place their orders elsewhere.

In tin plate the tendency of prices is downward. More mills are being started, but there is very little export inquiry, and the increase in the French duty is a further obstacle to business. Galvanized sheets are easy, the expected demand having failed to materialize.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.58 per £1 as follows:

Durham coke	£2	2					$7.52		
Cleveland basic	6	0					21.48		
Cleveland No. 1 foundry	7	0					25.06		
Cleveland No. 3 foundry	6	15	&	£7	0*		24.17	&	$25.06
Cleveland No. 4 foundry	6	15	&	7	0*		24.17	&	25.06
Cleveland No. 4 forge	5	17½					21.03		
Hematite	7	0*					25.06		
East Coast mixed	8	0	&	7	5*		28.64	&	25.96
Ferromanganese	18	0	&	15	0*		64.44	&	53.70
Ship plates	14	10					51.91		
Boiler plates	19	0	to	21	0		68.02	to	75.18
Tees	14	10					51.91		
Channels	13	15					49.23		
Beams	13	10					48.33		
Round bars, ¾ to 3 in.	12	10					44.75		
Rails, 60 lb. and up	10	0	to	15	0		35.80	to	53.70
Billets	11	0	to	11	10		39.38	to	41.17
Sheet and tin plate bars, Welsh	10	10					37.59		
Galvanized sheets, 24 g.	22	10	to	23	10		80.55	to	84.13
Black sheets	19	0	to	20	0		68.02	to	71.60
Tin plate base box	1	4	to	1	7½		4.30	to	4.92
Steel hoops	17	0					60.86		

*Export price.

Welfare Work for Employees

Analysis has been made by the International Labor Office, Washington, of the extent to which American manufacturing and other industries have carried on various classes of welfare work for their employees. The preliminary report covers 159 plants having a total of 453,069 employees, or an average of nearly 3000 each. Of the entire list, 51, or about one-third, are comprised under the headings of metal products, machinery, tools, electrical equipment, etc., automobiles and mining, and hence come fairly under the field served by THE IRON AGE. These 51 plants have a total of 191,024 employees, or more than 40 per cent of those covered by the survey.

Among the 51 plants, 27 employing 158,406 people are engaged in supplying their employees with certain educational facilities. It is reported that more than 30,000 of the employees, or 19 per cent of the number affected, are receiving direct benefit from this work. Some of the establishments give general educational training, some vocational training, some give lectures on safety and other matters and some maintain libraries for the use of their employees.

Of the 51 plants in our field, 38 provide sick or death benefits, 8 make provision for helping employees during slack seasons or periods of unemployment, and 14 provide old age pensions under varying sets of conditions. Some of the plants, of course, take care of all three of these forms of benefits.

Thirty of the establishments in THE IRON AGE field, with a total of 156,929 employees, provide recreational facilities, of which it is reported that more than 45,000, or 29 per cent, of the employees take advantage. Seventeen of these plants maintain separate club houses; 10 others maintain club rooms. There are 30 baseball diamonds, 51 tennis courts distributed among 16 plants, 22 bowling alleys maintained by 7 establishments. Nineteen of the plants have billiard or pool rooms with a total of 173 tables, of which number 100 are maintained by 2 automobile factories. Seven golf courses, 4 swimming pools, 10 gymnasiums, 19 orchestras, 18 bands and 10 glee clubs are maintained by as many establishments, while 26 of the plants have provision for regular outings or picnics.

The Osborn Mfg. Co., Cleveland, recently placed its new foundry at Grafton, Ohio, in operation and all molds for castings for its molding machines, except for the special, large size machines, are being made on a roll-over type of Osborn machine. The management states that operations in this plant indicate that the use of molding machines shows a saving in labor in a jobbing shop that is not engaged in production work. One of the molds for a molding machine housing made in the Osborn shop requires a flask 8 ft. long, 7 ft. wide and the cope and drag are each 36 in. deep. The weight of a cope half after the pattern was rammed was 20,500 lb. The mold was made on the largest size Osborn roll-over jolt molding machine.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 2c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets .....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
  Smaller and shorter, rolled threads.65 and 10 per cent off list
  Cut threads .....60 and 10 per cent off list
  Longer and larger sizes.....60 and 10 per cent off list
Lag bolts .....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
  Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
  Smaller and shorter.....60 and 5 per cent off list
  Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
  ¼ to 9/16 in. inclusive U. S. S..80, 10 and 10 per cent off list
  Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
  ⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....4c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off liist

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $3 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in., and 7/16-in., $3 base; 5/16-in., $3 base. Boat and barge spikes, $3.20 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.90c. from mill. Refined bar iron, 2.50c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.40–2.55	Nos. 11 and 12	2.60–2.75
Nos. 9 and 10 (base)	2.50–2.65	Nos. 13 and 14	2.70–2.85
		Nos. 15 and 16	2.80–2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	3.05–3.30	No. 28 (base)	3.25–3.50
Nos. 22 to 24	3.10–3.25	No. 29	3.35–3.60
Nos. 25 and 26	3.15–3.40	No. 30	3.45–3.70
No. 27	3.20 3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.25–3.50	Nos. 25 and 26	4.00–4.20
Nos. 12 to 14	3.35–3.60	No. 27	4.10 4.35
Nos. 15 and 16	3.50–3.75	No. 28 (base)	4.25–4.50
Nos. 17 to 21	3.65–3.90	No. 29	4.50 4.75
Nos. 22 to 24	3.80–4.05	No. 30	4.75–5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	3.05–3.30	No. 28 (base)	3.25–3.50
Nos. 17 to 21	3.10–3.35	No. 29	3.30–3.55
Nos. 22 to 24	3.15–3.40	No. 30	3.30–3.55
Nos. 25 to 27	3.20–3.45	Nos. 30½ and 31	3.35–3.65

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
13	12.75	12.62½	28.25	4.40	4.35	4.75	4.25
14	12.75	12.62½	28.00	4.40	4.35	4.75	4.25
15	12.75	12.62½	27.75	4.40	4.35	4.75	4.25
16	12.75	12.62½	....	4.40	4.35	4.75	4.25
18	12.75	12.62½	27.25	4.40	4.35	4.75	4.25
19	12.75	12.62½	27.00	4.40	4.35	4.75	4.25

New York

NEW YORK, July 19.

The markets are exceedingly dull. Copper is quiet and there is some weakness in prices in the outside market. Tin is lower in price because of the British exchange and larger offerings both here and at London. Lead is quiet with prices unchanged. Zinc is dull and weak, prices being slightly lower.

Copper.—Though many of the larger producers of copper are still adhering firmly to 13c., there is a further tendency toward shading in the outside market. There is very little business, both export and domestic demand having fallen off. The lowest prices are being made chiefly by the small producers. An advance report of the United States Geological Survey shows that the total production of primary copper in the United States in 1920 was 1,209,000,000 lb., which, if compared with the production in 1919, shows a decrease of 6 per cent.

Tin.—A little business was done on Tuesday of last week for forward delivery at 28.25c., but the market was almost lifeless during the remainder of the week. On Monday of this week there was a little more selling for forward delivery at 27.25c. There have been no developments of interest. Prices have softened because of the British exchange situation and also on account of freer offerings both here and at London. The London market is declining, to-day's quotation on spot Straits being £161 10s. as compared with £166 5s. one week ago.

Lead.—The American Smelting & Refining Co. continues its price of 4.40c., New York, and is taking most of the limited business that is being placed. In the outside market higher quotations are named; hence trading in the outside market does not amount to much. There are no new features.

Zinc.—Prices are easier, July shipment now being quoted at 4.75c., New York, August, 4.80c. and September, 4.85c. Very little business is being placed. In high grade zinc there is a slightly improved demand.

Aluminum.—The Aluminum Co. of America on July 15 reduced the price of 99 per cent plus ingot virgin aluminum to 25c., f.o.b. shipping point, making the price for the 98-99 per cent 24.50c.; No. 12, 23.80c., and sheets, 39.10c. These prices are still from 2 to 2½c. above the prices quoted on imported aluminum. The market continues very dull.

Antimony.—Lower prices are noted, carloads for July shipment now being available at 4.65c. Recent cables from the Orient indicate fairly large stocks.

Old Metals.—The market is generally unchanged and business is still impossible. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	12.00
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	10.50
Brass, heavy	7.00
Brass, light	5.25
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	5.25
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

JULY 19.—Tin, lead and spelter have declined. The fall in exchange has influenced the slump in tin, while both lead and zinc are being pressed on the market at lower prices. Purhasers who were unable to fill their requirements at the quotations 10 days ago now hesitate to buy. We quote lake copper at 13.25c. in carload lots; tin, 29c. to 29.50c.; lead, 4.35c.; spelter, 4.35c.; antimony, 7.50c. On old metals we quote copper wire 7.50c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 21c., all being buying prices for less than carload lots.

St. Louis

ST. LOUIS, July 16.—No interest is being shown in the non-ferrous markets, trade being exceptionally dull. Lead is quoted at 4.40c. in carlots and spelter at 4.25c. to 4.35c. We quote Lake copper carlots at 13.48½c.; tin, 28.86c. and antimony, 5.38½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 8c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Italian Iron and Metal Market

MILAN, ITALY, June 30.—The current price for finished iron and steel has fallen to 85 lire per 100 kilos, free cars Italy. Same material can, however, be purchased as low as 70 lire from stock as there have been practically no sales and also owing to the fact that many merchants are willing to sell at a loss in order to obtain cash. This condition makes purchases from foreign countries practically impossible. It must be noted that the present duty on iron and steel is from 6 to 9 lire per 100 kilos gold which is equal at today's rate of exchange to 18 to 27 lire.

Business is completely at a standstill. There have been several large failures due to depreciation in the value of merchandise. Many importing firms have gone out of business. This was to be expected as since the war there was an over number of small firms, who during the war were able to make a small fortune, but who lost it in a very short time during these last few months of crisis. This will help other firms who will be able to overcome this period of hardship.

Many articles have gone down in prices these last weeks. The Facsisti have been the main reason for these reductions and they have had several killed in fights with Socialists, who have also sustained several losses. They started by obliging the market people and peasants to reduce prices, otherwise they would confiscate all merchandise.

Here are this week's prices in lire, f.o.b. Milan per 100 kg.:

	April 17	May 22	June 30	Cents per Lb. June 30
Copper, electrolytic	630	575	600	13.20
Copper sheets	1100	1020	1020	22.44
Brass sheets	970	900	900	19.80
Brass wire	950	875	875	19.25
Brass rods	580	550	550	12.10
Brass tubes	1150	1070	1070	23.54
Black sheets base, 4 mm	160	160	150	3.30
Galvanized sheets No. 20	285	250	240	5.28
Tin plate, standard, per case	215	180	165	$8.08

Reduced Coke Production

UNIONTOWN, PA., July 18.—A further decrease in coke production and a slight increase in coal output have marked the past week in the Connellsville bituminous region. Coke production of W. J. Rainey, Inc., has been decreased to about 40 per cent through suspension of ovens at Paul and Revere.

Robesonia Iron Co., Robesonia, Pa., has placed an order for furnace coke requiring delivery of 7000 tons monthly during July, August and September through W. L. Byers & Co., at a price reported to be $3.25 a ton. The coke is being taken from the Herbert plant of the Connellsville Central Coal & Coke Co. An export order of 17,000 tons of coal has been shipped during the past fortnight to Holland.

CZECHO-SLOVAKIAN MARKET

Foreign Competition Felt—Unemployment Benefits Increase—Many Plants Merge

(Special Correspondence)

PRAGUE, CZECHO-SLOVAKIA, June 22.—If there is not an open shop movement over here in Europe, the reasons are to be sought in the entirely changed economic and political post-bellum conditions of revolution-ridden Central Europe. There are plenty of other causes, however, of industrial unrest, and the antagonism between socialist labor unions and the so-called yellow or Christian or national unions has been responsible for many strikes and lockouts. To this antagonism must be traced the origin of the trouble in the Czecho-Slovakian metal industry.

In the middle of May the workers at three of the largest Prague works struck to enforce their demand that none but socialist labor union members should be employed. Employers retaliated by a lockout affecting 54 works with about 25,000 hands, at the same time formulating the following demands: Reduction of wages by 10 per cent; dismissal of 10 per cent of the workmen, and a shortening of working hours by 10 per cent. They claimed that the prevailing slump justified a greater reduction in the number of hands and that living costs had dropped by far more than 10 per cent. A protracted struggle went on for several weeks, when eventually a settlement was reached through the arbitration of the Ministry of Social Welfare. On the surface it would appear that labor scored, since the employers had to withdraw all of their demands and a compromise was reached in respect to labor's share in the management. Labor, however, won a Pyrrhic victory, since it cost the unions about 50,000,000 kronen and the employers gained by the stoppage during the business depression.

Unemployment Benefits Large

The general stagnation of business in Czecho-Slovakia continues to gain. Unemployment benefits were paid 30,000 persons in May, of which 45 per cent were in the textile industry, 20 per cent in the building trades and 5 per cent in the metal industry.

The removal of tariff protection which existed before the war has permitted severe competition by French and German products aided by the high freight rates paid on foreign ores, the poor quality of domestic ores, the unfavorable coal situation and the specialization of products by foreign manufacturers. The Witkowitz steel works, to avert a curtailment of operations, are producing certain grades of pig iron and rolled material for stock to be cleared off when the market improves. The Trzynietz iron works of the Mining & Smelting Co. plans to lay off a considerable number of its workers unless the Government comes forward with orders, and the Prague Iron Industry Co. has operated its Kladno plant on reduced schedule for some time.

Price Reductions in June

Iron prices were reduced on June 1, but it remains to be seen whether the cut will stimulate the market. We quote now as follows per 100 kg., f.o.b. maker's mill:

	June 1 Kr.	June 1	May 1 Kr.
Foundry pig iron No. 1	225	$2.95	245
Foundry pig iron No. 3	223	2.92	243
Hematite	250	3.27	270
Tees and channels	360	4.72	385
Iron bars	375	4.91	400
Hoops	420	5.50	445
Rails over 35 kg	370	4.85	390
Rails under 35 kg	375	4.91	400
Sheets			
No. 6 U. S. S. gage and up	450	5.90	480
Nos. 6 to 11	460	6.02	500
Nos. 11 to 20	470	6.15	510
No. 20 gage and smaller	480	6.29	520

The last price reduction took place in February, when prices were cut by 50 to 60 kronen, on the average.

Numerous Merger Negotiations

Indications are that the iron and engineering industry are depending upon a co-ordination of efforts to regain lost foreign markets. Following the lead of the machine builders, the iron industry has also organized an export association, the Prague Iron Industry Co., the Mining & Smelting Co. and the Witkowitz Steel Works having established a community of interests organized on the lines of a syndicate. Agreements have been reached on concentration, and specialization of production, uniform sales conditions, etc., and a joint sales office has been established at Bruenn with a branch at Prague. The merger was largely influenced by fuel and raw material conditions. The Prague Iron Industry Co., while possessing ore mines, is short of coke, of which the Witkowitz works has a large surplus since shipments to Austria have considerably diminished. The principal countries with which trade will be sought are Austria, Jugo-Slavia, the Balkan States and the Russian border states. The Prague Iron Industry Co. and the Mining & Smelting Co. have established consignment stores in Jugo-Slavia to prevent foreign competition. The Government is lending active support to the movement. Negotiations are also pending between the Prague Iron Industry Co. and one of its principal customers, the Mannesmann Tube Works, Ltd., at Komotau, for the establishment of a working agreement to be reached by an exchange of shares.

Machinery Market Depressed

Very little improvement is reported in the machinery industry. There have been some orders from Roumania, but the general situation is far from satisfactory. The association of agricultural machinery and implement manufacturers under pressure of foreign competition has been forced to reduce prices. Orders booked by the locomotive and rolling stock builders have not met expectations and negotiations with France for the delivery of factory equipment for sugar plants are still pending. The bicycle industry reports a slump in exports by about 80 per cent since Russia, the Balkan markets and Poland appear to have covered their supplies by now, while the other Central European countries are barring imports by a prohibitive customs tariff.

Hearings in Ferromanganese Case Ended

Hearings in the case of alleged British dumping of ferromanganese in the American market were closed in New York, July 19, with the final session before the representative of the Federal Trade Commission, Examiner Edward M. Averill. The commission's counsel was Major Lambert. The respondents, Crocker Brothers, C. W. Leavitt & Co., and Frank Samuel, were represented.

Prices of ferromanganese current in 1919, as quoted by various trade journals of the United States and Great Britain, were offered in evidence, as well as the statistics of the United States Bureau of Mines, showing the consumption of ferromanganese in the United States over a 10-year period. Following the giving of testimony of the firms represented, both sides rested their case.

Respondent for C. W. Leavitt & Co. during the hearing pointed out that the British sellers in lowering the price for ferromanganese sold in the United States were merely anticipating the diminishing value of the pound sterling and that their quotations in dollars were based upon how many pounds sterling these dollars would buy. Joseph E. Davies, former chairman of the Federal Trade Commission, who represented Crocker Brothers, stated that the figures produced by the commission as representing the actual market price of ferromanganese in England were unreliable and that sales that had been made by Crocker Brothers in the United States were in most instances in excess of the prevailing British price. He added that when American producers had been charging as high as $430 per ton, Crocker Brothers were selling at not to exceed $200 per ton, which was greatly to the advantage of American consumers.

The case is in the hands of Federal Examiner Averill, who will report his findings to the Federal Trade Commission for final action.

PERSONAL

Walter S. Tower, trade adviser of the Consolidated Steel Corporation, New York, has taken up work with the Bureau of Foreign and Domestic Commerce, Department of Commerce, as mentioned in last week's IRON AGE. Mr. Tower's first duties will consist of co-operating with the United States Shipping Board in gathering statistics, such as those relating to trade routes, etc. Later he will go abroad to study trade conditions and will give particular attention to the iron and steel industry, which is considered to be the key to reconstruction. Upon his return to Washington, it now has been announced, Mr. Tower will head the iron and steel division of the Bureau. He has traveled extensively in North and South America, studying trade conditions, and has written several articles on that subject.

WALTER S. TOWER

B. M. W. Hanson, formerly vice-president and general manager Colt's Patent Fire Arms Mfg. Co., has become president of the Hanson-Whitney Machine Co., Hartford, Conn.

F. Karl Schneider has purchased the plant and equipment of the Albion Engineering Co., Philadelphia, operating it as a general engineering and machine shop. He has left the Krebs Pigment & Chemical Co., Newport, Del.

N. Price Whitaker, vice-president Whitaker-Glessner Co., has been appointed a member of the West Virginia state highways commission by Governor Morgan, and has accepted the appointment. This commission will have charge of the expenditure of $50,000,000 recently approved by voters of the state for road improvements.

I. A. Baum has reorganized the La Salle Engineering Co., Chicago, under the name of Boyer, Baum & Co., with offices in St. Louis, for consulting engineering in structural steel, reinforced concrete and timber structures.

Edmund S. Glauch, formerly assistant mechanical engineer for the Harrisburg Foundry & Machine Works, Harrisburg, Pa., recently opened an office as mechanical engineer in Harrisburg.

L. J. Campbell, president Electric Alloy Steel Co., Youngstown, Ohio, who served as a lieutenant colonel with the United States Army during the war, has been chosen as one of the representative Americans to officially receive the thanks of the French Government for the part this country took in the war. The Americans are to tour the leading cities of France next month as guests of honor, to attend the unveiling of many memorials and to otherwise receive attentions which will have historical significance.

Franklin G. Hubbard has become president and mechanical engineer of the Lacey Mfg. Co., Bridgeport, Conn., specializing in die and tool work. He was formerly associated with the H. E. Harris Engineering Co. and Hubbard & Harris, consulting engineers, Bridgeport.

C. H. Mount, formerly sales engineer Jeffrey Mfg. Co., Cleveland, has accepted a similar position with the Stearns Conveyor Co., Cleveland.

Charles W. Hughes, formerly with the Norwalk Iron Works Co., South Norwalk, Conn., is now with the Dixie Engineering & Insulating Co., Atlanta, Ga., a sales organization of the Norwalk company.

D. V. Waters is now mechanical engineer with Gould & Eberhardt, Irvington, N. J., having formerly been assistant to the chief engineer of the Ivers-Lee Co., Newark, N. J.

Henry Rodemeyer has become superintendent of the George A. Hebb Spring Co., Newark, N. J., having resigned from the Cook Spring Co., New York and Ann Arbor, Mich.

W. L. Neff has become New York representative of the Davenport Machine Tool Co., Rochester, N. Y. He was formerly with the Brown & Sharpe Mfg. Co. at New York. C. R. Burt, until recently with the Davenport company, has become president and general manager of the New Process Gear Corporation, Syracuse.

W. A. Carew, formerly general superintendent Morgan Engineering Co., Jersey City, N. J., has become superintending engineer for Row & Davis Engineers, Inc., New York.

R. K. Stockwell, until recently general sales manager Robins Conveying Belt Co., New York, has been appointed British engineering manager for that company, with headquarters in London.

Frank J. Fahey, vice-president Gillette Safety Razor Co., Boston, sailed July 16 for Europe on the White Star liner, Olympic, to visit the company's European branches.

Everett Morss, president Simplex Wire & Cable Co., Boston, has been elected president of the Boston Chamber of Commerce. Mr. Morss is chairman of the executive committee and a member of the corporation of Massachusetts Institute of Technology.

George H. Kennedy, formerly a machinist at the William Tod works, Youngstown, Ohio, of the United Engineering & Foundry Co., Pittsburgh, has accepted a position as instructor of machine shop practice in the Kamehameha School, an endowed institution, in Honolulu.

Peter Eyermann, who during the war was connected with steel work in Austria and since the armistice has been manager of the Bohemian State Steel Works, was recently appointed manager of the Austrian arsenal at Vienna. Mr. Eyermann was engaged in steel work engineering in the United States about 20 years ago, particularly in connection with the introduction of the blast furnace gas engine. Later he had offices at DuBois, Pa. On going to Europe some years ago he was connected for a time with the steel works at Witkowitz, Austria.

J. H. Drury, treasurer Union Twist Drill Co., Athol, Mass., and Robert B. McSkimmon, director S. W. Card Mfg. Co., Mansfield, Mass., who sailed for Europe early in May, returned last week.

Robert S. Hammond, district sales manager Whiting Corporation at Pittsburgh, has been transferred to Chicago in the same capacity.

Morris Ferer has associated himself with Abe Feinberg, Muncie, Ind., as general manager. He was formerly a member of the firm of Aaron Ferer & Sons, St. Louis. The company will continue to specialize in scrap iron and steel.

F. E. Norris, formerly general superintendent of the Sharon and Farrell works of the Carnegie Steel Co., is expected to return about Aug. 1 from France, where he has resided for two years. He has been supervising construction of an open-hearth plant and rolling mills for the M. Berliot Automobile Co., near Lyons, France. It is understood the company has abandoned plans for additional work after about half completing its plant.

F. R. Dravo, Dravo Contracting Co., Pittsburgh, recently was elected president of the Standard Scale & Supply Co., succeeding A. D. Black, resigned. C. H. Chapelle has been named treasurer of the company. J. B. Johnson and H. W. Keller, vice-presidents, have resigned and their duties are being attended to by Mr. Dravo.

James M. Cherrie, Springfield, Vt., has been appointed superintendent of the foundry of the Athol Machine Co., Athol, Mass., to succeed George Croak, who recently resigned to engage in the foundry business at Boston.

Edward H. Mangan, for several years plant engineer for the Norton Co. at Niagara Falls, has entered the employ of the General Abrasive Co. as sales manager.

Charles E. Hildreth, general manager Morgan Grinder Co., Worcester, Mass., recently acquired by the Greenfield Tap & Die Corporation, Greenfield, Mass., has resigned. His action is based on a desire not to leave Worcester, where he has made his home for more than 50 years.

Daniel N. Bates, traffic manager American Steel & Wire Co., Worcester, Mass., has been retired on pension after 36 years service with the company. Arthur D. Fiske, assistant division freight agent, succeeds Mr. Bates. Charles M. Booth, Worcester district sales agent, likewise has been retired on pension after 27 years service with the company. Albert R. Webb will take over Mr. Booth's duties.

S. V. McLeod has been appointed purchasing agent of the Algoma Steel Corporation, Ltd., with headquarters at Sault Ste. Marie, Ont., vice L. L. Jacobs, resigned, effective July 1.

Robert D. Black, formerly assistant sales manager Black & Decker Mfg. Co., Towson Heights, Baltimore, Md., has been appointed manager of the company's Philadelphia branch office, with headquarters at 318 North Broad Street. He succeeds W. C. Allen, who has been made a special factory representative, with headquarters at the company's Cleveland branch office, 6225 Carnegie Avenue.

William Robert Wilson has been elected president of the Maxwell Motor Corporation. He previously served in important executive capacities with the Studebaker Corporation and with Dodge Brothers.

John D. Nicklis has been appointed manager of supplies and purchases of Manning, Maxwell & Moore, Inc., and affiliated companies, with headquarters at 119 West Fortieth Street, New York.

S. M. Marshall, of Perin & Marshall, New York, who has been in India for the past two years in connection with new construction at the works of the Tata Iron & Steel Co., returned to New York this week.

John Duncan, who has been president of the Wheeling Steel & Iron Co., a subsidiary of the Wheeling Steel Corporation, since about a year ago, resigned recently to go into the coal and railroad business with his brother in St. Louis. Mr. Duncan retires from the steel business after an experience covering more than 30 years. He had been identified with the Wheeling Steel & Iron Co. since 1909, and from 1914 until 1920 was vice-president as well as general manager of sales of that company. Previously, beginning in 1889, he was with the National Tube Co. in St. Louis, the Western Tube Co., Kewanee, Ill., and again with the National Tube Co. as assistant general manager of sales in Pittsburgh.

New Model of Revolving Crane

The Byers Machine Co., Ravenna, Ohio, has developed a new 7-ton model of revolving crane, which can be furnished with steam, electric or gasoline power, mounted on road wheels, railroad trucks of any gage, on so-called crawlers or stationary base for use on barges, flat-cars or piers.

Of the total weight of the crane, 90 per cent is of steel, the gearing, travel mechanism, and all wearing parts, except engines, friction surfaces and parts exposed to wear of cables being of this material.

The crane is ordinarily furnished with 30 or 35 ft. boom which will operate a ¾-cu. yd. clamshell bucket in any material the bucket will handle. For coal handling the machine will operate a 1-yd. bucket. An orange-peel bucket of any type, if not excessive in weight, can also be operated. The machine can be equipped with a 4 kw. generating unit and a 36 in. lifting magnet, pile-driving set, drag line bucket or special steam shovel attachment.

OBITUARY

CHARLES F. BEAMAN, an expert on sheet-metal and sheet-metal working machinery, died on July 7 at St. Catherine's Hospital, Omaha, Neb., after a stroke of paralysis while in Omaha on a business trip for the Adriance Machine Works. He was born in Independence, Iowa, and left home at an early age and engaged in the sheet metal working industry. He was employed by the E. W. Bliss Co. for 32 years. After Mr. Bliss died, Mr. Beaman joined the Adriance Machine Works, remaining until his death, a period of 17 years. Mr. Beaman was a pioneer in introducing sheet metal working machinery into Mexico and was granted special privileges by the Mexican government.

JOHN JERNBERG, since 1882 instructor in forge practice at the Wooster Polytechnic Institute, Worcester, Mass., recently died suddenly from a shock at his old home in Sweden, according to cablegram. He left Worcester in May accompanied by Mrs. Jernberg, to pass the summer vacation abroad. Mr. Jernberg, who was 60 years old, was an expert metallurgist. A son, Henry Jernberg, is manager of the New York office of Fairbanks, Morse & Co., and another son, G. Robert Jernberg, is in charge of publications in the Worcester district of the American Steel & Wire Co.

HERBERT G. PARKER, for 30 years with the Pittsburgh Coal Co., Pittsburgh, and who during the war served with the Fuel Administration in Washington, died in New York July 14, following a long illness. After ending his service with the Fuel Administration, Mr. Parker became affiliated with the Iron Trade Products Co., Pittsburgh, in charge of coal and coke sales, and more recently was identified in a like capacity with A. M. Moreland & Co., Pittsburgh.

JOSEPH C. J. WAINWRIGHT, founder of Joseph C. J. Wainwright & Son, 23 Beverly Street, Boston, metals, died last week at his home in Stoneham, Mass. He was born in Birmingham, Eng., Dec. 10, 1851, coming to this country at the age of 19. He founded the firm which bears his name 30 years ago.

JOHN W. MILLS, president Rhode Island Supply & Engineering Corporation, Providence, R. I., died, July 12, after a long illness at his home, 30 Arnold Avenue, Edgewood, R. I., in his 70th year. He was born in England and came to this country at an early age.

FRANCIS REED, founder of the Francis Reed Co., 43 Hammond Street, Worcester, Mass., sensitive drilling machines, died at his home in that city, July 11. He was 69 years old and a native of Danbury, N. H. In 1889 he purchased the business of George Burnham on Hermon Street and developed it into the present company. He is survived by two sons, Ralph G. and Merton F., both of whom are connected with the company.

CHARLES P. BERRY, secretary, treasurer and general manager Oil City Boiler Works, Oil City, Pa., died at Memorial Hospital, Norwalk, Ohio, July 5, as a result of injuries sustained in an automobile accident. He was about forty-five years of age.

THOMAS H. RABE, 92 years old, secretary-treasurer Canton Malleable Iron Co., Canton, Ohio, died at his home in that city, July 16. He was born in Washington C. H., Ohio, and moved to Pittsburgh when a boy and made his home in that city for about 60 years. He went to Canton in 1892 and established the Canton Malleable Iron Co. He was active in prohibition work.

J. L. LARSON, sales manager Foote Bros. Gear & Machine Co., Chicago, died in that city on July 14.

Property of the Penn Steel & Iron Corporation, Lancaster, Pa., was sold at bankruptcy sale last week to Attorney John E. Malone, Lancaster, as representative for John F. Steinman, Lancaster, trustee. All real estate, equipment, buildings and grounds, which were sold separately, were purchased for a total of $183,000.

BOOK REVIEWS

The A B C of Iron and Steel. Fourth edition. Edited by A. O. Backert. Pages, xxiv + 408, 7½ x 10½ in.; illustrations, 269. Published by the Penton Publishing Co., Cleveland.

Three additional chapters have been added in this edition, treating of the manufacture of rails, tubular goods and tin plate, all by John D. Knox. The illustrations have been increased from 244 to 269. The previous edition had brought up to date of July 1, 1919, the directory of the iron and steel works of the United States and Canada. In the fourth edition the directory is brought up to Jan. 1, 1921, and contains the titles of the companies, their products and the names of their executive officers.

The A B C of Iron and Steel was intended to give a bird's-eye view of the industry and the various editions have adhered to the original purpose. Naturally a book which aims to treat the industry in a popular manner does not satisfy all engineers and practical men who have had extensive experience in manufacturing, but it does meet the popular demand in a satisfactory manner, being especially helpful to young men who are going into the iron business or men who are desirous of obtaining more information about some branch of the business with which they are not directly connected.

Handbook of Standard Details for Engineers, Draftsmen and Students. By Charles H. Hughes. Pages x + 312, 4¾ x 7 in. Published by D. Appleton & Co., New York.

Compiled to place before engineers and draftsmen, in convenient form, drawings, tables and formulæ of standard details for use in designing, this publication gives a wealth of material ordinarily scattered and not otherwise obtainable all in one volume. It is divided naturally into eight sections: drawings; fastenings; power transmission; pipes, tubes and fittings; rope and chain fittings; miscellaneous details; structural details and useful tables, being completed by an 8-page index. Except for the section on tables, it is well illustrated with different types of details for serving various purposes, each drawing being accompanied for the most part with tabular matter showing the variations in dimensions of different sizes of the detail.

As an addition to the library of those engaged in designing machinery of every description this book ought to find a ready demand. Most of the illustrations are very clear. If any criticism be offered, however, it must be based on the fact that some of the cuts have been made from drawings not specifically designed for illustrating a book.

The Slide Rule: A practical manual. By Charles N. Pickworth. Pages 133, 4⅞ x 7 in. Published by D. Van Nostrand Co., New York.

Slight revisions, together with descriptions of some new types of slide rules, mark this seventeenth edition of a well-known work, which, besides explaining the logarithmic theory upon which all slide rules operate, provides many practical examples illustrating the use of the instruments, and useful conversion tables of quantities in common use. The appendix describes some 15 new types of slide rules, and gives methods for extracting fifth roots, for solving algebraic equations, etc.

Year Book of the American Bureau of Metal Statistics. Pages 62, 8¼ x 10½ in.

There is just now activity in the compilation of production statistics in the country's leading industries that is without parallel. In some cases there is the resumption of detailed compilations which were interrupted by the war, but apart from that there has been the starting of new tabulations. Manufacturing associations are going into this in some instances, notably the National Machine Tool Builders. The statistical work carried on at Harvard and other universities has been broadened. From the American Bureau of Metal Statistics, 115 Broadway, New York, W. R. Ingalls director, there has just come the first issue of its statistical year book, dealing with production, consumption and commercial movements of copper, lead and zinc in the principal countries of the world in the past 10 years. The compilers were occupied principally with filling in gaps in the war period and have been so successful that now the statistical record of the world's production of the leading non-ferrous metals is practically complete to the end of 1920. Many governmental sources have been drawn upon in the compilation.

New Books Received

General Geology and Stratigraphy. By Dr. A. Born. A research record of advancement in geology and stratigraphy from 1914 to 1918. Published by Theodor Steinkopff, Dresden and Leipzig, Germany. Written in German.

Heat Treatment of Soft and Medium Steels. By Frederico Giolitti. Translated by E. E. Thum and D. G. Vernaci. Pages vii + 374; 6 x 9 in. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Export Trade Directory—1921 Edition. By B. Olney Hough. 1036 pages; 6 x 9 in. Published by the Johnston Export Publishing Co., 370 Seventh Avenue, New York.

Employee Training. By John Van Liew Morris. Pages xxiii + 311; 8 x 5½ in. Published by McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Foundrywork. By Ben Shaw and James Edgar. Pages xi + 115; 4 x 6½ in. Published by Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, W. C. 2, London.

Handbook of Standard Details, a compilation of the standard types, dimensions, sizes, weights, etc., of the materials and manufactured parts used in the construction of machinery and engineering structures. By Charles H. Hughes. Pages 312; 4½ x 7 in. Published by D. Appleton & Co., New York.

Case-Hardening of Steel. By Harry Brearley. Pages xi + 207; 5½ x 8½; illustrations 97. Published by Longmans, Green Co., Fourth Avenue and Thirtieth Street, New York.

Engineering Index. 1920 Edition. Pages 586; 6½ x9½ in. Published by the American Society of Mechanical Engineers, 29 West Thirty-ninth Street, New York.

Iron and Steel in Sweden. Descriptions of works, with lists of products and producing capacity. Pages 183, 7½x9½ in., profusely illustrated. Published for Jernkontoret (Iron Masters' Association) by Aktiebolaget Svenska Teknologföreningens Förlag, Stockholm, Sweden.

The Federal Administration and the Alien, a supplement to Immigration and the Future. By Frances Kellor. Pages xiv + 80; 5½ x 8 in. Published by George H. Doran Co., 244 Madison Avenue, New York.

A book on belt conveyors has been published by the Link-Belt Co., Chicago. It describes the uniroll and multiroll idlers recommended by the company. Among features of the book, which is known as No. 215, are methods of figuring belt conveyors, price lists, examples suggesting the correct types of belt conveyors for the handling of bituminous coal, by-product coke, sand and gravel, crushed rock, etc. Illustrations of typical installations.

The Link-Belt Co., Chicago, has issued a new steel chain data book, No. 475. In this is presented the heavier rugged steel chains used for power transmission, and also including elevating and conveying chains.

Trade and Office Changes

Vance McCarty, one of the prominent men in the leather belting industry, has been elected vice-president of the Chicago Belting Co. He leaves the Edward R. Ladew Co., a subsidiary of the Graton & Knight Mfg. Co., where he was vice-president. The first six of his 22 years experience in the leather belting industry were spent in various departments of manufacturing. For the last 16 years he has been associated largely with sales work. Vance McCarty started in the leather belting business when he was 18 years old. His first job was in the Riverside Tannery of Fairweather & Ladew, tanners of oak leather. A year later, in 1900, he began to make leather belts in the belting plant of Fairweather & Ladew, at Houston and Eldredge streets, New York. From 1900 to 1905 he worked in every department in the entire plant and at every individual operation in the manufacture of belting. From 1905 to 1918 he was first a salesman for the Pittsburgh branch and, later, in 1907, took charge of that branch and built up a large volume of belting sales. In 1918 Mr. McCarty went to New York and took charge of all belting sales of the Ladew company. He will make his headquarters at the New York branch of the Chicago Belting Co., 127-129 Water Street, New York. He will have charge of all sales in New York, Pennsylvania, Connecticut, Rhode Island, New Jersey, Maryland, Delaware, Virginia, West Virginia, District of Columbia, and will also have supervision over all export sales. He has specialized in selling of belting to the iron, steel and allied industries.

VANCE MCCARTY

The Pharo Mfg. Co., manufacturer of the Pharo governor, has moved its business from Detroit to Bethlehem, Pa., to give increased manufacturing facilities. At a recent meeting the following officers were elected: R. P. Hutchinson, president; R. D. Chapman, and G. C. Pharo, vice-presidents; W. B. Myers, treasurer; I. W. Gangawer, secretary; B. C. Sawyer, purchasing agent.

The Burroughs Adding Machine Co., Detroit, has acquired the Moon-Hopkins Billing Machine Co., St. Louis, for $750,000 through a sale authorized by the United States District Court in Detroit. The Moon-Hopkins company was organized in 1907 to manufacture a combination typewriter and billing machine. It employs 125 people and occupies a two-story building. John C. Moon, president of the company, said that the sale was made because the company was not making money and needed additional capital, which it could not get in St. Louis. "The sale was necessary," he said, "to forestall bankruptcy, not immediate, but eventual." Other adding machine manufacturers had contested the sale on the ground that the Burroughs company was endeavoring to get a monopoly of the business. The Moon-Hopkins company has an authorized capital stock issue of $2,500,000, but the actual capitalization is not so large. Standish Backus, president of the Burroughs company, in a telegram to St. Louis newspapers, said that as far as they can foresee they shall continue to operate the Moon-Hopkins plant and "hope to increase production in the near future."

The Koto Trading Co., Ltd., exporter and importer, has opened a branch office at 15 Park Row, New York, in charge of T. Kusanobu, formerly manager of Murai Trading Co., Ltd., New York. The directorate of the company consists of M. Shiohara, president; T. Furuya and K. Ishikawa, managing directors, and T. Kusanobu, New York representative. Mr. Shiohara is managing director of Sankyo Co., Ltd., Tokyo. Both Mr. Furuya and Mr. Ishikawa were formerly the managing directors of Murai Trading Co., Ltd., which has withdrawn from the field of trading business.

The Canadian Chicago Bridge & Iron Co., Ltd., Bridgeburg, Ont., and Montreal, Que., has changed its corporate name to Horton Steel Works, Ltd., according to an announcement made by C. H. Scheman, general manager of the company. The new name has been selected in honor of the late Horace E. Horton, who founded the organization in the United States in 1865. The Canadian organization was first incorporated in 1913 and the plant at Bridgeburg, Ont., was constructed in that year. Mr. Horton was one of the pioneer engineers of North America. Starting with a timber bridge at Orinoco, Minn., in 1865, Mr. Horton developed a large business in the design, fabrication and erection of bridges, steel tanks, etc. In the early nineties, he invented the hemispherical-bottom elevated steel tank. A few years ago his son, George T. Horton, now president of the Horton Steel Works, Ltd., invented the elliptical bottom tank with riveted steel riser. In addition to Mr. Scheman, G. S. Sangdahl is district sales manager at Montreal, C. C. Gregory is manager of plant and F. E. Gregory superintendent of erection. The main office and works are at Bridgeburg, Ont.

The name of the parent company, the Chicago Bridge & Iron Works, 37 West Van Buren Street, Chicago, is not changed.

The Foster-Songer Co., Pittsburgh, has appointed William T. Dunn, 10 High Street, Boston, as district sales agent for New England territory for the company's line of pipe and seamless tubing.

The Shields Cutter Co., formerly the Cleveland Milling Machine Co., Cleveland, after Aug. 1 will maintain a branch office and store at 192 Chambers Street, New York, (phone, Barclay 8796), in charge of J. V. Carlin, district manager, for the purpose of serving that district with milling cutters and special metal cutting tools.

B. M. Jones & Co., Inc., Cleveland branch, 115 St. Clair Avenue, N.W., is now being managed by the Connelly & Kendal Co., which has moved into the above address. Messrs. Harry Connelly and Joe Day are giving their personal attention to the sale of Double Mushet high-speed steel and Titanic carbon tool steels. Crerar Adams & Co., Chicago, Western sales agents for B. M. Jones & Co., Inc., will carry Double Mushet high-speed steel and Titanic carbon tool steels in Chicago, as well as Taylor's best Yorkshire iron. R. G. White, manager for the B. M. Jones & Co., Inc., Cleveland branch, has been appointed special Western representative, and will be located in Chicago. His headquarters will be with its Western sales agents, Crerar Adams & Co., 259 East Erie Street.

Barbour, Love & Woodward, Inc., machine tool dealers, formerly of 149 Broadway, New York, have moved from their temporary office and warehouse at 131 Washington Street to their new offices and show rooms at 45 West Eighteenth Street. Surplus stock will be carried in the building for the convenience of those desiring to inspect machines.

The San Francisco office of the Pawling & Harnischfeger Co., Milwaukee, has been moved from the Monadnock Building to 32 Beale Street. R. M. Taylor, district manager for the Pacific Coast, has his headquarters now at the Beale Street address. J. MacFerran Taylor is a new member of the Pacific Coast sales district.

The firm of Davis Brothers, Philadelphia, manufactures railroad spikes, ship, bridge and wharf spikes, and was founded in 1890 by Charles Gibbons Davis, and owned by him. Mr. Davis died April 20, 1921, and the firm is now managed by Edward L. Davis. The estate of Charles Gibbons Davis has applied for a charter of incorporation, so that the business can be continued. Bayard Henry is representing the new corporation. He is the attorney for the estate of Charles Gibbons Davis. The firm is represented by Edward L. Davis, and will continue to be represented by him.

The Gardner General Foundry Co., Gardner, Mass., has notified the Secretary of State, Massachusetts, that its 7 per cent preferred stock has been exchanged for a similar amount of 8 per cent preferred stock.

A Massachusetts charter has been granted the Spencer Thermostat Co., Boston, capitalized for $25,000 in preferred stock and 250 shares of common stock of no par value. F. Wilder Pollard, 14 Commonwealth Avenue, is president and assistant treasurer, and Laurence K. Marshall, 44 Rogers Avenue, West Somerville, vice-president and treasurer.

The National Machinery Co., bolt, nut and forging machinery, Tiffin, Ohio, has opened an Eastern sales office, room 637, Knickerbocker Building, Broadway and Forty-second Street, New York, in charge of F. J. Mawby.

The Auslander Safety Lock Co., New York, has been incorporated under State laws to manufacture locks and locking devices. The incorporators are J. and B. Zuckerman and J. Halpert. It is represented by Manheim & Wachtell, 1328 Broadway. The former company of this name has filed notice of dissolution.

IRON AND INDUSTRIAL STOCKS

Less Investing Going On and Movement of Quotations Is Narrower

Less investing interest was shown in stocks the past week, consequently there were smaller variations in quotations for same. Usually at this season of the year people with means spend as much time as possible away from business, which in a large measure accounts for the lagging interest in iron and industrial issues. In addition, however, there has been nothing inspiring happening in the steel industry for the demand for mill products has been decreasing with the tendency of prices downward. On the surface it is evident that liquidation in steel securities has passed, otherwise the market for them would have gone lower than it has since last reports. Where net losses are noted, there was no urgent selling, rather a sagging under their own weight, as might be expected with investing buying minimized. Shareholders are awaiting with much interest the outcome of the next meetings of the Bethlehem and United States Steel Corporation directors.

Unmistakable signs are that funds are beginning to accumulate to finance a business expansion movement, but the banks continue to exercise caution in loaning funds on anything but short term notes. Investment in miscellaneous bonds is running close to or above that in Government issues, on average day to day transactions, which in banking circles is taken as an encouraging sign. In past years, an increased demand and higher prices for bonds usually preceded an upward movement in stock values. With some of the important measures before Congress out of the way, it is believed in financial quarters steps will be taken to re-establish our export business through an extension of further credits or by some other means. The domestic railroad situation continues to improve slowly and the time when the carriers will be in the market for steel mill products is drawing closer.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30⅝ - 31¼	Int. Har. com.	71¼ - 75½
Allis-Chalm. pf.	70½ - 71⅝	Int. Har. pf.	— -100⅜
Am. Can com.	25¼ - 26¾	Lackawanna Steel.	37⅛ - 40
Am. C. & F. com.	123 -125	Midvale Steel.	23 - 23⅞
Am. C. & F. pf.	109 -110	Nat.-Acme	14 - 15
Am. Loco. com.	80 - 82	Nat. E. & S. com.	44½ - 45⅛
Am. Radiator, com.	— - 68⅜	N. Y. Air Brake.	55 - 56
Am. Steel F. com.	26 - 26⅞	Nova Scotia Steel.	— - 28⅛
Am. Steel F. pf.	80¼ - 80½	Press. Steel com.	71 - 73⅜
Bald. Loco. com.	72 - 76½	Replogle Steel.	18½ - 19
Bald. Loco. pf.	97 - 97¼	Republic com.	44⅞ - 49
Beth. Steel com.	— - 43½	Republic pf.	— - 81
Beth. Stl., Cl. B.	45¼ - 49	Sloss, com.	34 - 36
Beth. Stl., 8% pf.	99 -100	Un. Alloy Steel.	— - 25
Chic. Pneu. Tool.	50 - 50¾	U. S. Pipe com.	— - 15
Colorado Fuel.	— - 26½	U. S. Steel com.	71⅜ - 74⅝
Cruc. Steel com.	51 - 56¾	U. S. Steel pf.	108⅝ -109¼
General Electric.	119⅞ -127½	Vanadium Steel.	27⅛ - 29½
Gt. No. Ore Cert.	27¼ - 28½	Westingh'se Elec.	41⅛ - 44
Gulf States Steel.	30 - 30⅛		

Merger Postponed

Action on the proposed merger of the Central Steel Co., Massillon Rolling Mill Co. and National Pressed Steel Co., Massillon, Ohio, has been deferred until July 21. At a recent meeting of the stockholders at which there was representation in person or by proxy, of about 85 per cent of the common and preferred stock, the proposed merger was discussed and it is stated that there is apparently not a dissenting stockholder. However, it was thought best to defer action to give all stockholders an opportunity to give their consent to the consolidation. The companies have sent out a new circular letter to their stockholders, in which they state that they have determined that there must be practically a unanimous vote on the merger.

Assets of Ford Motor Co.

In view of all that has appeared in the public press during the past six months or so regarding the financial condition of the Ford Motor Co., Detroit, the accompanying statement, dated April 30, last, filed by that company with the Massachusetts Commissioner of Corporations, when compared with a statement of condition as of June 30, 1920, filed by the Ford company last year, is interesting.

Because of the disparity of dates covering the following figures, it would be unfair to draw final conclusions based on a period of a year. It is interesting to note, however, that on April 30, last, the company actually owed $4,597,753 net less than it did ten months previous, as is shown in comparing "accounts" and "notes payable" in the liabilities. At the same time the company was $24,437,886 better off on cash and accounts receivable. These figures would not suggest Mr. Ford's credit being strained, as some writers tried to make out a short time back.

Another salient feature is the large amount charged off to depreciation, nearly $25,000,000 more than was recorded June 30, last. The merchandise item shows a shrinkage of $33,009,854, which may be taken to mean the company pushed cars into representative's hands in the early part of 1921, and then drew down on drafts against such concerns.

Assets of Ford Motor Co.

	April 30, '21	June 30, '20
Real estate	$71,329,719	$85,549,726
Machinery	46,459,046	41,661,136
Merchandise	63,848,157	96,858,011
Furniture, fixtures, tools, autos, trucks and teams	44,779,634	
Notes	58,252	
Accounts receivable	51,268,976	
Cash	35,667,936	62,499,026
Securities	10,361,963	18,921,608
Patent rights	81,397	77,858
Miscellaneous investments	501,814	1,126,742
Good will	20,517,985	
Profit and loss	265,674	
Total	$345,140,557	$306,695,109
Liabilities		
Capital stock	$17,264,500	$17,264,000
Accounts payable	44,993,754	15,958,115
Notes payable	3,892,385	35,112,973
Deferred credits	3,027,120	4,861,613
Depreciation	43,493,393	18,654,489
Insurance	89,570	
Taxes	49,502,138	49,163,974
Surplus profit and loss	182,877,696	165,679,132
Total	$345,140,557	$306,695,109

The personnel of the company on the two above mentioned dates compare as follows:

1921		1920
Edsel B. Ford	President	Edsel B. Ford
	Treasurer	F. L. Klingensmith
B. J. Craig	Assistant Treasurer	
Henry Ford	Director	Henry Ford
Edsel B. Ford	Director	Edsel B. Ford
Alfred Lucking	Director	F. L. Klingensmith

A temporary receiver has been appointed for the Fabricated Steel Products Co., Leetonia, Ohio, on application of three creditors with claims totaling $4,860. The plant will continue to operate under the receiver, it is announced.

First mortgage 6 per cent real estate notes to the extent of $40,000 of the Axelson Machine Co., Los Angeles, Cal., have been offered in the St. Louis market. The security is the land and plant recently acquired for a branch in St. Louis.

Lackawanna Steel Co. Suffers Deficit

Nearly a million dollar deficit was the outstanding feature of the report of earnings for second quarter of the Lackawanna Steel Co. This contrasts sharply with a profit of $1,881,946 for the corresponding quarter of 1920. The deficit for the first half of 1921 was $974,392. The first quarter of 1921 resulted in a profit of $8,735. The surplus on Dec. 31, 1920, was $33,812,601. A summary of earnings for second quarter and first half follows:

	Second Quarter		First Half	
	1921	1920	1921	1920
Total net earnings after taxes and ordinary expenses	*†$384,761.81*	$2,786,107.42	$282,933.28	$3,123,017.97
Deduct: Interest on bonds and other obligations:				
Lackawanna Steel Co.	221,912.50	251,745.84	444,137.50	486,325.00
Subsidiary companies	36,979.17	39,266.66	74,791.66	79,366.66
	$258,891.67	$291,012.50	$518,929.16	$565,691.66
Balance	*$643,653.48*	$2,495,094.92	*$235,995.88*	$2,557,326.31
Less—Appropriations:				
For extinguishment of mines and mining investment	9,199.15	59,641.03	62,760.37	113,420.27
For depreciation and accruing renewals	330,274.81	553,507.87	675,635.75	1,011,680.11
	$339,473.96	$613,148.90	$738,396.12	$1,125,100.38
Deficit for second quarter	*$988,127.44*	*$1,881,946.02	*$974,392.00*	*$1,432,225.93

*Profit. †Italics signify deficit.

Machinery Markets and News of the Works

MORE INQUIRY IN WEST

Eastern Markets Quiet, but Chicago Reports Slight Improvement

Reductions of About 15 Per Cent Made by Manufacturers of Sensitive Drilling Machines

Although the machine-tool market continues inactive in the East, some improvement over last month is noted in the Middle West, particularly at Chicago, where a fair amount of prospective business is before the trade. Among the inquiries is one from the H. W. Johns-Manville Co. for 15 machines. Several purchases of small lists of new and used tools have been made in Chicago.

Some Cleveland dealers likewise report a little improvement in inquiry, but at Cincinnati, Boston and New York the markets are extremely dull, with both orders and inquiries at low ebb.

The International Nickel Co. still has some equipment to buy for its new plant at Huntington, W. Va.

The United States Glass Co. is expected to put out a list at Pittsburgh soon for equipment for a plant to be built at Shreveport, La.

The Illinois and Rock Island lists, which have been pending at Chicago for some weeks, are still held up and the purchasing departments of these roads are reported to have stated to machine-tool builders that purchases will not be made until substantial reductions have been made in machine-tool prices.

Some of the sensitive drill manufacturers will reduce prices this week about 15 per cent. A lathe company is offering lathes at a discount of about 20 per cent from recent prices.

New York

NEW YORK, July 19.

The best that any of the local machine-tool sellers are doing is an occasional sale of a single machine. Even such orders are not plentiful. Inquiries are likewise few in number and great difficulty is experienced in closing business.

A reduction in prices of about 15 per cent will be made this week by some makers of sensitive drilling machines. The leading manufacturers of motors and controllers have announced reductions of about 10 per cent.

N. D. Jonovitch of Serbia arrived in New York last week to purchase machinery. He may be addressed in care of the Serbian Consulate General, 442 West Twenty-second Street, New York City.

The crane market continues to improve slightly from the standpoint of inquiries and a few sales are reported. The greatest activity the past two or three weeks has been in hand power cranes, some inquiries calling for as high as 15 and 20-ton capacities. An inquiry is being handled by Naylor & Co., 120 Broadway, New York, for a gantry crane equipped with a 2½-cu. yd. bucket for export to France. John A. Savage & Co., Crosby, Minn., have asked for quotations on a 30 to 40-ton, 8-wheel locomotive crane for their Sagamore mine, Riverton, Minn.

Among recent sales are: Industrial Works, a 20-ton, 50-ft. boom locomotive crane to Luria Brothers, Lebanon, Pa., for a new scrap yard in Pittsburgh; Champion Engineering Co., 30-ton, 55-ft. span overhead traveling crane to the American Steam Shovel Co., Marion, Ohio; Milwaukee Electric Crane & Mfg. Co., a 5-ton, 64-ft. span overhead traveling crane to the Lehigh Wilkes-Barre Coal Co., Wilkes-Barre, Pa.; Shepard Electric Crane & Hoist Co., a 4-ton electric hoist with 2-cu. yd. bucket for coal handling and a 5-ton electric hoist to the Pittsburgh Screw & Bolt Co., Pittsburgh, and the Hoisting Machinery Co., 50 Church Street, New York, a 15-ton, 50-ft. boom second-hand Brownhoist locomotive crane to the Dutton Lumber Co., Poughkeepsie, N. Y.

The Swadeshi Brass & Iron Works, 233 Kika Street, Bombay, No. 4, India, of which T. Jagjiwandas & Co. are sole proprietors, is in the market for the following equipment: Cotton ginning and weaving machinery and spare parts; spinning machinery parts only; rolling mills with all equipment for producing square, flat and round angle iron from ¼ to 4-in. sizes and sheets 1-32 to ⅜-in. thick from iron scrap, average production eight to 12 tons per day; complete plant and equipment for manufacturing hardware, such as hammers, shackles, shovels, axles, nails, flat and wire, each one ton per day; machinery for wood and metal screws, 200 to 250 gross per day capacity; machinery for cutlery and surgical instruments; machinery for making iron bolts and nuts from 1 to 2-in. diameter; complete plant for making one ton of steel castings per day from hematite pig iron and iron and steel scrap; also equipment for foundry for casting three to 10 tons per day, with equipment for pattern shop; equipment for blacksmith's shop employing 20 smiths.

The Richmond Screw Anchor Co., Pulitzer Building, Park Row, New York, manufacturer of heavy hardware, has leased the buildings at 251-55 Bush Street and 362-64 Smith Street, Brooklyn, for the establishment of a new plant. The property will be occupied early in August.

The Harrisville Ore & Steel Corporation, New York, has been incorporated with a capital of $500,000 by H. G. Conway, E. G. Kerr and M. F. Dudek, to manufacture steel products, operate iron ore properties, etc. It is represented by Peaslee & Compton, 501 Fifth Avenue.

The Du Bois & Depollier Co., Brooklyn, has been incorporated with a capital of $1,000,000 under Delaware laws, to manufacture watch cases and precision specialties. It will succeed to the business of the Du Bois Watch Case Co., 316 Herkimer Street.

The Rudy Way Mfg. Co., New York, has been incorporated with a capital of $25,000 by J. Harris, W. E. Armstrong and A. Fuchelocher, to manufacture radiator air valves and valve protectors, etc. It is represented by M. Eichner, 1545 Broadway.

The Rooney Pump & Transmission Co., New York, has been incorporated with a capital of $50,000 by M. B. Salzberg, S. Shookoff and P. J. Rooney, 22 William Street, to manufacture pumping equipment and kindred products.

The Perfect Brick & Hollow Tile Co., New York, has been incorporated with a capital of $3,200,000 under Delaware laws, by Frederick G. Stoehr, Rae Taustine and Thomas G. Chamberlain. The company is represented by the Capital Trust Co., Dover, Del.

The New York Edison Co., 130 East Fifteenth Street, New York, has filed plans for a one-story addition to its "Waterside" powerplant, 63 x 94 ft., at Fortieth Street and First Avenue, to cost about $125,000.

The Moore Patents Corporation, New York, N. Y., has been incorporated with a capital of $500,000 by C. W. Moore, S. Dressler and A. Berres, to manufacture pipe, pipe fittings, plumbing fixtures, etc. It is represented by H. G. Littau, 321 East 149th Street.

The Stevens-Webb Co., New York, has been incorporated with a capital of $50,000 by R. D. Goldberg, B. Levy and W. S. Doernberg, 1133 Broadway, to manufacture farming implements and other agricultural equipment.

The Dexter Folder Co., 200 Fifth Avenue, New York,

manufacturer of paper folding machinery, feeders, etc., is taking bids for a two-story addition to its plant at Pearl River, N. Y. W. E. Truesdell, 5 Beekman Street, New York, is engineer.

Fire, July 10, destroyed a portion of the plant of the Royal Metal Furniture Co., 125-37 Eighth Street, Brooklyn, with loss estimated in excess of $200,000, including machinery.

The Rite Electric Lamp Co., New York, has been incorporated with a capital of $20,000 by I. Rendelman, M. Sonin and S. J. Berkowitz, 898 Broadway, Brooklyn, to manufacture incandescent electric lamps.

The Ringless Piston Co., recently organized under Delaware laws to manufacture automobile engine equipment, will operate in New York, with capital of $1,000,000. It is represented by J. C. Henriques, 103 Park Avenue.

The Adirondack Power & Light Corporation, Amsterdam, N. Y., has disposed of a bond issue of $1,000,000, the proceeds to be used for extensions, betterments in plant and system, general operations, etc. J. Ledlie Hees is president.

The Farmers' Portable Mill Corporation, New York, has been incorporated with a capital of $250,000 by E. T. Thomas, M. Stephens and G. Luehing, to manufacture mechanical equipment for farm service. It is represented by the Thomas Engineering Co., 176 Greenwich Street.

Plans are being perfected for a reorganization of the Willys Corporation, 11 Pine Street, New York, manufacturer of automobiles and automobile equipment. It is said that the two subsidiaries, the Auto-Lite Corporation, Toledo, Ohio, and the New Process Gear Co., Syracuse, N. Y., will be merged into one operating unit, while the new plant on Elizabeth Avenue, Elizabeth, N. J., comprising the former works of the Duesenberg Motors Corporation and additions, will be operated as a separate plant division for the production of the Chrysler six automobile. The reorganization plans include a new bond issue to total about $20,000,000.

The Kentucky Midland Pipe Line & Refining Co., New York, has been incorporated under Delaware laws with capital of $5,000,000, to construct a refinery in the Kentucky oil field district. It is represented by Arthur W. Britton, 65 Cedar Street.

The superintendent of lighthouses, Tompkinsville, N. Y., will receive bids up to 3 p. m., July 29, for approximately 300 tons of ¾ to 2-in. open and stud link iron mooring chain, also shackles and swivels.

The Percy-Welton Machine Co., New York, has been chartered under State laws to manufacture machine products. The incorporators are S. Waxman, S. B. Klee and L. E. Felix, 217 Broadway.

In connection with plans to commence the manufacture of automobiles at its plant at Long Island City and Oakland, Cal., the Durant Motors, Inc., 1764 Broadway, New York, is said to have placed an order for 50,000 automobile motors with the Continental Motors Corporation, Detroit, Mich., with delivery by Aug. 1. The motors will be shipped at the rate of 150 a day. Production of the Durant cars will begin at about this same time.

The Keystone Appliance Corporation, New York, has been incorporated under Delaware laws with capital of $2,500,000 to manufacture electrical appliances and equipment. The incorporators are Thomas E. Halle, James L. Watson and F. H. Butchorn. It is represented by the Corporation Trust Co., 37 Wall Street.

The Automatic Coin-Change & Record Machine Co., Bound Brook, N. J., has been incorporated with a capital of $1,500,000 by Irving J. Palmer, Fred A. Probose and Jeremiah J. Regan, to manufacture coin machines and other automatic machinery and parts. It is represented by John P. Cullen, 403 East Main Street, Bound Brook.

An electric power plant will be erected by the City Council, Gloucester City, N. J., in connection with a new electrically operated pumping plant for the waterworks system, filtration plant and other improvements, estimated to cost about $202,000. Remington & Vosbury, Camden, N. J., are engineers.

The Modern Optical Mfg. Co., 357 DeWitt Street, Belleville, N. J., has been organized to manufacture optical mountings and other precision specialties. Charles Presbey heads the company.

The Smith Rubber & Tire Co., Inc., Midland Avenue, Garfield, N. J., is arranging for increased production at its plant to develop a maximum output of 600 tires per day. Winfield Clearwater is president.

The Koehler Machine & Tool Co., Newark, N. J., has been incorporated with a capital of $125,000, by Henry Koehler, Joseph Klopak and John J. Evans, to manufacture machinery, tools, jigs, dies, etc. It is represented by J. Howard Conover, 763 Broad Street.

The Lehigh Valley Railroad Co., Jersey City, N. J., will install two new ore and coal unloaders at the foot of Chapel Street, of 15- and 5-ton capacity, respectively, estimated to cost about $461,000, exclusive of foundations. The latter work will cost $40,000.

The Slip-On Chain Co., Newark, has been incorporated with a capital of $100,000 by Paul G. Bennett, Ernest E. Ryman and Ernest G. Stauber, to manufacture skid chains, automobile parts, etc. It is represented by Harry L. Tepper, 800 Broad Street.

The Public Service Gas Co., Public Service Terminal, Newark, has filed plans for a one-story addition to the engine department at its plant at 15 Congress Street.

New England

BOSTON, July 18.

The machine tool market continues inactive. Even sales of individual machines are conspicuously lacking and with the exception of a 60-ton crane for the Amoskeag Mfg. Co., dealers lack live prospects. This is partly attributed to the fact that a large majority of New England metal-working industries are either closed or working on greatly reduced schedules. The outlook for business, however, is not as discouraging as appears on the surface. It is conservatively estimated that $1,000,000 worth of inactive prospects are in the hands of dealers. Prices have been quoted on this amount and prospective customers are waiting until business conditions warrant the expenditure of funds.

Prices on machine tools show little, if any, change. Some producers, however, are offering larger discounts. The Little Giant Hammer Co., Mankota, Minn., is offering machinery at 30 per cent discount from list, or 10 to 15 per cent more than heretofore. The Pittsburgh Machine Tool Co., Braddock, Pa., lathes, is offering its product at 20 per cent discount. It is understood other manufacturers, while not coming out openly with larger discounts, will accept them.

The S. A. Woods Machine Co., Boston, which went into the production of motors last March, reports a good demand for a new motor recently brought out. It has lately equipped one shop and is installing many others in textile mills. Other motor builders state the demand from textile interests is satisfactory but far below normal.

Manufacturers of high speed cutters have reduced prices 15 per cent, and on high speed end mills, 10 per cent. Some interests are quoting straight shank drills at 50 and 5 per cent discount, as against 50 per cent a week ago. The market on popular selling oil cans, used in machine shops, is 10 per cent lower.

Plans for the proposed one-story repair shop at Greenville, Me., 102 x 218 ft., for the Great Northern Paper Co., Millinockett, Me., are being revised.

Landers, Frary & Clark, New Britain, Conn., have begun operations in a small way in their newly acquired plant, the Greenwood Mills, New Hartford, Conn. Vacuum cleaners will be made.

The business of the Morgan Grinder Co., Worcester, Mass., formerly Churchill-Morgan-Crittsinger, Inc., recently acquired by the Greenfield Tap & Die Corporation, Greenfield, Mass., will immediately be moved to the latter city, instead of waiting until fall, as originally planned.

L. F. Fales, Walpole, Mass., special machinery, contemplates some minor changes in foundry equipment made necessary by the installation of a No. 5 Whiting cupola of 40-ton capacity. This department nominally employs about 100 molders but to-day has only 40 on the payroll and is operating three days a week. S. A. Merrill is superintendent.

The Silentflush Valve Mfg. Co., Springfield, Mass., capitalized for $300,000, has taken out a charter. Arthur W. Morris, 54 Buckingham Street, is president, and Robert M. Keating, 73 Taylor Street, treasurer.

The Builders Iron Foundry, 9 Coddington Street, Providence, R. I., will erect a one-story addition, giving approximately 12,000 sq. ft. of increased floor space.

A new power house will be erected at the textile mill of the Ansonia O. & C. Co., Ansonia, Conn., in connection with a new manufacturing extension, estimated to cost about $75,000.

The New Egland Power Co., 35 Harvard Street, Worcester, Mass., has disposed of a bond issue of $1,250,000, the proceeds to be used for the erection of a new power plant, with initial generating capacity of about 5500 hp.

Allis Freedman, 27 Church Street, Springfield, Mass., is planning for the erection of a new one-story, brick machine shop to cost about $20,000.

The Richard French Iron Works, Worcester, Mass., has acquired property on Howe Avenue, Millbury, Mass., for a new plant to replace its Worcester works, recently purchased by the Arcade Malleable Iron Co. Plans for a number

of buildings are in preparation, with main structure to be one-story, 50 x 120 ft. Construction will begin at an early date to have the plant ready for operation in the fall.

A new power plant, with 100 ft. stack, will be erected by the M. J. Whittall Associates, Worcester, in connection with the erection of a new weave shed at their carpet mills, estimated to cost about $125,000.

The Atlas Die Casting Co., Worcester, Mass., recently organized with a capital of $200,000, has leased space in the building at 41 Jackson Street, for its new works.

The Industrial Appliance Co. of New England, Boston, has been chartered under State laws to manufacture mechanical and engineering specialties. William W. Cummings is president, and Gordon W. Russell, 235 Brewster Terrace, Brookline, Mass., treasurer.

The Robinson Anti-Splash Tire Co., Boston, has been incorporated with a capital of $200,000, to manufacture automobile tires. Charles A. Robinson, 3960 Washington Street, is president and treasurer.

The Frank H. Fargo Co., Bridgeport, Conn., has been incorporated with a capital of $75,000 by Frank H. Fargo, Stratford, Conn.; H. W. Graves, New Haven, Conn., and J. J. Beckwith, Jr., 61 Livingston Place, Bridgeport, to manufacture steel and metal furniture and parts.

The Two-In-One Signal Lamp Corporation, New Haven, Conn., has been incorporated with a capital of $50,000 by J. M. Chapnick, 279 Whalley Avenue, and I. Fine, 607 Elm Street, New Haven, to manufacture electric lamps and signal devices.

The Connecticut Metal Bed Co., New Haven, Conn., has been incorporated with a capital of $25,000 by G. E. Tester, 625 Orange Street, and associates, to manufacture metal bedsteads and similar products.

Philadelphia

PHILADELPHIA, July 18.

The American Motor Body Co., Glenwood Avenue near Eighteenth Street, Philadelphia, has filed plans for an addition. Improvements will also be made in the present works.

The Philadelphia Machine Screw Works, Inc., Philadelphia, has been incorporated with a capital of $25,000 to manufacture machine screw products and other mechanical specialties. A. L. Barbier, 2132 North Eighteenth Street, is treasurer.

The Kilbourne & Jacobs Mfg. Co., Commercial Trust Building, Philadelphia, has arranged for a bond issue of $900,000, to be used in connection with general operations for the manufacture of wheelbarrows, scrapers, trucks, trailers, etc. J. R. Kilbourne is president and general manager.

The Union Tank Car Co., 21 East Fortieth Street, New York, has leased a portion of the Hog Island Shipyard, Philadelphia, comprising the section known as steel yard "A," and will use the property in connection with its repair shops now in the Point Breeze district.

The Tioga Engineering & Pattern Co., Philadelphia, is being organized by Albert G. Schleber, Jr., William S. Cox and Benjamin G. Slaughter, to manufacture machinery and parts, and other metal products. Application for a State charter will be made Aug. 12. It is represented by J. Edgar Butler, 1524 Chestnut Street.

The M. J. Dougherty Co., Philadelphia, Pa., manufacturer of piping, etc., has removed its plant to new quarters on Washington Avenue, occupying the block from Twenty-fourth to Twenty-fifth Street, where increased fabricating and production facilities will be provided.

The Pennsylvania Rubber Products Corporation, Philadelphia, has been incorporated under Delaware laws with capital of $500,000 to manufacture mechanical rubber products. The company is represented by F. R. Hansell, Land Title Building.

The American Chemical & Sugar Machinery Co., Colonial Trust Building, Philadelphia, has acquired the plant of the Harrison Chemical Co., fronting on the Delaware River, Chester, Pa. The new owner will remodel the buildings, and plans for the installation of equipment at an early date. It is said that employment will be given to 200 operatives.

The Coodel Pneumatic Valve Co., Camden, N. J., has been incorporated with a capital of $75,000 by Thomas F. Delaney, Charles H. Cooke and William C. Casperson, to manufacture valves and other mechanical products. It is represented by the New Jersey Corporation Guarantee & Trust Co., Camden.

The Pennsylvania Supply & Mfg. Co., Allentown, Pa., is being organized by Charles B. and George A. Kuhns, Shamokin, Pa., operating a local works under the name of Kuhns Brothers, for the manufacture of cornices, ceilings, ventilators and kindred metal products. The new company will specialize in a similar line of manufacture, including architectural metal work, skylights, etc., and has acquired about 15,000 sq. ft. of floor space at Church and Chestnut streets, Allentown. It is planned to commence production early in August. Myron R. Miller, Allentown, is also interested in the new company.

John E. Malone, Lancaster, Pa., has acquired the plant of the Penn Iron & Steel Corporation, Plum Street, for $108,000, covering ground, buildings and equipment. The miscellaneous machinery will be disposed of in individual lots. The plant at one time was known as the Norris Locomotive Works.

The Pennsylvania Department of Forestry, Harrisburg, Pa., is planning for the installation of 50 steel towers in different parts of the State forests, to be used for observation purposes in connection with fires.

The Pennsylvania Rubber Co. of America, Philadelphia, has leased the entire building at 857 North Broad Street, totaling about 14,000 sq. ft., for a local establishment.

The Schimmel Electric Supply Co., Philadelphia, Pa., has been incorporated with a capital of $330,000 to manufacture electrical equipment and supplies. It will take over the business operated under this name at 318 Market Street. I. D. Schimmel is treasurer.

W. E. S. Dyer, Land Title Building, Philadelphia, engineer, has completed plans for the erection of a new one-story power house at the plant of W. H. and E. A. Margerison & Co., Front and Lehigh streets, manufacturer of towels, etc.; and for a new power house and coal storage plant at the works of the Enterprise Furniture Co., Glen Rock, Pa. Construction of both plants will begin at once.

Buffalo

BUFFALO, July 18.

Fire, July 10, caused damage of $60,000 to the plant and machinery of the Archer-Daniels Linseed Oil Co., Louisiana Street, Buffalo.

L. G. Schoepflin & Co., Buffalo, automobile trucks, now temporarily located at Ellicott and Washington streets, has had plans prepared for a new two-story service and repair works at 306 Franklin Street, estimated to cost about $60,000.

The Sinclair Consolidated Oil Corporation, 120 Broadway, New York, is said to be negotiating for the purchase of property at Niagara Falls, N. Y., as a site for a new oil refinery, estimated to cost in excess of $2,000,000 with machinery.

A new one-story power house will be erected by the Oswego Shade Cloth Co., Oswego, N. Y., at its plant on Utica Street.

The Rochester Gas & Electric Co., Rochester, N. Y., has disposed of a bond issue of $7,000,000, the proceeds to be used for plant extensions and improvements, general operation, etc. Robert M. Searle is president.

Arrangements are being made for dismantling the plant of the Rochester Auto & Tool Co., Rochester, N. Y., and the removal of the equipment to Jaslo, Poland. It is organized under State laws with capital of $75,000, and the stockholders are of Polish descent. The works were established about two years ago.

Baltimore

BALTIMORE, July 18.

The Seaboard Iron & Steel Co., 905 Lake Drive, Baltimore, has awarded contract to J. Henry Smith, 1426 Light Street, for the erection of its new plant on South Pica Street. Construction will begin at once.

The General Steel Products Co., 33 South Gay Street, Baltimore, has been incorporated with a capital of $50,000, and 500 shares of stock, no par value, by Edgar F. Kirwan, William G. Levinson and Henry L. Fleming, to manufacture metal products.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will receive bids until 11:30 a. m., Aug. 3, for material for the Canal Zone, including steel, boiler tubes, wire and cable, motors, pumps, electrical equipment, tractor mowers, nails and other equipment, all as set forth in Circular 1453. The assistant purchasing agent is located at 24 State Street, New York.

The American Aircraft, Inc., 1304 Fidelity Building, Baltimore, has been incorporated with a capital of $1,000,000 by William H. Campbell, George O. Blome and Robert J. Stewart, to manufacture airplanes, hydroplanes, motors, etc.

The City Council, Frostburg, Md., has perfected plans for the installation of new electrically operated pumping ma-

chinery for the municipal waterworks, to consist of one pumping unit with capacity of 300 gal. per min., and one of 100 gal. per min., with motors, switches, controlling apparatus, etc.

The Wrapping Ad Machine Co., Towson, Md., has been incorporated with a capital of $100,000 by Jorgen I. Haase and Jesse T. Dowling, Towson, to manufacture paper wrapping machinery, paper holding equipment, etc.

The Tyler Airless Tube Co., 757 Calvert Building, Baltimore, has been incorporated with a capital of $100,000, by Edgar L. Wade and William J. Murphy, to manufacture automobile tires and tubes.

A. L. Flint, general purchasing officer, the Panama Canal, Washington, will take bids up to 10:30 a. m., Aug. 31, for the purchase of 15 locomotives, offered for sale by the department, as set forth in Circular 1454.

The Flame Ignition Unit Co., 614 West North Avenue, Baltimore, has been incorporated with a capital of $110,000 by William H. Martin, John K. Brown and Allen F. North, to manufacture flame ignition unit devices.

The United States Shipping Board, Washington, is planning for the construction of a new electric power plant at Craney Island, near Norfolk, Va., and the installation of an electrically operated pumping plant.

The Thompson Mfg. Co., Washington, has been incorporated with a capital of $350,000 under Delaware laws by James T. Thompson, H. Leroy Goff, and H. N. Wayne, Washington, to manufacture electric lighting and heating equipment and devices. It is represented by the Colonial Charter Co., Ford Building, Wilmington, Del.

A new one and two-story electric power plant and ice-manufacturing plant, estimated to cost $75,000, will be constructed at the State Hospital for the Insane, Goldsboro, N. C., Dr. W. W. Faison, director. Plans are being prepared by Wiley & Wilson, Lynchburg, Va., engineers. Bids will be asked at an early date.

The Red Cedar Chest Co., Altavista, Va., will break ground at once for rebuilding its plant, recently destroyed by fire. The new factory will be 60 x 500 ft., and is estimated to cost $125,000 with machinery. Lockwood, Green & Co., 101 Park Avenue, New York, are engineers.

The Bacher Machine & Grinding Co., Wilmington, Del., has been incorporated with a capital of $100,000 by Horace G. Eastburn, Franklin S. Bunting and George J. Bacher, 305 Delamore Street, Wilmington, to manufacture machinery and tools.

Ohio

CLEVELAND, July 18.

Some dealers report a little improvement in inquiry for small lots of machinery for equipping new shops, but prospective purchasers are slow in placing orders and aggregate sales the past week were very light. The Osborn Mfg. Co. has taken an order from the Navy Department for seven power molding machines for the Philadelphia navy yards and for a large power molding machine for an Eastern foundry. Inquiries for molding machines have improved somewhat. A manual training school in Erie, Pa., is inquiring for a number of machine tools. A Cleveland dealer has sold three carloads of used machinery, amounting to $16,000, from the plant of the Enterprise Mfg. Co., Cleveland, for the Federal vocational school, Valparaiso University, Valparaiso, Ind.

Manufacturers of punching and shearing machinery are getting practically no inquiries. Local machine-tool manufacturers and dealers do not look for much change in the situation within the next few weeks, but expect some revival in buying early in the fall.

In Cincinnati there are no apparent signs of improvement in inquiries or orders for machine tools, although the market is not entirely devoid of either. Inquiries are reported from Mexico, and a company manufacturing planers is understood to have shipped an order for three machines to a foreign buyer. During the past week an inquiry for a number of tools came through the office of the National Machine Tool Builders' Association for a school in India. A manufacturer of conveying machinery reports activity, the shipments being made East. The Big Four has not purchased against its recent inquiry nor has the Illinois Central taken action yet in regard to its recent list, previously reported. Resumption of railroad shop work has begun in the Zanesville shops of the Baltimore & Ohio Railroad, which have been closed for the past six months. The market for used machinery is generally quiet, although some sales have been made.

The Fisher Lock Co., Hamilton, Ohio, has been recently incorporated for $50,000. The plant is located at Seventh and Walnut streets. It is understood that most of the equipment has been installed and work will begin very soon. The incorporators include Wilbur R. Black, Joseph Fisher, Thomas Zollers and Walton Bowers.

The Bowman-Vaughn Co., Lisbon, Ohio, will erect a new factory for the manufacture of toys.

The Central Welding Co. is a new company which has started a plant at 1005 Twelfth Street, Canton, Ohio. Glenn E. Wilson, formerly with the Oxweld Acetylene Co., Chicago, is president and general manager and Harvey Winkleman, vice-president and assistant manager.

The Acme Cultivator Co., Salem, Ohio, recently incorporated with capital stock of $50,000, contemplates the erection of a plant for the manufacture of cultivators.

The Lima Sheet Metal Products Co., Lima, Ohio, has under erection a new plant, involving an expenditure of $110,000 and is reported to have placed orders for $40,000 worth of equipment. The works will include a main building, 60 x 234 ft., and three wings, each 40 x 60 ft.

The Chisholm-Moore Mfg. Co., Cleveland, has taken an order for a complete overhead track system for the new Huntingdon, Pa., plant of the Pierce, Butler & Pierce Co., Syracuse, N. Y., manufacturer of plumbing, heating and steam equipment.

Pittsburgh

PITTSBURGH, July 18.

Both actual and prospective machinery business in this section is excessively dull. The International Nickel Co. has yet to buy the tables, small motors, saws and shears for its new plant at Huntington, W. Va., and the United States Glass Co., which soon will start work on a new plant at Shreveport, La., is expected to put out an inquiry for the necessary equipment. An inquiry has reached this market from the Wagner Mfg. Co., Sidney, Ohio, aluminum ware, for a vertical milling machine for milling steam cookers. It is possible that this requirement will be met from a used machine. A local manufacturer's agent reports the sale of three motor-driven wood-working machines for shipment to a West Virginia lumber company, and also has disposed of two wood-working machines for a manual training school in that State. The same house sold a 16-in. quick change gear engine lathe to a Johnstown, Pa., coal mining company. All of these machines were taken from stock and replacement orders are unlikely for the reason that it is the inclination of this seller and others to get stocks down to the minimum before entering new orders. Little or nothing is going on in cranes at present. The Wheeling Steel Corporation has put out an inquiry for a 5-ton overhead for the Beech Bottom, W. Va., plant of the Whitaker-Glessner Co. The Greenville Steel Car Co. is expected to close for a crane late this week, but it is announced that the Crane Co., Chicago, which is putting up a warehouse here, has decided to defer the construction of the building in which it was planned to install three cranes. Another reduction of 10 per cent, the third so far this year, has been announced in the price of the motors by leading manufacturers.

The Waugh Foundry & Machine Works, Box 667, Williamson, W. Va., recently organized with a capital of $50,000, has awarded contract to the Truscon Steel Co., Youngstown, for a one-story foundry and machine shop, 50 x 150 ft. The company will specialize in the manufacture and repair of mining machinery. A list of equipment to be installed has been prepared. C. S. Waugh is president, and J. R. Hill, general manager.

Fire, July 9, destroyed the plant of the Janelow Products Co., Janelow, near Clarksburg, W. Va., manufacturer of wood products, with loss of about $85,000, including machinery. L. J. Hittinger, Clarksburg, is head.

Mark H. Russell and M. T. Perseger, Williamson, W. Va., are organizing a company, capitalized at $1,000,000, for the erection of an ice-manufacturing and cold storage plant.

The American Cotter Pin Co., Pittsburgh, has filed notice of dissolution under State laws.

The Replacement Auto Parts Co., Pittsburgh, is being organized by F. F. Hall, E. H. Lecrone and O. O. Schucker, to manufacture automobile parts and equipment. Application for a State charter will be made on July 25. John A. Metz, 707 B. F. Jones Law Building, represents the company.

The Universal Visible Calculator Co., Pittsburgh, has been incorporated with a capital of $25,000 to manufacture calculating machines and parts. A. S. Dick, 632 Duquesne Way, is treasurer.

Fire, July 6, destroyed a portion of the works of Carl C. Miller & Co., 835 Penn Avenue, Wilkinsburg, Pa., operating a brass finishing and plating plant.

The Brown Puncture-Proof Tube Co., Pittsburgh, has been incorporated with a capital of $25,000 to manufacture automobile tubes and other rubber specialties. C. E. Johnson, 2112 Wightman Street, is treasurer.

A. J. List, Tyrone, Pa., has awarded contract to J. Van

Hildebrand, Tyrone, for a new two-story automobile service and repair works, on East Tenth Street, 60 x 100 ft., estimated to cost about $55,000.

The Nitro Foundry Co., Nitro, W. Va., has been incorporated with a capital of $50,000 by W. A. O'Neill, Ralph Matthews and M. S. Aldrich, to manufacture castings.

The Twelfth Street Garage, Wheeling, W. Va., has filed plans for a five-story and basement automobile service and garage building, with machine and repair department, 85 x 130 ft., at Twelfth and Main streets, to cost $150,000. E. A. Baden is president.

Chicago

CHICAGO, July 18.

The market shows some improvement over last month in sales and inquiries. The H. W. Johns-Manville Co. has put out the following list covering repair shop equipment for its new Waukegan, Ill., plant:

One 24-in. engine lathe.
One 16-in. engine lathe.
One 14-in. engine lathe.
A No. 2 plain milling machine.
An electric floor grinder.
Plain cylindrical grinding machine.
Universal grinding machine.
Hack-saw.
One 20-in. shaper.
One 21-in. drill press.
One 14-in. drill press.
One 30-in. open side planer.
Pipe machine.
One 3½-ft. radial drill.
One 4-ft. radial drill.

Local dealers are working on this list, but it is understood that purchases will be closed in New York. The Automatic Electric Co., Chicago, has bought the equipment listed in this column last week, for its Fort Dodge, Iowa, subsidiary, the Monarch Telephone Mfg. Corporation. The Acme X-Ray Co., Chicago, bought second-hand machines, principally, to fill its requirements, as enumerated last week. The Milwaukee Tank Works, Milwaukee, is inquiring for a 24-in. engine lathe and a No. 1½ milling machine. Lists of equipment for Federal vocational training schools at Jacksonville, Ill., and Valparaiso, Ind., are before the trade. The Jacksonville inquiry includes a universal milling machine, Brown & Sharpe No. 1-A, or equivalent; a 14-in. x 5-ft. engine lathe; 12-in. or 14-in. stroke shaper; 20-in. drill press; wet floor grinder, and a portable electric center grinder, ½-hp. with 2½-in. x 6-in. medium grade carborundum wheels. The Stephens-Adamson Mfg. Co., Aurora, Ill., is inquiring for a ¼-in. plate bending roll, ⅝-in. stake riveter, ¼-in. circle shear and a 5-ft. brake for its Los Angeles, Cal., plant.

The Illinois Central and Rock Island lists are still unbought. The vice-president in charge of purchases for the latter road states that machine tool prices are still too high and no buying will be done until substantial reductions are made.

The Teeter Toy Mfg. Co., 1519 North Artesian Avenue, Chicago, has been organized with $11,000 capital stock, to manufacture metal toys. The incorporators include J. S. Jefes, Herman Driehouse, N. P. Coerens, Frank Anderson, and Jacob J. Hank.

The G. A. Ball Bearing Mfg. Co., 3051 West Lake Street, Chicago, is taking bids through Burrett H. Stephens, engineer, 37 West Van Buren Street, on a one-story plant, West Lake Street and Albany Avenue, to cost $65,000.

The New Owatonna Mfg. Co., manufacturer of drills, seeders, and ensilage cutters, is having plans drawn for works on West Fifth Street, Winona, Minn., to cost $225,000, exclusive of equipment. It will include an office building, garage, machine shop, 160 x 220 ft.; foundry, 120 x 140 ft.; covered material storage, 80 x 100 ft., and possibly an additional warehouse, 100 x 120 ft. Frank D. Chase, Inc., Chicago, is architect and engineer.

The Mit-Shel Stamping Mfg. Co., 510 Jersey Street, Quincy, Ill., has been incorporated with a capital of $50,000 by Edward H. Mitchell, Theodore Schell and William Spohr, Jr., to manufacture stamped metal products.

The Wheeling Corrugating Co., 2547 Arthington Street, Chicago, has taken bids for a one-story addition, 90 x 125 ft., estimated to cost about $40,000. Paul Gerhardt, 64 West Randolph Street, is architect.

The Twin City Separator Works, 2830 Colfax Avenue, Minneapolis, Minn., manufacturer of grain-cleaning machinery, etc., has awarded contract to the Pike & Cook Co., 416 South Fifth Street, for a two-story addition, 62 x 148 ft., on Madison Street, N. W., estimated to cost about $30,000. C. O. Paulson is secretary and treasurer.

The Utility Battery Co. of America, Mount Prospect, Ill., has been incorporated with a capital of $5,000,000 under Delaware laws to manufacture electric storage batteries and kindred equipment. The incorporators are T. C. Fredericks, M. Luce and H. L. Wuerffel, Mount Prospect. The company is represented by the Capital Trust Co., Dover, Del.

The Chicago & Northwestern Railroad, 399 West Jackson Boulevard, Chicago, has plans under way for a two-story ice-manufacturing plant at Clinton, Iowa, estimated to cost about $50,000.

Schaffer Brothers, 2207 South Central Park Avenue, Chicago, manufacturers of metal products, have taken bids for a new one-story sheet metal-working shop, 50 x 140 ft. The Walter Engineering Co., 38 South Dearborn Street, is architect.

The American Accumulator Co., Owatonna, Minn., manufacturer of electric storage batteries, has awarded a contract to Hammel Brothers & Anderson, Owatonna, for a new one-story plant, 90 x 106 ft.

The Common Council, Corning, Iowa, has approved a bond issue of $60,000 for the construction of a municipal electric light and power plant. W. C. Chubb is city clerk.

Detroit

DETROIT, July 18.

The Niles Fence Co., Niles, Mich., recently organized to manufacture wire fencing, has plans under way for the establishment of a factory with an initial daily output of about 15,000 ft. of material. M. Thompson is president.

The Ideal Pattern & Machine Co., Grand Rapids, Mich., has filed notice of dissolution under State laws.

The plant of the Below Sawmill Co., Marinette, Mich., was destroyed recently by fire with loss estimated at about $90,000, including machinery. No announcement has as yet been made regarding the rebuilding of the works.

Fire, July 10, destroyed the forge shop, wood-working plant and a portion of the powerhouse and pumping plant at the works of the Bates Iron Mining Co., Iron River, Mich., with loss estimated at about $30,000.

The Wabash Railroad, 144 South Clark Street, Chicago, has acquired about 65 acres near Detroit, to be used for the establishment of new shops, yards and other terminal buildings.

The Belmont Sand & Gravel Co., Fourth National Bank Building, Grand Rapids, Mich., recently organized, is planning for the immediate installation of equipment at its proposed new plant at Belmont, near Grand Rapids, to consist of crushing machinery, washing equipment, hoisting and conveying apparatus, etc., with power house, equipped with oil-engines. Maurice Sluyter is president, and I. R. Blandford, secretary.

Milwaukee

MILWAUKEE, July 18.

Inquiry for machine tools from the automotive industries has picked up to some extent the past week or 10 days, but thus far little actual business has been passing. Production of tools is now at a minimum, as makers and dealers have no difficulty in filling the majority of orders out of stock. Business is considered more active than in June, and while improvement is slow, confidence is expressed that the remaining months of 1921 will furnish a material increase over the first half.

Gray iron founders report some improvement in demand, but steel foundries are operating at a decreased production schedule because of the lack of new orders.

Structural shops are kept fairly busy with a steady run of small jobs, principally in the nature of public garages, school buildings and public works. Sizable tonnage contracts are scarce.

The Sommers & Son Co., Chicago and Milwaukee, manufacturer of machinery and equipment for milk condensing plants, has broken ground for a new foundry and machine shop, 38 x 117 ft., one story, of brick and concrete, at Thirty-first and Burleigh streets, Milwaukee. It will be ready about Sept. 1, at which time the present leased quarters at 3022-3026 Galena Street will be abandoned. F. X. Sommers is vice-president and general manager at Milwaukee.

The Rogers Mfg. Corporation, Milwaukee, has been organized with an authorized capital stock of $50,000 to manufacture carbureters and other auxiliary devices and appliances for gas engines, motor vehicles, etc. The incorporators are William A. Hyde, Bert Vanderveldt and Claude J. Hendricks, attorney, 1504 First Wisconsin National Bank Building.

The Riverview Foundry Co., Silver Lake, Wis., has been organized with a capital stock of $10,000 to engage in the gray iron foundry business. The incorporators are Charles B. Bohen, R. C. Dixon and I. F. Dixon.

The Manitowoc Church Furniture Co., Waukesha, Wis., will build a power plant addition and a new stack and will install a 125-kw. generating unit. Charles F. Schuetze is general manager.

The Stewart-Galvin Co., Marshfield, Wis., has been incorporated with a capital stock of $50,000 to manufacture storage batteries. It represents a merger of interests of the Stewart-Galvin Battery Co. and the Stewart Storage Battery Co. For the present production will be carried on in the major part of the Marshfield-Franklin Garage. Later a new factory will be erected. Amos Roll, A. C. Felker and R. R. Williams, all of Marshfield, represent local interests in the enterprise.

The Wisconsin Screw Co., Racine, Wis., recently increased its capitalization from $30,000 to $60,000 to accommodate the development of its business. It manufactures automatic screw machine products.

The Monarch Tractor Co., Watertown, Wis., which was bid in at bankruptcy sale for $44,000 by E. B. Cadwell of New York, a principal creditor, has resumed operations on a limited scale, following the confirmation of the sale and transfer of the property to Mr. Cadwell. J. L. Hornbeck has been retained as works manager.

The Kinsey-Davidson Electric Welding Co., 208 Mayer Building, Milwaukee, has changed its style to the Davidson Electric Welding Co., following the purchase of the interest of John I. Kinsey by W. B. Davidson. Mr. Kinsey is engaging in another line of business.

The Filer & Stowell Co., Milwaukee, has started work on alterations, repairs and improvements in its foundry department, to cost about $25,000.

The Green Bay Investment Corporation, Green Bay, Wis., has let the general contract to the Ludolf M. Hansen Co. for the erection of a four-story building, 100 x 200 ft., to be equipped as a cold storage warehouse. A large refrigerating unit and two electric elevators will be installed.

The Foster Construction Co., 413 Grand Avenue, Milwaukee, has taken the general contract to erect a new high, graded and vocational training school at Goodman, Marinette County, Wis. It will cost about $120,000 complete.

The Gulf States

BIRMINGHAM, July 18.

The Stringer Brothers Foundry Co., 109 North Dearborn Street, Chicago, manufacturer of pipe, brass goods and other plumbing specialties, has begun the erection of a new branch plant at Gadsden, Ala., to include iron and brass foundry, assembling, finishing and other general works departments. It is proposed to commence production at the earliest possible date. A company to be known as the Stringer Brothers Co., capitalized at $200,000 and chartered under Alabama laws, will operate the plant. Charles C. Stringer is president.

The Texas Oil Co. and the Gulf Refining Co., Meridian, Miss., are planning to rebuild their local plants, destroyed by fire, June 28, with loss estimated at $150,000, including equipment. The adjoining plant of the Acme Planing Mill was also destroyed with loss of about $35,000.

The Richard Carter Co., Gulfport, Miss., manufacturer of gasoline engines for automobiles, etc., is planning for enlargements and the installation of new equipment.

The F. H. Koretke Brass Mfg. Co., 922 Magazine Street, New Orleans, is planning the erection of a one-story addition to its foundry. E. W. Gosselin is vice-president and general manager.

The Frohlichs Marine Repair Works, New Orleans, is planning for the early operation of its new floating machine shop and marine repair works, now being completed at a cost estimated at close to $250,000, including machinery. The plant has been established on a barge, 110 ft. long, with 26 ft. beam and 6 ft. draft.

The Gadsden Clay Products Co., Gadsden, Ala., has been incorporated with a capital of $25,000, to manufacture building tile and kindred specialties. Robert Riley is president, and Gordon Hood, treasurer.

Electric motors, presses, transmission and other machinery will be installed in the new one-story plant, 100 x 100 ft., to be erected at Tampa, Fla., by the United Paper Co., Atlanta, Ga., for the manufacture of paper wrappers for fruit. The building contract has been let to E. W. Parker, Curry Building, Tampa. Louis Wellhouse is president.

The Grove Land & Timber Co., Asheville, N. C., is planning for the construction of a new electric light and power plant at St. Petersburg, Fla., in connection with the improvement of a large tract of land in this section. E. W. Grove is president.

The Cisco Clay & Coal Co., Cisco, Tex., has plans under way for the erection of new works for the manufacture of brick, tile and kindred products. It will be constructed in units, and later a second section will be erected for the production of face brick, etc.

W. A. Rogers, Houston, Tex., has acquired the oil refinery of the Ryan & Fisher Refining & Production Co., Waco, Tex. The new owner plans for extensions and improvements in the plant, and will increase the capacity from 500 to over 1000 bbl. per day.

The H. & A. Wood Products Co., St. Petersburg, Fla., manufacturer of toys, is planning for enlargements in its factory to double the present capacity.

Indiana

INDIANAPOLIS, July 18.

About $600,000 will be expended by the American Coating Mills Co., Elkhart, Ind., for the addition to its coated paper manufacturing plant at the foot of Division Street. It will be three stories, 50 x 150 ft., and 50 x 50 ft. Construction will begin at once. C. C. Colbert is president and treasurer.

The Rockport Planing Mill Co., Rockport, Ind., is arranging to rebuild its plant, destroyed by fire, July 9. Charles Wilbern is president.

The M. G. Miller Mfg. Co., Columbia City, Ind., has been chartered under State laws to manufacture refrigerators and similar equipment. The incorporators are M. G. Miller, Lloyd Crouch and A. J. Freed, Columbia City.

A new power house will be erected at the Wiley High School, Terre Haute, Ind., by the Board of Education, in connection with general remodeling and improvement of the structure, estimated to cost about $120,000. Bids will be asked at once. Miller, Johnson & Miller, 105 South Seventh Street, are architects.

The Standard Oil Co. of Indiana, Indianapolis, is planning to rebuild its refinery at Whiting, Ind., destroyed by fire, July 5, with loss estimated at close to $2,000,000.

The Central South

ST. LOUIS, July 18.

Very little machine tool business is being transacted in this section. Railroads are not sending out any inquiries, and automobile plants are running on small capacity.

The Kaw Boiler Works, Kansas City, Kan., bought a 5-ton crane through a manufacturer's representative in St. Louis.

The N. O. Nelson Mfg. Co., 928 Chestnut Street, St. Louis, manufacturer of sanitary ware, plumbing fixtures, etc., is completing plans for extensions and improvements in its plant at Noblesville, Ind., to cost about $50,000.

The Western Tractor Co., Joplin, Mo., has completed negotiations with the Chamber of Commerce, Wichita, Kan., for the acquisition of local site for the erection of a new plant to manufacture farm tractors and parts. The present works, representing an investment of close to $500,000, will be removed to the new location.

The Lock Joint Pipe Co., Webb City, Mo., is planning for the erection of a new works for the manufacture of reinforced cement pipe, estimated to cost about $125,000 with machinery. The Missouri Pacific Railroad Co. at this place is interested in the project.

The American Washing Machine Co., Muskogee, Okla., has been incorporated with a capital of $25,000 by J. M. Sims, W. F. Bickford and E. V. Vernor, Muskogee, to manufacture electrically operated washing machines and parts.

The Chickasha Auto Top Co., Chickasha, Okla., operating an automobile top and equipment manufacturing plant at 114 Kansas Avenue, has preliminary plans under way for the establishment of new works as an extension to the present factory.

The Prewitt Shock Absorber Co., Bolivar, Tenn., has been incorporated with a capital of $25,000 by M. L. Prewitt, A. C. Osborne and W. S. Follis, Bolivar, to manufacture automobile shock absorbers and other kindred equipment.

The Usona Mfg. Co., 826 South Eighteenth Street, St. Louis, manufacturer of electrical specialties, has awarded a contract to the Kremer & Voiril Construction Co., Century Building, for its new one and two-story plant, 100 x 150 ft., at Chateau and Spring streets. F. C. Long is president.

The Magnolia Petroleum Co., Duncan, Okla., has awarded a contract to the Austin Co., Euclid Avenue, Cleveland, for three new one-story buildings, 40 x 260 ft., 40 x 40 ft., and 25 x 65 ft., estimated to cost $50,000.

The Battery Service Co., Muskogee, Okla., manufacturer

of storage batteries and equipment, is planning for the erection of a new one-story factory, 110 x 170 ft. J. H. Schmidt is president and manager.

The Motor Oil & Refining Co., Chickasha, Okla., recently organized, is perfecting plans for the construction of a new refinery with daily initial capacity of about 5000 bbl., and estimated to cost close to $300,000 with machinery. R. C. Parks is general manager.

The Marland Refining Co., Ponca City, Okla., has acquired property in St. Charles Parish, near New Orleans, for a new refinery and general oil terminal plant. It is said that the proposed works will cost in excess of $1,000,000 with equipment.

The Missouri Public Utilities Co., St. Louis, is planning for the rebuilding of its power plant at Sikeston, Mo., recently destroyed by fire.

A new two-story plant to cost about $50,000 with machinery will be constructed by the Central West Grease Co., 212 North Fifth Street, St. Joseph, Mo. Preliminary plans are under way. A. B. Snoddy is president.

The Cooper Battery Co., Jackson, Tenn., is planning to rebuild its plant recently destroyed by fire. R. L. Beare is head.

The Twin Pin Clothesline Co., Charlotte, N. C., has been organized to manufacture wire clothes pins and similar products. It is headed by D. S. and W. J. Boyles, Charlotte.

The Sash Weight Foundry Co., Sand Springs, Okla., has been chartered under State laws to manufacture sash weights and other iron castings. The incorporators are L. C. Hinds, A. C. Spitznagel and E. M. Tyler.

California

SAN FRANCISCO, July 12.

The most conspicuous business of recent date was the sale of about 20 machine tools, including lathes, drills and grinders, to the San Joaquin Power & Light Corporation, Fresno, Cal., which supplies power for the entire San Joaquin Valley. While the consideration involved has not been made public, it is said to run into five figures. There has been a fair business in some machine lines, notably in mining and automobile equipment, but the general situation does not present a very encouraging aspect.

Samuel Kraemer, Placentia, Cal., has filed plans for a new one-story machine shop, 40 x 130 ft.

The Pacific Platinum Works, Glendale, Cal., has been incorporated with a capital of $20,000 by A. S. Hoyt and A. M. Draper, to manufacture metal products.

The Pacific Clay Products Co., American Bank Building, Los Angeles, is completing plans for its new plant at Los Nietos, Cal., for the manufacture of firebrick and other refractory products. It will replace the plant recently destroyed by fire and will have an initial daily output of about 25,000 firebrick.

The Interlocking Tile & Sewer Pipe Co., Indio, Cal., has been incorporated with a capital of $250,000 to manufacture tile, brick, sewer pipe and kindred products. J. A. Gordon is president; J. P. McNally, secretary, and J. W. Wilson, treasurer.

The Electric Utensils Co., 1405 South Hill Street, Los Angeles, has filed notice of organization to manufacture electrical specialties. Kenneth H. Woolson, 910 Third Street, heads the company.

The National Cornice Works, 1323 Channing Street, Los Angeles, manufacturer of metal products, has filed plans for extensions and improvements in its plant.

Bagley & Co., 901 Nineteenth Avenue, Oakland, Cal., operating a boat repair plant, have plans for a one-story shop addition, for general repair work.

Fire, July 5, destroyed the power house, operating plant and mechanical buildings of the Sultana Mining Co., Angels Camp, Cal., with loss estimated at about $100,000, including machinery.

The Consolidated Wagon & Machine Co., West Third Street, Salt Lake City, Utah, is planning to rebuild the portion of its works destroyed by fire, July 2, with loss estimated at $75,000.

The Utah Refining Co., Salt Lake City, Utah, is adjusting the insurance on its oil refinery, recently destroyed by fire, with loss estimated in excess of $300,000, and has plans under way for rebuilding.

Canada

TORONTO, July 18.

The machine tool market in this section has been exceptionally quiet the past week. Very few manufacturing concerns in Ontario or Quebec are operating above 50 per cent capacity and the majority are running between 10 and 15 per cent. Very little is being done in the way of new construction, which is at a lower point than for a number of years. There is, however, a small demand for certain lines of wood-working tools. Small tools continue in fair demand, but users are not stocking up, being content to buy as needed. No further softening in prices has been announced.

H. E. Montgomery, town clerk, Timmins, Ont., is receiving bids for a direct connected motor-driven blower and electrical fittings for a sewage disposal plant.

The town of Daysland, Alta, is contemplating spending $14,000 on an electric light plant and equipment.

Cie Electricite, St. Prime, Que., is erecting a power house at a cost of $40,000.

Menary & Wetherill, Wetaskiwin, Alta., have purchased the Wetaskiwin Welding Works and have opened a machine shop. They are asking for catalogs, lathes, etc.

The Rapid Electric Co., Ltd., Sault Ste. Marie, Ont., has been incorporated with a capital stock of $40,000 by Charles T. Toombs, George L. Wilson, Arthur P. Crawford and others to manufacture electrical machinery, tools, etc.

The H. W. Steel Shank & Specialty Co., Ltd., Preston, Ont., has been incorporated with a capital stock of $50,000 by Samuel H. Parker, Henry W. Steel and others to manufacture metal and wood products, etc.

The Auto Signal Light Co., Ltd., Leamington, Ont., has been incorporated with a capital stock of $50,000 by Robert Fairful, Robert D. Sloane, George A. Brown and others to manufacture automobile signal lights, accessories, etc.

The ratepayers of Thorold, Ont., carried a by-law giving a fixed assessment of $20,000 to the Gove Motor Car Co., Detroit, which will establish a plant. It has secured an option on a 5-acre site and construction work will soon begin.

Plans of New Companies

Henry Althof's Sons Co., 121 East Twenty-third Street, Erie, Pa., which was recently incorporated under the laws of Pennsylvania, was formerly conducted as a co-partnership. There is no change in the personnel, the former co-partners being the sole owners of the corporation. The officers are as follows: George T. Althof, president; Henry A. Althof, vice-president; Edward W. Althof, secretary and treasurer. The business has been established for more than half a century, and three generations of the Althof family have been interested in it within that period. It was conducted for many years under the name of the Erie City Iron Fence & Wire Works but for the past few years has been conducted as Henry Althof's Sons. The company is not contemplating the purchase of any new equipment at this time.

The Dawn Mfg. Co., 552 Fairfield Avenue, Bridgeport, Conn., manufacturer of washing machines, which was recently incorporated, may be in the market within a month or two for lathes and drills.

The Decker Mfg. Co., 251 Elm Street, Newark, N. J., recently incorporated, will manufacture blow torches and kindred products. The company advises that it is not in the market for new equipment.

The Martin Automatic Fishing Reel Co., Mohawk, N. Y., has been incorporated recently, though the business was established some years ago. No additions to the plant or equipment are contemplated at this time.

The Detroit Alloy Steel Co., 1436 Lafayette Boulevard, Detroit, Mich., which was recently organized for the purpose of making tool steel, reclaiming Stellite and making centers for milling machines and lathes, will specialize on the latter work. The company claims that it will make a center that will give service at ratio of 10 to 1.

The Metal-Craft Mfg. Co., 64 West Randolph Street, Chicago, recently incorporated, manufactures metal office furniture and all kinds of sheet metal fixtures and equipment for factories and shops, such as bins, shelving, cabinets, benches, tool stands and racks, machine guards, boxes, barrels and lathe pans; also stampings, dies and jigs. An illustrated pamphlet describing the Metal-Craft special sanitary locker and the complete line of office furniture will be mailed on request.

The Sani Products Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by John S. Duggan, 114 Kendal Avenue; Willis B. Sturrup, 6 Adelaide Street East, Thomas S. H. Giles and others to manufacture metal and wood products.

The Canuck Tool Mfg. Co., Ltd., Toronto, has been incorporated with a capital stock of $40,000 by Sumner W. Graham, 62 Richmond Street West; Percy C. Innes, Frederick E. Claxton and others to manufacture tools, implements, machinery, etc.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.93c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.93c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.03c.
Channels, angles and tees under 3 in. x ¼ in., base	2.93c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.93c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	3.13c.
Toe calk, ½ x ⅜ in. and larger	3.60c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.03c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.68c.
No. 12	3.73c.
No. 14	3.78c.
No. 16	3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	5.60c.
No. 26	4.40c.	5.65c.
No. 28	4.50c.	5.75c.
No. 30	4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	4.50c.
No. 16	4.75c.
Nos. 18 and 20	4.90c.
Nos. 22 and 24	5.05c.
No. 26	5.20c.
No. 27	5.35c.
No. 28	5.50c.
No. 30	6.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt	—46	—30	¾ in. Butt	—18	List
¾ in. Butt	—52	—37	1-1½ in. Butt	—20	— 2
1-3 in. Butt	—54	—40	2 in. Lap	—14	+ 3
3½-6 in. Lap	—49	—35	2½-6 in. Lap	—18	— 2
7-12 in. Lap	—40	—24	7-12 in. Lap	— 7	+10

Steel Wire

BASED PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.50c.
Annealed soft	4.50c.
Galvanized annealed	5.25c.
Coppered basic	5.00c.
Tinned soft Bessemer	6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb.	$6.80	$6.55
		90 lb.	6.90	6.65
		100 lb.	7.00	6.75
IC	$10.60	$9.50	IC	7.20	6.95
IX	11.80	10.75	IX	8.10	7.85
IXX	13.60	12.25	IXX	9.10	8.85
IXXX	15.60	14.25	IXXX	10.50	10.25
IXXXX	17.20	16.00	IXXXX	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	24c.
No. 1 solder	21c.
Refined solder	18c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb.	80c.
Commercial grade, per lb.	40c.
Grade D, per lb.	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.	30c. to 33c.

Old Metals

Business is very quiet and values remain stationary. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	8.00
Brass, heavy	4.75
Brass, light	4.00
Heavy machine composition	8.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

New York, July 28, 1921

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Increasing Revolving Ferrous Scrap Fund

Permanent Loss of Iron Reserves Pointed Out—Importance of Scrap for Steel Manufacture—Effect of Imports of Scrap or Ore

BY WALTER GRAHAM*

WAR taught the necessity of iron, not only for the advance of civilization, but also for its protection and its potency (in the hands of the Germans, for its destruction.) Because of this, 75 per cent of the iron reserves of Germany have been given to France; this is probably the most important restriction placed upon Germany. If France can secure sufficient good coking coal, which is doubtful, or develop her hydroelectric power, of which she has more than any other European country, about 6,200,000 hp., and succeed in converting these ores of Lorraine annexée electrically (she now has 69 electric furnaces), France may become second only to the United States as a producer of steel.

The United States is divesting itself rapidly, permanently, of its iron reserves. This is a more important consideration than the other vastly important question of the quick exhaustion of its oil reserves, which can be conserved by substitutes, as oil shales, coal and hydroelectric power. The iron ore reserves, of grades now used, are estimated to last only two generations; this reserve will go into scrap, but there is an estimated annual permanent loss of upwards of 20,000,000 tons of iron ore, of 50 per cent iron content.

Production and Sources of Scrap

Ferrous scrap is produced by discarding or rejecting iron and steel in process of manufacture, and by gathering, preparing and grading old or disused iron and steel products. It is "secondary metal" as distinguished from "primary metal," smelted from ores. It has a higher Fe content than pig iron, has been converted and refined and is cheaper than pig iron.

During the war every effort was made to gather it. As the larger producers of scrap know its value and carefully sort it, the War Industries Board found that the total supply could be increased only by inducing the farmers and town people to gather their scrap; the Red Cross and other agencies made a patriotic appeal to the people to cooperate in this. There are no reliable statistics of the total domestic production of scrap; by a formula, described below, the 1919 production is estimated to have been about 18,000,000 tons.

Our scrap imports are small, amounting in 1913 to 41,512 tons and in 1918 to 65,693 tons. Steel making countries, which are the largest producers, use their own scrap, so there is not a large tonnage available by importation to replace the exhaustion of our iron reserves, estimated to be about 10,000,000 tons a year. The large scrap producing countries, other than the United States and Canada, are across the Atlantic, and all large producers of scrap are also large users of it. Our imports are mostly from Canada (1913, 26,333 tons; 1918, 45,518 tons). Exports from the United States are mostly to Canada and Italy (1913, 102,201 tons; 1918, 22,385 tons); both these countries lack pig iron.

The scrap industry is an important factor in the conservation of iron ore, coke and limestone. As the annual turnover of scrap increases, less pig iron is needed, and consequently less blast furnace, coke oven and quarry capacity, and less transportation facilities are required. The importance of the last mentioned saving is seen from the fact that transportation costs on raw materials per ton of pig iron have increased from $4.79 in 1912 to $10.55 in 1921. A ton of scrap may replace a ton of pig iron, which is made of two tons of iron ore, a ton of coke and half a ton of limestone, or 3½ tons, approximately.

Common Uses of Scrap

As 50 per cent or more of the charge of the open-hearth steel furnace is scrap, its importance as a raw material is high, becoming more so as up to 100 per cent of the charge of the electric steel furnace may be scrap. Scrap is also used in blast furnaces and chemical works; and, without melting, by rerolling, forging and stamping and by piling and rolling into bars of iron. Pig iron can be made from scrap in the blast furnace and the electric furnace by adding carbon and silicon. Cast iron scrap is practically pig iron, and is remelted simply in the cupola for castings.

Wherever scrap and electric power can be obtained, the highest grades of steel can be made, even from low grades of scrap, as the electric furnace process is wonderfully refining, eliminating not only phosphorus, but sulphur. Steel can be made, in the absence of iron ore or coke, by utilizing scrap in the place of pig iron and substituting electric power for coke and gas coal, or oil. A nation with cheap electric power, hydroelectric preferably, can become a steel producer, competitively, even though it possesses no iron ore or coal; once possessed of large tonnages of iron and steel in place, in the form of equipment and structures of iron and steel, a country may support a considerable steel industry on the continual reclamation of scrap.

As the conversion of scrap into steel involves an oxidation loss of some 3 per cent, and since in the long run 95 per cent only of the steel is recovered as scrap, a persistent depletion of some 8 per cent occurs. These losses are increased by exports of iron and steel, the scrap from which is not returned by countries manufacturing steel, their production being largely based on the scrap supply, for which there is competition.

Quantities of Scrap Recovered and Consumed

Statistics of domestic recovery and consumption of scrap are incomplete; by a formula explained below, the following estimates are arrived at:

	1910	1913	1916	1918
Tons	8,846,816	9,742,000	15,854,588	18,372,773
Value	.....	$109,104,000	.....	$551,183,190

To arrive at these figures it is necessary to take

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into account the oxidation of carbon and silicon in the pig iron and of iron in the conversion into steel; taking these losses into consideration a formula may be used to estimate the scrap supply approximately. The formula is: 103,092 per cent of the steel made, minus the Fe in the Bessemer and basic pig iron made, equals 85.5 per cent of the scrap supply. The remainder, 14.5 per cent, represents rolled and rerolled iron. This formula gives a scrap total for 1916 of 15,854,588 tons. The formula is based on the figures for one year only.

Efforts are being made to obtain other figures, with which to revise these estimates of scrap production. It is understood that the figures of exports and imports enter into this, but as the average ratios for years 1910-1918, of exports to production is 0.65 per cent and of imports 0.55 per cent, a difference of only 0.1 per cent, it is felt that until needed figures are obtained and a revision of estimates made, the present estimates can be used as fairly informative.

Oxidation Losses Requiring Neutralizing

Under the head of oxidation: the Bessemer process is highly oxidizing, as it blows compressed air through molten iron; iron losses, in the atmosphere and in the slag, may be conservatively stated to be from 3 to 6 per cent. The puddling process loses 5 per cent of iron in the slag as oxide. The open-hearth process loses 3 per cent of metallic iron, as iron oxide in the slag. There are iron losses also in heating furnaces and from weathering. An average of 3 per cent loss by oxidation, applied to the tonnage of steel output, is taken as a conservative figure. Pig iron losses are approximately 5 per cent by oxidation of carbon, silicon and manganese.

The excess of exports of iron and steel over imports in 1917 was 5,779,474 tons. The year of largest production is used, because the steel business is increasing, and it is felt that figures based thereon do not overestimate future conditions of the industry.

Imports of scrap in 1917 nearly balanced exports, being 223,834 tons for the former and 238,666 tons for the latter. Imports of machinery, cutlery, tools, etc., although a part of the consumption, are not taken into account, as total tonnage figures are not available and the amount is but a small fraction of the total steel production.

Calculation of Permanent Losses

The total permanent annual loss of iron (Fe) may be stated as follows:

	Tons
3 per cent of 46,978,364 tons* (oxidation loss)	1,407,850
5 per cent of 47,011,358 tons† (not returned)	2,350,567
Exports less imports	5,779,474
Total estimated permanent annual loss	9,537,891
Equivalent iron ore (50 per cent iron content)	19,075,782

The steady reduction of iron reserves of the United States may be judged from the above estimate. The increase of production of scrap, estimated, by the formula given above, more than doubled in 8 years, being in 1910, 8,846,816 tons, in 1918, 18,372,773 tons.

Scrap Formerly Held in Low Esteem

In the early days of the iron industry there was a remarkable disregard of the value of scrap, the old iron works paying little attention to anything but the hammered bars, which passed current almost as coin, in Virginia, at 6c. per lb. During the past generation, old slag dumps of charcoal iron works have been used in blast furnaces, having been found to contain much metallic iron of pure quality, as well as iron oxide, which made this material more valuable than iron ore. The great use of scrap began with the rapid development of the open-hearth process, about 1890; the scrap business has grown to large proportions with the growth of the basic open-hearth process, particularly.

Scrap Production Vastly Increased During War

The war produced vast amounts of scrap, not only by destruction and wear but in process of manufacture. The average rejection of shell steel at the steel mill before forging and machining was 42 per cent for rolled steel and 22 per cent for cast steel. These percentages of rejection are interesting, as the cast steel slugs were made in inverted, hot top molds, the riser, or hot top, being practically the total rejected steel. This is a strong argument in favor of the inverted, hot top mold. The percentage of steel in the hot top (over 20) should be noted, as only 10 per cent is allowed in some works experimenting with this type of mold.

Turnings of guns and shells were a large item of scrap production. Blast furnaces used up to 100 per cent of these fine turnings, and open-hearth furnaces increased the percentage of scrap up to 75 per cent, and even in one case to 90 per cent. But fine scrap turnings and borings are liable to rust and admixture of dirt, and are hence not desirable in the open-hearth furnaces, and they are of unknown composition. To meet this the use was advocated of high manganese pig iron for high initial and residual manganese in the steel bath.

Alloy steel scrap is increasing and is valuable, but requires expert preparation and use. The unknown percentages of nickel getting into the scrap supply, particularly from the Cuban ores, is troublesome to the crucible steel makers, who use purest scrap, as the process is not a converting or refining one as are the others, particularly the electric process.

An interesting use of steel scrap in the blast furnace in a high phosphorus iron ore section is the making of Bessemer grade pig iron from basic open-hearth steel scrap, for ingot molds, to save high transportation costs. Wrought iron scrap is valuable, as it is fibrous and is made into bar iron, by piling, heating and rolling. Because of its crystalline structure, steel scrap is not permissible in the higher grades of bar iron.

Where the Scrap Comes From

About 20 per cent of the scrap supply is "country scrap," miscellaneous iron and steel gathered from towns and farms by peddlers and traders into scrap yards, where it is sorted and prepared for use by scrap dealers. About 25 per cent of the scrap supply is "railroad scrap," carefully gathered by the railroads, and graded and sold to dealers and consumers; some of it is made into bars, bolts, etc., by the railroads for their own use. Some 30 per cent of the scrap is "industrial scrap" made in works and rejected in processes of manufacture, such as crop ends.

Much scrap never comes on the market, being returned to the furnaces and remelted by the works making it. So well do the works appreciate the value of scrap in these days that slag dumps are hunted through for it. As scrap losses show in the monthly cost sheets, the manager endeavors to reconvert his scrap monthly.

It would be well if the country at large would take this view of the scrap question. The possible permanent exhaustion of domestic iron reserves at the rate of 10,000,000 tons a year, which doubles (Hewitt's formula) every ten years, and which will increase with the world need of our steel and the efforts being put forth by increased export agencies, merchant marine, etc., calls for constructive suggestions for its replacement. If an amount of scrap equal to the losses of iron could be imported, the remedy would be easily found, but this cannot be expected, so consideration must be given to the iron ore supply.

Use of Vast Reserves of Low Grade Ores

It is argued that the immense reserves of low grade iron ores can be utilized indefinitely, but the question arises: "Can the United States maintain the comparative advantage in the manufacture of steel by using iron ores that require expensive beneficiation, or extra fuel, flux, labor and transportation charges with lessened furnace production?" It is an axiom with blast furnace men that high grade iron ore produces high grade, low cost pig iron and large furnace output, and low grade ores the reverse.

Very pure ores need low grade ore to increase the slag, for good furnace working and to carry off the sulphur from the coke and limestone and ore. Large

*Ingot production, figured "up" to allow for oxidation, which, when deducted, leaves the net production.
†Same as above, with wrought iron added.

numbers of blast furnaces are located near coke and flux and some low grade iron ores, by which hundreds of empty coal cars are returning daily from the Atlantic ports, which could bring back cheaply as return freight imported iron ore.

If all the world were using low grade ore or ore concentrates, no doubt the United States could use low grade ores, but a study of the iron reserves of the world shows that there is a vast reserve of pure iron ore in Brazil that is barely touched, and which the Germans looked to before the war, and the English are now planning to develop on a large scale, by building modern ore ships, docks and railroad and mining equipment.

Ore Imports as Offset to Scrap and Oxidation Losses

If Brazilian iron ores can penetrate to the Pittsburgh district, about 30,000,000 tons of Lake ore would be released annually as a reserve for the middle West, to which the center of population and of the steel business is drifting. The by-product coking coals of West Virginia and Kentucky, a wonderful field of low sulphur, low ash, low cost coals, meet at the Lakes the Lake ores, which are almost automatically discharged into blast furnaces, at which are located by-product coke ovens. All the Lake ores are needed to match these coal reserves, and the growth of the United States will absorb the steel made from them.

Imports of Brazilian ores would obviate the long rail haul on Lake ore to the Eastern steel works, and replace our losses of iron reserve and place these works in position to export the higher grade steel, for which there is the necessary skilled labor, trained for a century. Exports of steel under these conditions would not be a detriment.

Urged to Buy Coal Now

WASHINGTON, July 26.—Warnings to consumers of bituminous coal again are being sent out by the Government, urging them to lay in their supplies now, in order to prevent a shortage this winter, due to the lack of cars or other conditions. Recently, the Interstate Commerce Commission sent out notices to this effect to public utility organizations and a similar appeal has been subsequently issued by the Secretary of Commerce. Mr. Hoover says that there is every indication that there has been an undue slackness in the purchase of coal which may accumulate to large demands in the autumn. He expressed the conviction that due to the general depression in the prices of bituminous coal at the mines, it is not too high at the present time, in fact, he was of the opinion that numbers of operating coal companies are making no profits whatever.

"If there should be a recovery of business activities in the autumn, taken in conjunction with the large increase in percentage of disabled cars (from 5 per cent to 16 per cent during the past six months) and the inability of the railways to finance their maintenance, there are possibilities of development of a most serious situation as regards coal movement," Mr. Hoover stated.

Ladd Metric System Bill

WASHINGTON, July 26.—Efforts are being made by Senator Edwin F. Ladd, of North Dakota, to have the Senate Committee on Manufactures conduct a short hearing at the present session on his bill, providing for the compulsory adoption of the metric system. After the convening of the regular session in December, he hopes to reopen the hearings and go into the matter at length. Present indications are, however, that no hearings will be held at the present session. Senator La Follette, of Wisconsin, chairman of the committee, has stated that he is favorable to the granting of the hearing but doubts that it would be possible to secure the consent of any three members of his committee to act as a subcommittee to conduct the hearings. It is the opinion of Senator LaFollette that there is other legislation now before Congress which he considers to be of greater importance than the so-called metric system bill, and he is unwilling to undertake the conduct of the hearing personally.

SALES STOPPED

Step Toward Central Bureau for Sale of Government Surplus

WASHINGTON, July 26.—Pending the establishment of co-ordinating machinery for the supervision and control of all Government sales of surplus material, Director of the Budget Charles G. Dawes will continue in force the order issued by him last Thursday, stopping all sales of this kind, with the exception of perishable property. The order carries no particular significance so far as it concerns surplus quantities of steel held by different branches of the Government, as there have been no important sales attempted recently, and the Shipping Board, which has the greatest bulk of surplus steel, amounting to some 300,000 tons, recently stopped all sales. The other branches having sizeable tonnage are the War and Navy Departments, whose combined total of surplus is estimated at not over 40,000 tons.

The order, however, derives most interest from the fact that it is the entering wedge to some form of a centralized bureau for the sale of all Government surplus property, though it may be of a general character with given branches of the Government still in control as to certain details with regard to the disposal of materials. Lack of co-ordinating control, according to General Dawes, has resulted in large and currently accruing loses to the Government and it is the purpose of the Budget office to absolutely check this loss until the machinery for supervising the sales can be formed.

Building material, steel, cement, lumber, furniture, ships, automobiles, textiles, food supplies, buildings, etc., said General Dawes, are owned by the United States and available for current use. It is the purpose to have a central body to supervise the sale of this material.

"In the face of a large supply on hand," his order to department and bureau heads said, "because of the lack of a co-ordinated control and system of survey, with facilities for bringing to the knowledge of all departments the requirements of each, the different departments of the Government have been buying different classes of material in the open market with little recourse to stocks on hand.

"The cause of this situation, while it is primarily due to the lack of co-ordinating machinery of supervision and control, is aggravated by the delay on the part of the different departments in declaring as surplus certain property unnecessary to their purposes. It is also aggravated by the delay in the preparation of inventories which are now incomplete."

Preparing to Increase Output

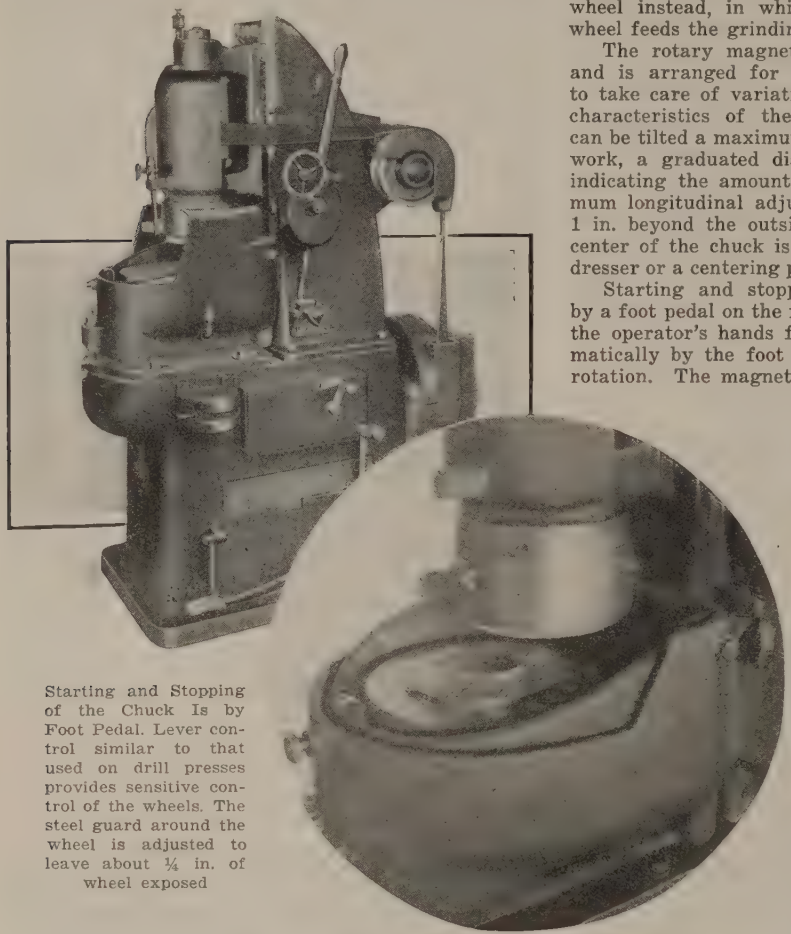
The Athol Machine & Foundry Co., Athol, Mass., vises, is readjusting its production machinery with a view to increasing output 150 per cent when business conditions warrant. Approximately two dozen machine tools, including large drill presses, have been discarded and a broaching machine and two other less important pieces of equipment purchased. Various machines are being placed in batteries, and in sequence, according to required machining operations. A modern tool crib has been installed on the second floor of the plant, and a large number of jigs and fixtures made. In addition, a new stock department has been established, all patterns have been redesigned, a new directing head secured for the foundry department and heat treating and oil tempering equipment installed. The company's entire line of vises has been revamped and standardized and all parts made interchangeable and in other respects improved. New products also are being placed on the market. S. F. French, general manager and superintendent, has been succeeded by H. R. Linton.

During the first six months of 1921, industries at Youngstown, Ohio, disbursed $29,458,814 in wages, as compared with $45,923,170 distributed during the corresponding six-month period of 1920. The June payroll of $3,764,116 was $283,425 less than that in May, and compares with $7,723,830 in June of 1920.

NEW ROTARY GRINDER

An 8-in. rotary surface grinder has been brought out by the Pratt & Whitney Co., Hartford, Conn. The machine is designed for grinding disks, rings and cylinders requiring flat and parallel surfaces and is provided with sensitive adjustments for the rapid production of gear blanks, washers, cutter hubs or other work requiring close accuracy. In addition, it is provided with means for grinding concave or convex surfaces.

The machine is regularly arranged for belt drive, with idler pulleys equipped with double ball bearing mounting. The main driving pulley is 26 in. in diameter, taking a 4 in. belt, and the tight and loose pulley, 16 in., taking a 6½ in. belt. The speed of the countershaft is 450 r.p.m. A 7½ hp. constant speed semi-enclosed motor running at 1800 r.p.m. can be furnished



Starting and Stopping of the Chuck Is by Foot Pedal. Lever control similar to that used on drill presses provides sensitive control of the wheels. The steel guard around the wheel is adjusted to leave about ¼ in. of wheel exposed

if required in which case the motor is mounted on an adjustable base and a spring idler provided to automatically tighten the driving belt.

The main drive shaft is mounted on radial ball bearings and the chuck driving clutch equipped with a ball thrust bearing to take the load at this point. A secondary shaft, carrying a chuck driving pinion and sliding two-speed gears is mounted on bronze bearings and equipped with a flexible coupling to take care of chuck tilt and alignment. The entire mechanism runs in oil, the bearings being lubricated by splash.

The spindle is mounted on ball bearings amply lubricated and protected from dirt and moisture. Means for eliminating end play are provided and adjustments for wear can be made. The wheel is 8 in. in diameter, 3 in. high, has a rim ⅝ in. thick, runs at 2000 r.p.m., and is mounted on a holder in a manner to facilitate easy mounting and changing. Two mounts are furnished. A safety band is clamped around the wheel which is again surrounded by a steel guard, adjusted to leave about ¼ in. of the wheel exposed when grinding. As the wheel is raised to the idle position the guard automatically covers the wheel so that the work on the chuck can be handled with safety. The guard is adjustable for wheel wear.

Lever control, similar to that used on drill presses, gives sensitive control of the wheel when grinding and an easy quick movement to the upward or idle position is provided where liberal clearance under the wheel is allowed for handling work. A positive mechanical stop is provided to grind to specified thickness when the lever feed is used. Finer adjustments for wheel wear and varying thicknesses are made by hand wheel graduated to 0.0002 in., operating through a worm and wheel. The hardened points of this stop are so positioned that the backlash in the worm and wheel is neutralized and the wheel and slide are overweighted in order to obtain very close accuracy. For certain classes of work the lever may be locked in position and the hand wheel for finer adjustments used as a feed wheel instead, in which case one turn of the hand wheel feeds the grinding wheel down 0.05 in.

The rotary magnetic chuck is 10 in. in diameter and is arranged for two speeds, 50 and 100 r.p.m., to take care of variations in the diameter or physical characteristics of the material ground. The chuck can be tilted a maximum of 2 deg. for convex or concave work, a graduated dial on the outside of the guard indicating the amount of tilt in minutes. The maximum longitudinal adjustment brings the chuck center 1 in. beyond the outside diameter of the wheel. The center of the chuck is bored to receive a safety wheel dresser or a centering plug used when grinding washers.

Starting and stopping of the chuck is controlled by a foot pedal on the right side of the machine, leaving the operator's hands free, and a brake operated automatically by the foot pedal rapidly retards the chuck rotation. The magnet current, 110 or 220 volts direct current, is controlled by a switch on the right of the machine. The switch also acts as a demagnetizer.

A pump and piping convey the cutting lubricant from a tank within the column to the inside of the wheel, the volume of flow being regulated by valves. In addition, a hose is provided on the outside for washing the work and the chuck. Access to the tank for cleaning purposes is provided through a sliding settling pan located in front of the column. The flow of cutting lubricant ordinarily is controlled by the movement of the feed lever, which automatically turns on the water when grinding or shuts it off when the wheel is in the work handling position. This control may be disconnected by a simple pull knob, allowing hand operation of the water supply. The spray is confined to the table by a cast guard, the front section of which can be dropped by releasing a pull knob, thus giving additional clearance while handling the work.

Cost of Living Almost Stationary

July figures of the National Industrial Conference Board, 10 East 39th Street, New York, show that the cost of living for the month is 61.6 per cent above the corresponding figure for July, 1914. Last month the excess was 61.9 per cent, while July of 1920 showed an excess of 104.5 per cent. Rent and light are both above the figure for last year, food and clothing are both far below the figure for last year, fuel and sundries have shown practically no change.

Arthur G. McKee & Co., Cleveland, have completed the erection of a five-unit Kling-Weidlein dry gas cleaner for the Shelton Iron & Steel Co., Stoke-On-Trent, Staffordshire, England. This is the first Kling-Weidlein Gas Cleaner to be erected in England.

Wages in the British Steel Industry

War Advances Were Large, but Readjustments Are Now in Progress—Not Many Employees Were Reduced Before April—Workers Still Limit Output

BY PAUL M. TYLER*

AFTER more than six years of steadily advancing wages, Great Britain has entered on a period of readjustment that must inevitably result in a nation-wide reduction in the earnings of her workers. While it is doubtful if wage rates reached an unwarranted level during the period when commodity prices were at their peak and the whole world was clamoring for goods, the pendulum swung too far and liquidation of labor prices was delayed well into the period of industrial depression that swept over the world during the late months of 1920. Whereas the prices of raw materials in England reached their highest level in February, 1920, and the cost of living attained its maximum at the end of October, wages generally continued to increase until January. Except for those trades in which there is regulation by sliding scale agreements under which wages fluctuate according to the Ministry of Labor index number of retail prices and rents, or according to the prices of the product, comparatively few workers suffered any reduction in their nominal earnings up to the end of April.

Many Idle Workers

Even prior to the coal strike, unemployment in the British Isles had reached alarming proportions with the result that the total earnings in many important trades were greatly reduced. Unfortunately, however, this situation did not result in any considerable pressure upon the nominal wage levels. This condition is attributable to various causes, among which may be mentioned the granting of unemployment doles and the organized resistance of the powerful national unions. In certain cases labor contracts are still in force which prevent an early readjustment to meet the needs of the present situation. The payment of unemployment doles—amounting in the case of a single man to 20s. a week—removes the argument of the hungry stomach and the mass of unskilled workers consider that if they accept employment, they are working only for the difference between the wages which they get and the dole they would receive without working at all.

The attitude of the labor unions is clearly indicated by the stand taken by the coal miners, who refused to work except on condition that a national wages board were set up to facilitate collective bargaining with their employers and earnings under time rates for about 30 hours' work a week that will maintain an even higher standard of living than they enjoyed before the war on the basis of a full week. While there is a real need for improvement in total earnings of British workers as compared with pre-war standards, even in the event that the cost of living should return to the same levels, the workers and particularly their leaders are still consistently refusing to make up the difference by increasing efficiency. "Ca' canny" or the deliberate restriction of output is the persistent policy of a large group of British workmen and the wage cost of many commodities is due more to slack performance on the part of the workman than to the daily or weekly wages being high. The fallacy of British labor's economics has been urged persistently by the employers' associations and the press during and since the war and some progress has been made among the more intelligent classes of workers, but the theory that there are not enough jobs to go around is too firmly imbedded to give way easily in spite of the fact that from one-third to one-half of all the products of British industry must be sold abroad in competition with those of other countries whose standards of living are lower or whose methods of production are more efficient.

Cost of Living

In considering the probable readjustments in general wage levels, it is necessary to give some attention to the cost of living. The Ministry of Labor publishes a figure monthly which purports to represent the "increase in the cost of maintaining unchanged the average pre-war standard of living of the working classes." This figure does not strictly represent the actual increases in expenditures of the average family owing to the fact that variations in the amounts of increase in the prices of different commodities have tended toward the purchase of different proportions of some of the items included in making up the index and because the standard of living has been raised in many families whose earnings have been increased in greater proportion than prices. These figures, however, are probably more representative than any others that can be readily obtained of the general increase in the cost of living in England since 1914 as they include allowances for food, rent, clothing, fuel and light, and miscellaneous items.

A tabulation of the above index number indicates that the cost of living in England increased gradually but steadily from a few months after the outbreak of the war until the armistice, when it was 120 per cent above the pre-war average. In 1919, there was a slight fall during the spring and summer, but in the fall of that year it increased again to 125 per cent above pre-war. The increases during the greater part of 1920 were more rapid than during any previous period, reaching the maximum of 176 per cent above the pre-war level, but falling at the end of the year to 165 per cent. Living costs declined precipitously during the early months of 1921, reaching 133 per cent above the pre-war average on the first of April. On that date food prices were 238 per cent above pre-war, rent was 144 per cent higher, and clothing was 325 per cent more costly; the increase in the expenditure for fuel and light was estimated at 245 per cent and in the case of miscellaneous items 210 per cent. Material reductions were made in the cost of clothing during April and food continued to become cheaper. While predictions are dangerous, the cost of living may reasonably be expected to fall to less than double the pre-war average within a few months.

Wages Fall with Living Cost

The cost of living figures as published by the Ministry of Labor are accepted in an increasing number of trades as the basis for the readjustment of wages. While the cost of living was advancing, the workers were quick to recognize the relation between living costs and earnings and readily accepted contracts which incorporated a cost of living bonus in addition to a basis rate. In the majority of cases, there has been no trouble in the adjustment of payments to the workers in accordance with these agreements.

Railroad Workers Contest Sliding Scale

In the case of railroad workers, however, there was a difference of opinion as to the interpretation of the sliding scale adjustment when the index number showed a decrease instead of an increase. The rates of wages of railroad men in the conciliation grades are made up of certain standard rates (agreed upon in March, 1920, and retroactive to Jan. 1, 1920), which represent the average pre-war weekly rate of pay in each

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group plus 38s. a week, and also further increases (ranging from 2s. to over 8s. per week) granted in June, 1920, the total wages in every case being subject to a reduction or increase of 1s. per week for each fall or rise of five points in the "cost of living." Adjustments of earnings in accordance with this agreement are considered at quarterly meetings of the Central Wages Board comprising representatives of the railroad managers and of the two unions involved. When this board met in March to determine wages for the three months beginning April 1, the relevant index number was 141 as compared with 169 at the last meeting. The trade union representatives argued that the previous ascertainment had been based upon a figure of 165, owing to the provision that only a full five points affected the result. According to the workers' contention, the difference between the two figures was 165 less 141, or 24, and the reduction in the cost of living bonus should be only 4s. The representatives of the railroad companies, however, urged that the cost of living index figures should carry exactly the same amount of bonus when descending as when ascending and, since on May 1, 1920, the index number of 141 had carried an agreed bonus of 3s., the proper reduction in the cost of living bonus was 5s. In short, the employers argued that all adjustments of bonus should go back to the starting point of the scale, viz., the index number of 125 in December, 1919, from which the original bonus dated. After discussion the union's claims were accepted, but a new scale was adopted in anticipation of further changes. Henceforth when the cost of living is falling, index numbers of 160 to 156 involve a bonus of 7s. a week on the basis rates, 156 to 151, one of 6s. a week, etc.; when the cost of living is rising, index numbers of 145 to 149 involve a bonus of 4s. a week, 150 to 154 one of 5s. a week, and so on.

Coal Miners' Wages

Owing to the wide differences in the economic state of coal mining in the different parts of the British Isles, it is doubtful if any British industry has as great variation in wage scales in the various sections. As a result of the several flat additions and bonuses granted to colliery employees since 1914, the differences are now less important than they were before the war, but, in March, 1921, just before the national strike, the average earnings of all classes of employees varied from less than £4 per week in Somerset and North Staffordshire to over £5 per week in Scotland and certain parts of Yorkshire. The wages of different grades of workers on company account seem to be remarkably similar, skilled workers receiving only comparatively little more than those who are totally unskilled. Miners and timbermen in South Wales, for example, received about 89s. 2d. per week, while "hauliers" got 80s. 9d. and underground laborers received 73s. 11d. In Cumberland the differences were even less, colliers receiving 80s. per week while other underground labor received 78s. 8d. and surface laborers got 71s. 4d.

These earnings are for employees on time work, whereas most of the more experienced miners were on tonnage rates and for such workers, weeky earnings of £10 or more were not uncommon. It is stated, however, that the average earnings of all classes of employees in and about British coal mines in January, 1921, were £22 1s. 9d., or about £5 per week, and this can be taken as the maximum average earnings for all classes of workers in any one month. Prior to the war the average earnings of all classes of colliery employees were about £7 10s. per month. In addition to their actual wages, however, the coal miners in England are furnished with house coal at nominal prices, and in many instances live in houses owned by the coal mine proprietors who ordinarily charge much less rent than other British workers have to pay for similar accommodations.

The wages of iron miners and quarrymen generally come under sliding scale agreements according to the selling price of pig iron. Among the best paid miners are those in the Cumberland district, whose wages reached 26s. 1d. per shift in January and were reduced to 23s. 10d. in March. In the Furness district iron miners were reduced to 16s. 6d. per shift in March as compared with a maximum rate in January of about 20s. Limestone quarrymen in West Cumberland were reduced in March by 1s. 8½d. per shift. Subsequent to the change, the wages of skilled workers ranged between 18s. and 19s. per day, while laborers got about 1s. per day less.

Wages in Iron and Steel Largely Scaled

The wages of almost all classes of workers in the iron and steel industry in Great Britain are adjusted more or less automatically according to the ascertained prices of the products. Most of the workers in these trades are relatively unskilled, but during and since the war they have been relatively well paid. The wages paid in the different sections of the country vary somewhat, but the average nominal wage of unskilled workers just prior to the slump in February, when they were at the maximum, was approximately 70s. 4d. per week of 47 hours. The actual average weekly earnings of all classes of employees in the iron and steel industry reached a maximum of 108s. per week in September when most of the works were operating full time. Owing to restricted operation of plants as a result of the coal strike in October, actual earnings declined in October and November, but again increased in December, owing to better working conditions. The maximum wages, however, were being paid in February when the nominal earnings of all classes of employees in the British iron and steel industry averaged approximately 132s. per full week or about 18s. to 19s. per shift of eight hours. Blast furnace employees were getting approximately 20s. a day in most districts, while the wages of common labor in the steel works were somewhat less. Open-hearth heaters and mill men are ordinarily paid on tonnage rates, the most recent adjustment in South Wales (March, 1921) fixed the wages of "teemers" at 8s. 4d. per shift plus 1d. per ton on the make of the shop between three heaters. The earnings of ladlemen were, for first helpers, 6s. 3d. and for second helpers, 5s. 3d. per shift plus 1/6d. per ton on the output of the shop between three heaters divided among three men of each of these grades.

Puddlers are invariably paid on a tonnage basis. The basis rate is 13s. 6d. per ton and this appears to be standard throughout the country. The additions to this base rate, however, vary somewhat in the different parts of the country according to the ascertained prices of wrought iron bars obtained by selected firms in each district. Decreases, amounting to from 20 to 25 per cent were recorded about April 1, bringing the puddling rate in Cleveland down to 202½ per cent above standard and in Scotland to 212½ per cent above the standard, or 40.8 and 42.2s. per ton, respectively.

Large Earnings of Skilled Men

The spread between the wages of highly skilled workers and common labor is greater in British iron and steel works than in other countries. Nearly all the men who are in charge of processes (such as head rollers, blast furnace keepers, etc.) are paid on a tonnage basis. Their earnings vary greatly in different plants, but are always high, many of these men getting £25 a week or more.

The wage advances in the iron and steel industry as compared with pre-war scales vary widely according to the class of work performed, being much greater for low paid men than for those who received good wages in 1914. According to figures published by the National Federation of Iron and Steel Manufacturers, the average actual earnings of all classes of workers in the iron and steel industry in Great Britain were at the rate of about £250 per year in 1920 as compared with £92 annually before the war, an increase of 172 per cent. Due to the fact that employment was generally better in 1920 than before the war, the increase in nominal wages was doubtless a little greater. Probably the largest increase for any single class was in the wages of common labor in the steel mills, which advanced from about 22s. 6d. per week in 1914 to 70s. 4d. in February, 1921, or over 212 per cent.

As a result of the established custom of fixing wages in most branches of iron and steel manufacture by means of wages boards for each class of workers in the various sections, the readjustment of wages in this industry to meet changing conditions of trade is not accompanied by the difficulties now encountered in other British industries. The principle that the workers' wages should be adjusted according to the selling prices of the products is accepted by both parties concerned. The work of the different wages boards consists mainly in the ascertainment of the average sales prices for certain specified products, as shown by the books of specified firms. These can be ascertained easily and quickly and wages are adjusted accordingly. The wages boards ordinarily meet every three months to fix the wages for the following quarter on the basis of prices prevailing during the preceding three months. Under this system, it will be seen that the workers gain the benefit on a declining market, whereas, when prices are rising, the employers have the advantage. In order to make the system even more flexible a few wages boards meet every two months.

Engineering and Shipbuilding

The wage increases to machinists and other employees in the engineering and shipbuilding trades have taken the form of flat increases to the basis rates as existing in different sections before the war together with various war bonuses. The last advance was at the end of May, 1920, when the basis rates had been advanced a total of 13s. per week and war bonuses totaling 26s. 6d. plus an additional bonus of 12½ per cent on the total weekly earnings had been given to all male employees over 20 years of age. Owing to the variations in local rates, the final wages of skilled workers in these trades vary somewhat in different sections of the country. In February, 1921, the wage for ordinary skilled machinists (fitters) ranged from 83s. 9d. to 89s. 4d. Millwrights and erectors generally received from 3s. to 5s. more per week. The 47-hour week is now standard throughout the country. Prior to the war the wages of skilled machinists averaged about 38s. per week of 53 hours.

Maintenance men in steel works and tin plate mills in South Wales were paid on a different basis until March 27 when they were given a flat rate of 100s. per week in place of the former arrangement of a basis wage of 43s. plus the then ascertained bonus (on the basis of steel prices) of 177 per cent. This wage, however, is still higher than that obtaining in other parts of the country where mechanics of similar skill get the same wages whether employed in engineering shops or on repair and upkeep of machines in other classes of production.

Apprentices are largely used for running semi-automatic machines and their wages will vary according to the class of work they perform. The wages for boys and youths, however, were fixed in the Midlands on March 21, 1921, on a new scale superseding the former arrangement, which included war wages of 10s. 9d. per week for all such workers. The present scale is as follows:

Machine Shops—Boys (Per Week of 47 Hours)

Age	Basis Rate		Bonus		Total Wages	
	s.	d.	s.	d.	s.	d.
14	10	0	4	0	14	0
15	12	0	5	0	17	0
16	14	0	7	0	21	0
17	16	6	8	6	25	0
18	19	0	12	0	31	0
19	21	6	14	6	36	0
20	23	6	18	6	42	0

The above rates do not apply to youths advanced to work as stampers in drop forging nor to apprentices already serving.

Iron molders, although belonging to a different union from that of the engineering workers, are paid on a similar basis. The variations in the basis rates are somewhat greater than in the engineering trades, ranging from 49s. to 62s. 8d. plus the war wages, totaling 26s. 6d. plus 12½ per cent on the total weekly earnings (i.e. from 84s. 10d. to 104s. 10d. per week of 47 hours, according to district).

Shop laborers in engineering works and foundries get from 61s. 6d. to 66s. 6d. plus 12½ per cent, or 69s. 2d. to 74s. 10d. per week, according to the district.

Wages of Women Workers

Considerable numbers of female workers were employed in the heavy machine trades during the war, but most of them have been weeded out and replaced by men or boys. A great many women, however, are still employed on light machine work and in the hollow ware and hardware trades. They are also found in the foundries as coremakers, etc., and in brass manufacture, operating capstan lathes or polishing. During the greater part of 1920 the wages paid to such labor in the Midlands averaged about 41s. 6d. per week. In the middle of March, 1921, a new scale was adopted resulting in decreases ranging from 2s. 9d. to 8s. 5d. per week. The rates now increase from 14s. 6d. per week for girls of 14 years up to 35s. per week at 20 years or over. On lighter work, or where little experience is required, the wages of women are only 32s. per week of 47 hours.

Piece work is common in many shops, but is not favored by the workers. The usual arrangement of piece rates is such that an average worker can earn 25 per cent more on piece work than on time work.

Wages in the engineering trades had not been reduced at the end of April, but conferences were being held for a general reduction. In certain districts, notably around Birmingham and Coventry and in Scotland, the individual shops had been able to induce their employees to remain at work and accept reductions of from 20 to 35 per cent. It is expected that the 12½ per cent increase on the total weekly earnings of time workers and the corresponding war bonus of 7½ per cent granted to piece workers will be removed before long and the basis rates and flat war advances will be reduced by at least 5s. per week. If this is done, the wages of skilled mechanics in England will be approximately 70s. per week or only about double pre-war wages.

Other Metal Trades

In general, the wages of workers in other classes of metal work are similar to those paid in the engineering trades, although not adjusted on a national basis. Sheet metal workers in Halifax, for example, receive 2s. 3d.. per hour, or slightly more than an ordinary skilled machinist. Male jewelry workers in London get 2s. 5d. an hour, while women in the same trade get 1s. 3½d. an hour. First-class electricians are paid about 2s. an hour. In the metal bedstead trade (Birmingham) the stockfitters in charge get 85s. per week, second-hands 70s., while "improvers" are paid on hourly rates of 1s. 4d. per hour for frame setters, 1s. 3d. per hour for cupola men and benders, and 1s. 1½d. per hour for other workers; all the workers in this trade receive an additional 10 per cent on basis time rates plus 30s. per week as a flat war bonus to all workers over 18 years of age.

In the manufacture of light castings, the standard rates for grinders and polishers are 41s. per week; blacksmiths, 38s.; fitters and pattern makers, 37s.; sheet iron workers, dressers, box fitters and berlin blackers, 35s. per week; all of these being subject to a flat war wage of 40s. per week plus 12½ per cent on the total weekly earnings.

The Trade Board governing the wages of employees working on stamped and pressed metal have established the minimum rates for male workers of 21 years and over at 1s. 4½d. per hour and of female workers of 18 years and over at 0s. 9d. per hour. These rates, however, are lower than those ordinarily paid in the district. In these trades the 47-hour week is established and only 4½ hours are worked on Saturday. Time and a half is provided for all times over 4½ hours on Saturday, even if the total number of hours worked per week does not exceed 47. Double time is allowed on Sundays and legal holidays.

The directors of the St. Louis Chamber of Commerce have decided upon a referendum vote to ascertain the sentiment of its membership on the question of the open and closed shop. The chamber has a membership of about 4800.

PRINCIPLES OF STORAGE

Experience and Practices of Pittsburgh Railways Summarized

Orderly piling, maximum visibility, absence of drawers, proper packaging and everything on wheels are the factors emphasized as essential for proper storekeeping, according to M. T. Montgomery, recently general storekeeper for the receivers of the Pittsburgh Railways Co., Pittsburgh, and now assistant to the general manager. He gave a paper on "Stores Engineering" before the Engineers' Society of Western Pennsylvania, which is published in the January, 1921, proceedings of that society. He states:

"Of all phases of operation which form the entity of a plant the question of caring for materials has not generally received the consideration it deserves. It was not considered of sufficient importance because the development of facilities entering into the manufacturing of products demanded most of the attention of those who kept pace with the times. Since intrinsic value of materials greatly increased, the investments in unapplied materials assume large proportions.

"The first requisite of stores engineering is cleanliness and nothing can be kept clean unless piled in orderly fashion." The Pittsburgh Railways Co. even piles its bolts. In reference to this Mr. Montgomery

(Above) An Old Case with 480 Drawers Was Converted into Modern Bins, with Everything in Sight

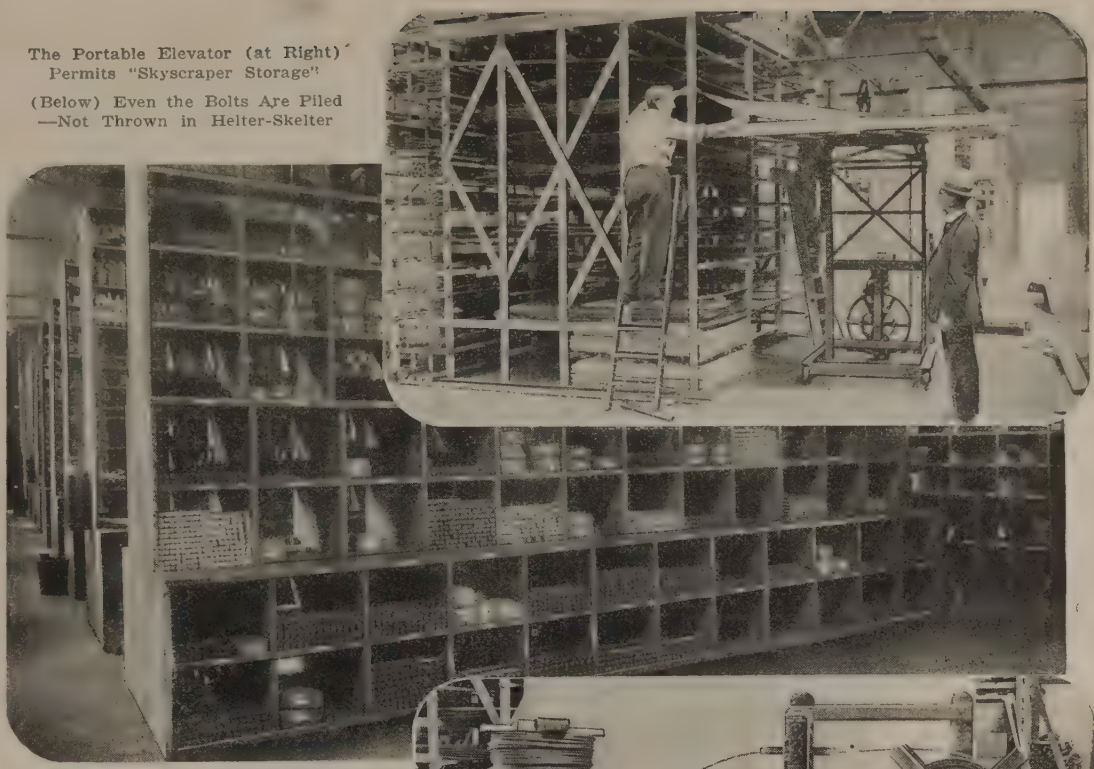
(Left) Ladders Are Equipped with Non-skidding Shoes

(Top, Right) "Everything on Wheels" — Even Barrels

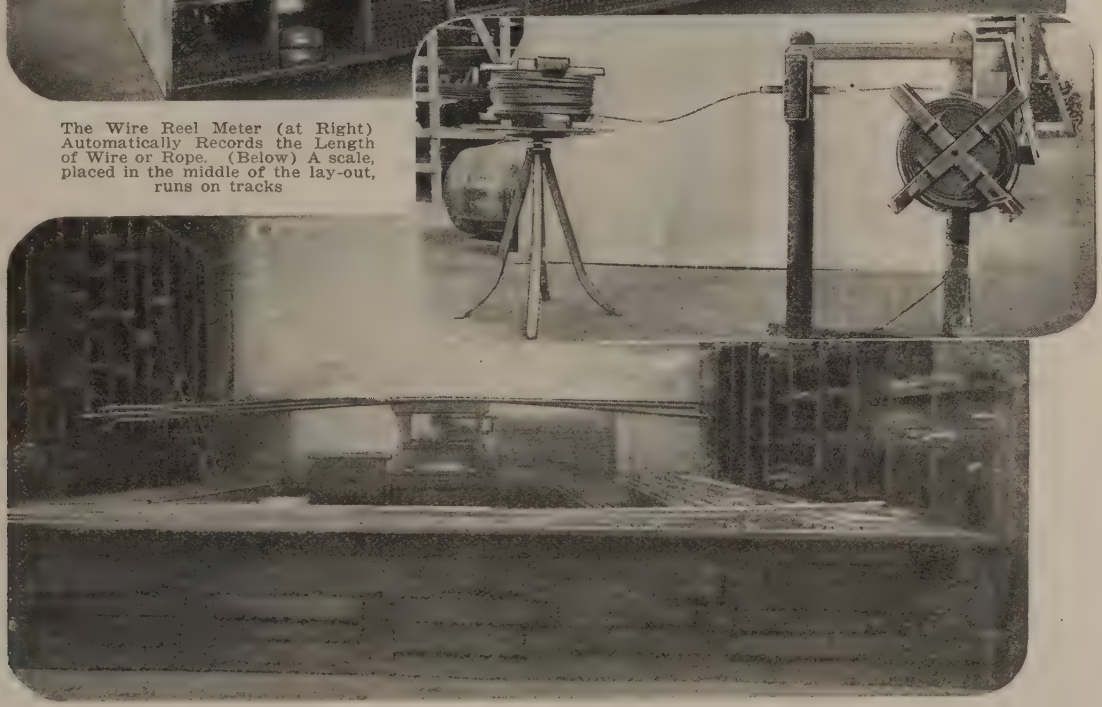
(Bottom, Right) A Traveling Hoist, Starting from the Receiving Floor, Runs the Length of the Warehouse

The Portable Elevator (at Right) Permits "Skyscraper Storage"

(Below) Even the Bolts Are Piled —Not Thrown in Helter-Skelter



The Wire Reel Meter (at Right) Automatically Records the Length of Wire or Rope. (Below) A scale, placed in the middle of the lay-out, runs on tracks



states: "Most people who saw our arrangement viewed this particular phase with a certain amount of misgiving. It seemed to them more or less a hobby and an expensive one at that, rather than an absolute necessity. It is a great deal more economical to pile goods in an orderly way than to throw material helter-skelter into receptables.

"Since we count our stock once a month it is necessary to do the work as quickly as possible and as accurately as possible. Our stores department calendar provides six days for actual taking of stock. The stock men do this, attending to their regular duties in addition. If materials were piled in a disorderly fashion this could not be accomplished; neither would we get anywhere if the bulk of the stock had to be counted by handling each piece. To count most of our material without actually handling it, we designed screen backs for our cases. As we insist upon counting materials without handling, we did away with drawers.

"Contrary to the belief of most operating men it does not cost any more to have vendors ship material in specified containers instead of according to the regular commercial practice. For instance, most manufacturers ship line ears, which support the overhead trolley wire, in barrels of from 180 to 220. We insist that they be shipped in boxes of 50. Small screws which are not of the standard commercial variety we order shipped in packages of 100.

"Economic operation depended on getting the most work done for the least number of man hours expended. Our success in this line may be attributed to the common-sense application of automatic lifting trucks and platforms, which means potentially 'everything on wheels.'" Among the devices are: A traveling hoist which starts from the receiving floor and runs the length of the warehouse; a device which automatically records the length of wire or rope; ladders equipped with non-skidding shoes; portable elevators for lifting sheets, tubing, etc., into the special racks.

"As the material is received, it is examined and

if ordered to certain specifications or blueprints, the engineer in charge is notified to pass on the goods. If the specifications call for a certain chemical analysis, samples are taken at random and sent to the laboratory for testing. Articles of small dimensions are tagged and the tag gives all the information necessary to trace the material to its source. Every package is opened and material examined; this, of course, does not hold good on standard packages of screws, nails, etc. We weigh the iron received by means of a portable scale in our iron rack.

"On our property we sell annually many thousands of dollars' worth of scrap. Ferrous scrap is taken to the scrap docks, where it is sorted according to kind and cut into charging-box size, if necessary. For this work use is made of an alligator shear and a cutting torch. The scrap is then put into bins. The non-ferrous scrap is segregated according to commercial practice and is handled at the general stores. The copper is put into shape for melting and when ready for sale is placed on lifting truck platforms—another instance of 'everything on wheels.' It is the custom at some points to dispose of the scrap once a month irrespective of market conditions, or else on a contract for the year based on the fluctuation of new metal. We have found it an additional source of revenue to follow the market. All scrap is sold to the highest bidder. We have a mailing list of scrap dealers and mills constantly in the market. We sell our scrap f.o.b. loading point and insist upon cash deposit for the value of each shipment before it is actually forwarded."

Will Confer with Manufacturers

WASHINGTON, July 26.—President John E. Edgerton of the National Association of Manufacturers has issued a notice to members of the association advising them that the conference it is to hold with officials of the Bureau of Census with regard to the biennal census covering "statistics of products of manufacturing industries" which are to be taken for the year 1921 will take place at Hotel Washington, Washington, at 10 a. m., Friday, July 29. Request is made that representatives of the different branches of industry who are affiliated with the association attend the conference. It is expected that Secretary of Commerce Hoover will be present to open the conference and participate in its deliberations.

"The Director of the Census desires this conference with representatives of the associations in order that he may consult with them concerning the number, nature and form of the various inquiries and the general scope and work of the Census Bureau," President Edgerton states, "as well as the methods of co-operation with the officials of the Bureau and Department to facilitate the work and accomplish the best and most useful results to American industry."

Among organizations asked to send representatives to the conference are the American Iron and Steel Institute; American Supply and Machinery Manufacturers' Association; National Association of Engine and Bolt Manufacturers; National Association of Brass Manufacturers; National Pipe and Supplies Association; Heating and Piping Contractors National Association; Railway Car Manufacturers' Association; American Hardware Manufacturers' Association; National Implement and Vehicle Association; Refractories Manufacturers' Association; Electrical Manufacturers' Club; National Automobile Chamber of Commerce and the National Coal Association.

The June output of the Ford Motor Car Co. in the United States was 108,962 passenger cars and trucks, which is an average of 4190 cars for each of the 26 working days. This is the high mark in the history of the company, breaking the May record by 7486. The schedule for July calls for 109,000 cars and trucks. The sales department reports that the demand for closed cars has been exceptionally strong, but that all models are in greater demand than production facilities can provide.

The Changed Status of Southern Blast Furnaces

In its weekly comment on pig iron conditions the Matthew Addy Co., Cincinnati, goes into particulars concerning the way in which Southern producers of pig iron have had their sphere of operations limited by high freight rates:

"Some of the things that distress pig iron may be deduced from the fact that there is only one merchant furnace in blast in the states of Tennessee and Alabama. Ordinarily there are about twenty-five furnaces in blast in the South. Birmingham used to supply all the iron needed on the Pacific Coast. The freight rate in the old days was $12.32 per ton, but to-day the rate is $22.40 per ton. And all the iron that is needed on the Pacific Coast is coming by sea, most of it from Belgium.

"The present cost of very high-grade coke from Connellsville is $4.50 per ton. In the old days the rate to California was $11.30 per ton; the present rate is $19.76. And all the coke that California and the Pacific Coast uses is now coming from Germany. The old freight from Birmingham to Cincinnati used to be $2.75; it is now $4.50. The freight on pig iron to St. Louis before the war was $2.75; to-day it is $5.25. The South has just about gone out of the pig iron business because freight rates are so high as practically to build a wall around the Southern furnaces. It is not necessary to make any elaborate argument in the face of such features, and in a greater or less degree all the iron business in America is confronted with just such changes in freight rates which have profoundly and tremendously altered all economic conditions. It may be that freight rates were too low, but American business has been built up on cheap transportation and plenty of it, so to speak, and of late we have been having highly expensive transportation and mighty little of it.

"During the war the higher the price and the more things cost, the better—'the more the merrier' seemed to be the program. But not now. We are going back with great rapidity in all directions to the solid ground of the past. But the railroads are still at the peak. Immense progress has been made in some directions, but the railroads are now distinctly holding things back."

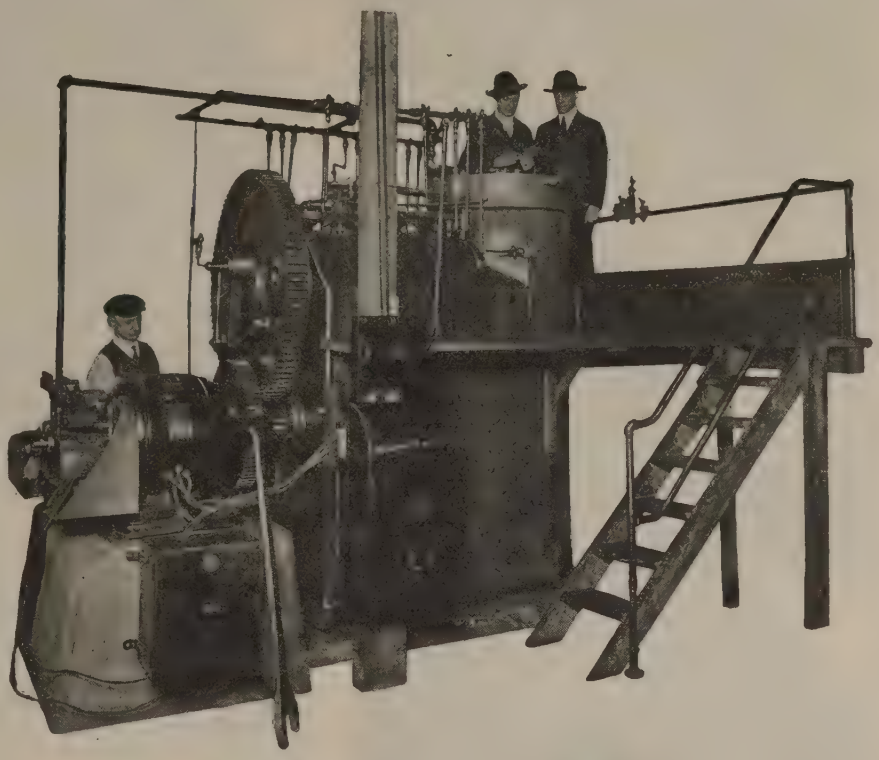
New Chief of Division of Commercial Laws

WASHINGTON, July 26.—The appointment of Archibald J. Wolf of New York to take charge of the newly created Division of Commercial Laws, announced last Thursday, creates a feature of the work of the Bureau of Foreign and Domestic Commerce, Department of Commerce, which departmental officials consider particularly necessary at this time owing to the many changes or modifications in the commercial codes of the most important countries of the world which have taken place since the armistice. It is intended that Mr. Wolf will immediately take steps to obtain reliable information regarding foreign commercial laws for the benefit of American business men interested in foreign trade. His work will deal with such subjects as the incorporation of American firms abroad, status of American firms in foreign countries from a legal standpoint, legal steps necessary in connection with the establishment of American branch plants or sales rooms abroad, etc.

Several years ago, Mr. Wolf was an active member of the field staff of the Bureau of Foreign and Domestic Commerce and in that capacity conducted several foreign investigations. One of his best-known products, from an official viewpoint, is a report on the credit practices and methods in vogue in foreign countries known as Special Agents Series No. 62—"Foreign Credits." Some of his other official reports deal with commercial organizations in Germany, France, Switzerland and the United Kingdom. He is also the author of several well-known unofficial books on export trade, and financial and legal subjects.

Cuts Teeth of a Gear at One Operation

The Stevenson Multiple Shaper and How It Operates and Its Field



THE Stevenson Gear Co., Indianapolis, has developed a new type of gear cutting machine known as the Stevenson multiple shaper, which cuts all or a multiple number of teeth in a gear or similar product at one operation. The essential member of the machine is a special tool head which consists primarily of a series of radially disposed tools spaced about the circumference of the blank to be cut. Operation is the same as an ordinary vertical shaper except that the tools are held stationary and the gear blank reciprocated past the tools. The mechanism consists essentially of a ram carrying a blank-supporting arbor and the multiple tooled head for operating upon the blank.

The frame of the machine is a casting of rectangular box section with a vertical cylindrical portion at one end in the center of which the ram is mounted. The tool head is placed above the ram at the top of the cylindrical portion. The crank shaft which drives the ram is journaled near the top of the rectangular section and is provided with an adjustable crank head at the end next to the ram and is driven through back gears by an individual motor. The arbor which carries the gear blanks fits in a socket in a spindle which is journaled inside the ram and is free to rotate independently of the reciprocating motion imparted to it by the ram. An intermittent indexing movement is imparted to the spindle after each cutting stroke by an intermittent gear train. The machine illustrated is 7 ft. high, weighs 17,000 lb. and when operating to full capacity is driven by a 100 hp. motor. Its capacity is for gears 12 in. in diameter, 6 in. face, 4 diametral pitch.

The tool head consists of a flat, steel disk 3 ft. in diameter, provided with a hole at the center and a number of radial grooves cut in its face in which the tool bits are arranged about the circumference of the gear. Successive feeding movements are given the tools by an annular sectional cam ring. As the gear blank is reciprocated past the cutting tools, the tools are gradually fed in by successive cuts to the full depth of the tooth. At the completion of each stroke of the ram and before the next cut begins, the gear blank is indexed a space equal to one tooth, thereby presenting a different tool to each tooth from the one which made the previous cut. After the tools have been fed in to full depth, they are held stationary in that position while the cutting process continues until the gear has indexed one complete revolution, thereby giving each tool an opportunity to take one last cut on each tooth. This final complete index is intended to give uniformity of spacing of the teeth in the gear equal to that of the indexing mechanism. Uniformity of the tooth form is secured even though the tools themselves may not be uniform, because if any tool is longer or wider than any other that portion of it which is longer or wider will take one last cut on the corresponding portion of each tooth in the gear, thereby eliminating variation which may have been caused by previous cuts. This process of finishing all the teeth of a gear with a single finishing tool is intended to provide accuracy; and the speed is multiplied by the number of tools operating on the gear blank at one time.

To a designer the most interesting individual mechanism on the machine is the tool head. In the illustrations given Fig. 2 is a top view showing the tool head as it would appear when in operation, Fig. 3 is a bottom view as it would appear when taken off of the machine ready for disassembly or adjustment. Fig. 4 shows the tool head partly disassembled with the principal details of its mechanism exposed. When mounted on the machine the only working parts to be seen are the points of the tool bits surrounding the gear blanks and the small depth adjustment dial. The four pairs of T slots are for attaching a piloting device, which is used on extremely long and slender arbors which may need an outer support.

Two tool heads are provided for each machine, and while one is in use the tools of the other are being sharpened and reset. The tool head is held in place by 8 studs and nuts, which when it is desired to set up a new job or to sharpen the tools, are taken off and the tool head lifted bodily and replaced by the other tool head. This arrangement is calculated to eliminate loss of time on account of set-up and sharpening tools. As the tool head is taken off it is turned bottom side up on trunnions, the clamp and gear plate being removed, exposing the tools and the feeding mechanism.

The tool bits are rectangular in section except the

lower side, which is in the form of a V. The gear tooth profile is formed at the inner end of the tool and is backed off to permit sharpening without changing the form. The outer end of the tool rests against a spiral cam surface and is ground in the form of an exact radius. A small pin near the back end fits in a groove which has an opposing spiral surface and retains the tool in close contact with the other cam surface, providing correct contact and withdrawing the tools to their starting position after the cut is finished.

Individual cam lugs are mounted on a large ring which encircles the tool bits and spacing plate, and are held down by T bolts fitting in a circular T slot in the ring. The bits are adjusted for depth independently by moving the cam lugs individually along the T slot relative to the cam ring and each other. Simultaneous feeding movements are imparted to the cam ring through two idler gears, seen in the lower part of Fig. 4.

The final depth to which the tools are fed is determined by an adjustable stop which positively limits the rotary feeding movement of the cam ring. This feed mechanism being spring actuated, the position of the depth controlling stop can be varied within reasonable limits without resetting of the feed mechanism. The dial which controls this adjustment can be quickly reset whenever desired.

To provide relief for the tools on the back stroke

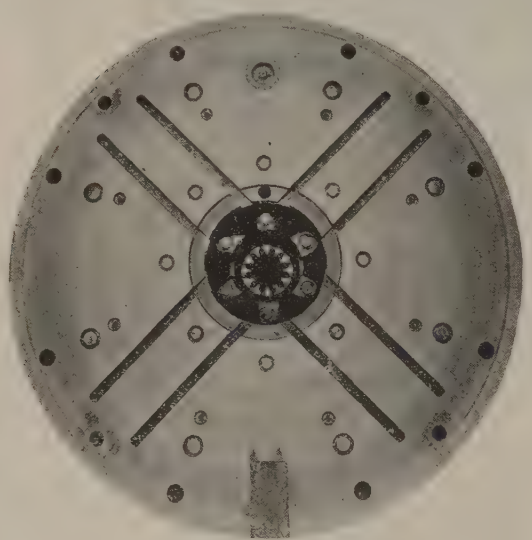


Fig. 2—Top View of Tool Head As It Would Appear in Operation

of the ram, a reverse feeding movement is imparted to the cam ring, and before the beginning of the cutting stroke, the forward feeding movement of the cam is made great enough to compensate for the slight retraction for relief and also to provide the necessary additional feed for the depth of the next cut.

The large gear and plate shown in Fig. 3 are used to intermittently clamp and release the tool bits during the cutting and feeding operation. The lower central plate is mounted directly above the tool bits and is provided with adjustable set screws and lock nuts above each tool. The outer gear member is free to rotate about the central plate and is provided with screw threads which engage a corresponding threaded portion of the tool head base. A rotary reciprocating motion imparted to this gear by a cam operated segment clamps the tools during the cutting operation and releases them during their relief and feeding movements. This clamping arrangement by forcing the V-shaped seat on the tool bit into a corresponding seat on the spacing plate in the tool head serves to centralize and accurately locate the cutting point of the tool, in addition taking up clearance and looseness, eliminating vibration and chatter.

The feed and clamping mechanism shown in Fig. 5 comprises the segments and cams for actuating the tool

Fig. 3—Bottom View of Tool Head As It Would Appear When Taken Off of Machine for Disassembly or Adjustment

head feed cam and the tool clamping gear. The feed cam segment which is shown near the center of this illustration swings about the central stud as a fulcrum, and is moved directly by a spiral cam, which is rotated intermittently by a ratchet on which it is mounted and can be adjusted to produce various feeding motions. The cam has a long gradual slope for the feeding movement and a sharp descent for quickly returning the tools to their starting position at the completion of the cutting operation. The slight retraction for producing the relief movement is accomplished by mounting the fulcrum stud eccentrically on a shaft which is given a partial rotation by a face cam on the large driving gear. The tool clamping gear segment seen in the lower part of the illustration is actuated directly by a push rod in contact with another face cam on the large driving gear. The releasing movement is accomplished positively, but the clamping movement is effected by means of a spring in order to eliminate the possibility of breaking some part if the clamping mechanism were accidentally adjusted too tight.

The indexing mechanism as shown in Figs. 6 and 7 consists of a split bushing guide, one-half of which is attached to the ram spindle, the other half being attached to a revolving drum on which is mounted a worm gear driven by a worm and an intermittent gear train. The intermittent indexing movement is derived from a Geneva wheel and is transmitted through a set of

Fig. 4—Tool Head Partly Disassembled with Principal Parts of Mechanism Exposed

change gears to the worm and worm wheel. By varying the ratio of the change gears in the train, indexing movements for any desired number of teeth may be obtained. Minute angular adjustments of the spindle position varying by one second of arc, for locating keyways, teeth of cluster gears, etc., are obtained by means of a differential clutch between the worm and worm shaft.

The main crank shaft is connected to the large back gear by a quick return crank of the drag link type, giving a slow cutting stroke and quick return. The driving motor is mounted on a sliding base and drives through a single set of speed change back gears, the drive for the indexing mechanism being taken direct from these gears. The motor is controlled by a push button switch, automatic compensator and solenoid electric brake.

The work arbor used in this machine has a taper shank and thrust collar, and fits the tapered socket in the ram spindle. The gear blanks are put on the arbor and fastened in place by a nut, while the arbor is held in a vise-like fixture attached to a bench at the side of the machine. After loading, the arbor is dropped into the taper socket in the ram spindle and the machine is ready to work. The thrust of the cut forces the taper back into the socket until it strikes the shoulder of the arbor. While one arbor of gears is being cut, another arbor is being loaded with blanks. As the arbor is finished the operator, holding the arbor of uncut blanks in one hand, stops the machine, presses a foot pedal, knocks out the arbor of completed gears, and catches it in the other hand. He then drops the arbor of uncut blanks into the open socket, the operation of stopping, changing arbors and starting again, it is claimed, consuming less than ½ min. The total time of completing an arbor of gears ranges from 1 to 3 min.

In cutting some gears, it is desirable to use as many tools as there are teeth in the gear. In others it is more practical to use only half or a third as many tools as there are teeth, in which case a tool head equipped with any number of tools could cut gears having any number of teeth which is a multiple of the number of tools used. Thus a spacing plate having 10 tools could be made to cut 10, 20 or 30 teeth, etc. In a case like this, if it is desired to cut a number of teeth greater than the number of individual tool bits which can conveniently be placed within the space a gang tool bit is used in which each tool cuts two or more teeth. This is particularly advantageous in cutting gears having a large number of very fine teeth, because although the amount of power required for cutting all of the teeth is small, it would nevertheless be practically impossible to use as many individual tools as there are teeth in the product.

To cut a gear having an odd number of teeth and where it is not practical to use a tool for every tooth, as in the case of a 29-toothed gear, for example, ten

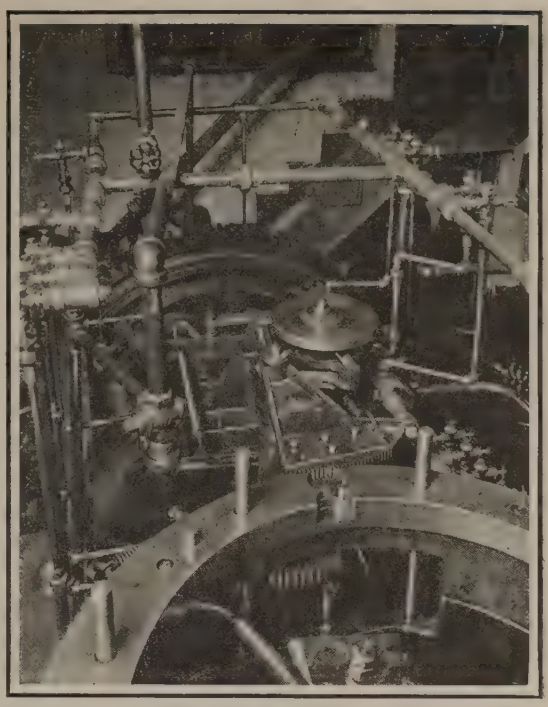
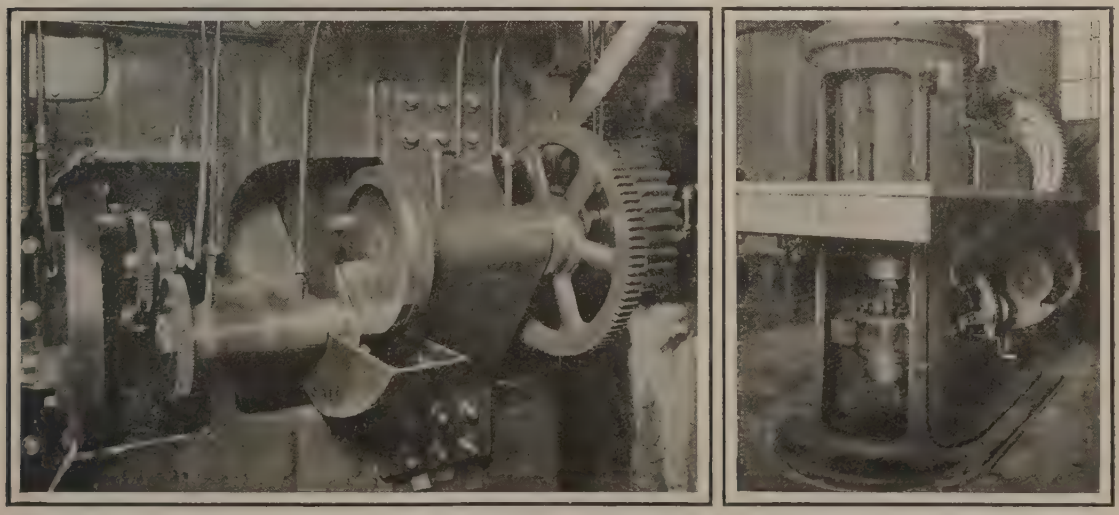


Fig. 5—Toothed Segments for Actuating the Head Feed and the Tool Clamping

tools might be used. Nine of the spaces between tools would be equal to 3/29 of a circle each and the tenth space equal to 2/29. While the service on one tool would be slightly less than that on each of the other 9, the difference would be scarcely appreciable.

In some cases, it is desirable to make every other tool in the form of some sort of a roughing tool, either a square nose gashing tool or a stepped roughing tool of the usual type and so adjust them that they will remove most of the stock from the tooth space. The alternate tools are then made in the usual type of finishing tools and take the last few finishing cuts. At other times, a special cam is provided for one tool, it is held back during the stock removing cuts and is then suddenly fed forward ahead of the other tools to take the finishing cuts on all of the teeth. These various arrangements are merely suggestive of a few of the possibilities in this line, but a number of possible combinations will readily suggest themselves to tool designers and set-up men.

Although the multiple shaper is classed as a gear cutting machine, it is adapted to the production of all



Figs. 6 and 7—The Intermittent Indexing Movement Is Derived from a Geneva Wheel and Is Transmitted Through a Set of Change Gears to Worm and Worm Wheel

cylindrical products having teeth or grooves such as sprockets, splined shafts, reamers, taps, milling cutters, saws, ratchets and knitting machine rolls. The advantage of cutting the teeth on the various products with the Stevenson multiple shaper compared with standard one tooth machines, varies as the number of the teeth or grooves in the product or the number of tools used. The reason for this is that the standard machines ordinarily cut one tooth at a time and the Stevenson shaper ordinarily cuts all the teeth at once and consequently the products having the larger numbers of teeth have a greater capacity for increase than those with small numbers of teeth.

A few examples of the cutting time records which have been made on various products are shown in the following table, and will serve to illustrate the remarkable time saving made by the Stevenson process. Ordinarily a machine is considered as quite an improvement if it saves 5 or 10 per cent on a product, but a saving of 50 to 80 per cent is indeed a rare feat of engineering and invention. The standard machines were operated very close to their maximum speed capacity, while the Stevenson machine was run at a very moderate speed. If its speed had been increased to equal that of the others, the time saving would have been still greater.

Comparative Tooth Cutting Time for Various Products Cut on Standard Gear Cutters and on the Stevenson Multiple Shaper

Product	10 P24T ½-In. Face Gear	3-In. Diam., ⅝-In. Pitch Sprocket	1½-In. Splined Shaft	1-In. Machine Reamer	3-In. Milling Cutter	2¾-In. Screw Slotting Saw
No. teeth in product..	24	12	6	8	12	72
No. tools used in Stevenson multiple shaper	12	12	6	8	12	36
No. blanks on arbor..	6	16	1	1	8	120
Cutting time per piece (standard gear cutter), min.	1.6	1.04	3.3	3.24	3.6	0.48
Cutting time per piece (Stevenson multiple shaper), min.	0.4	0.23	1.35	1.04	0.36	0.01
Per cent saving in time by Stevenson shaper	75	78	59	68	90	96

An interesting example of one advantage of the machine was found in fluting 1 in. taper shank machine reamers. The holder first made for this purpose was provided with a tapered socket for holding the tapered shank of the reamer and also a collar for supporting the neck of the reamer up near to the flutes. As soon as the job was put in to operation it was found that the cutting pressure was so evenly balanced that the neck support was entirely unnecessary and therefore it was not used. The reamer was held by the taper shank only, with an over-hang of 5 in.

Another example of the advantage was found in cutting gears of different materials stacked on the same arbor, such a combination of steel, brass, raw-hide, etc. Eight blanks of different materials, such as steel, cast iron, fiber, bronze and aluminum, were stacked on the same arbor and cut at the same time. It was demonstrated that the variations in pressure caused by the different materials were unable to affect the accuracy of the tools.

Improvement in Fabricated Steel

The amount of fabricated steel business that was contracted for in June, according to the records of the Bridge Builders and Structural Society, George E. Gifford, secretary, 50 Church Street, New York, was 66,900 tons. This corresponds to 37 per cent of the capacity of the bridge and structural shops of the country and is the largest monthly volume since September, 1920. The total for the first half of 1921 is 283,400 tons, which compares with 324,900 tons for the first six months of 1919, when business was recovering from the stagnation following the signing of the armistice.

"Pittsburgh Plus" and Good Roads

The American Farm Bureau Federation has issued statistics showing the added cost to good roads which is due to "Pittsburgh plus." The figures were obtained from the State highway commissioners of the states mentioned and represent estimates of the amount of steel to be used on roads to be constructed within the next four years. The excess cost of freight on steel from Pittsburgh to typical points in each State as compared with the cost from the nearest steel mill was set down as the "average cost of Pittsburgh plus." The figures show that in 10 states the extra toll paid to "Pittsburgh plus" during the next four years will amount to nearly $2,000,000 for roads alone. According to the Farm Bureau Federation, this will be paid in taxes largely by the farmers. The data follow:

State	Amount of Steel to Be Used	Average Cost of "Pittsburgh Plus" (Per Ton)	Total
Illinois (4000 miles, 16½ tons per mile)	66,000 tons	$7.60	$504,000
Alabama	12,000 tons	10.00	120,000
Montana (amount for bridges unknown)	900 tons	7.00	6,300
Nevada	1,450 tons	7.00	10,150
Arizona	1,200 tons	7.00	8,400
Michigan	16,000 tons	2.00	32,000
Washington	28,000 tons	7.00	196,000
Wisconsin	50,000 tons	7.60	380,000
Arkansas	25,000 to 30,000 tons	7.00	200,000
Minnesota	60,000 tons	7.60	456,000
Ten states	260,000 tons	Total cost	$1,912,850

The resolution condemning the Pittsburgh basing point for steel prices, adopted by the House of Representatives of the State of Missouri on June 21, was concurred in by the State Senate on July 13. This makes five State legislatures which have gone on record as opposing "Pittsburgh plus," those which took previous action being Minnesota, Wisconsin, Illinois and Iowa. A like resolution is expected to be adopted by the legislature of Georgia which is now in session.

Wages in New York Factories

The Bureau of Statistics of the New York State Industrial Commission reports average wages during the month of May in factories in the State at $25.86, a reduction from the $28.45 per week in May, 1920, but a figure much higher than that obtaining in the corresponding month of any previous year. It is more than double the $12.74 of May, 1915.

Figures for the "Metals, Machinery and Conveyances" group of industries are consistently higher than the average. In this group the average weekly wage in May of this year was $28.16, compared with $31.50 last year and $14.61 in 1915.

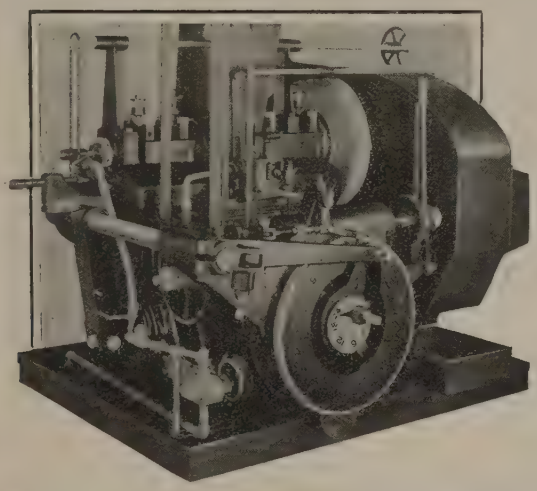
The high water mark of earnings expressed in dollars per week was reached in October, 1920, with an index figure of 228, based on June, 1914, at 100. There has been a consistent drop month by month since October (except that March was a little heavier than February) to a figure of 204 for May. This leaves the wage increase at 104 per cent above the figure for June, 1914.

Compared with this, the retail food price of the United States Bureau of Labor Statistics shows that food is only 46 per cent above the figure for June, 1914. Corresponding figures for retail food prices in New York City and Buffalo show respectively 45 per cent and 39 per cent above the figure for January, 1915. In both these cities, as well as in the United States as a whole, the maximum of food prices was reached in July, 1920, since which time a reduction of approximately one-third has materialized.

The Mutual Enamelware Co., Chattanooga, Tenn., a subsidiary of the Crane Co., Chicago, is installing a 292-kw. connected electric vitreous enameling furnace capable of heating up to a temperature of 1700 deg. Fahr. The furnace will be used for bath tubs and other bathroom and lavatory fixtures, and is being built by the George J. Hagan Co., Pittsburgh, in collaboration with the General Electric Co.

New Automatic Surface Grinding Machine

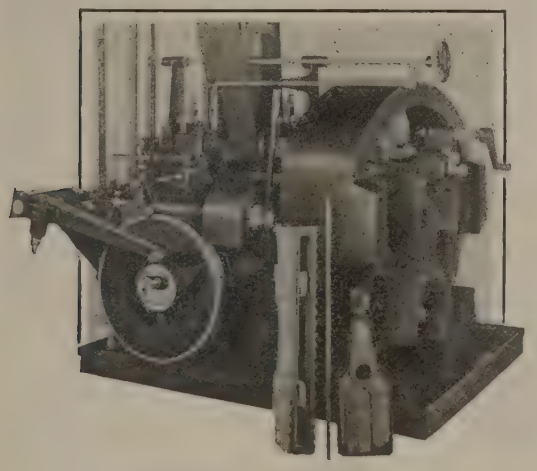
An automatic surface grinding machine of unusual design has been built by William Osterhom, consulting engineer, 2301 North Knox Avenue, Chicago. The machine embodies a number of operating features which will prove of particular interest to shops in which the surfacing of parts up to 12 x 40 in. is part of the daily routine. The general view of the machine shows it equipped for grinding plain surfaces, such as are shown in the foreground. One of these castings is a radiator top for a motor truck, 4 in. wide by 32 in. long, of very flimsy section. The other piece is a small drill



Work Is Locked in Fixture Mounted on Tilting Table, Hinged on Swinging Arm. This view shows position for grinding

press base, about 10 x 20 in. The chucking time from floor to floor was 13 sec. and the actual grinding time 45 sec. About 3/32 in. of metal was removed from the castings in that space of time.

The machine is completely automatic except for locating the work and locking it in the fixture. The latter is mounted on a tilting table, which is hinged on a swinging arm and thrown into proper relation with the surface of the emery wheel by means of an



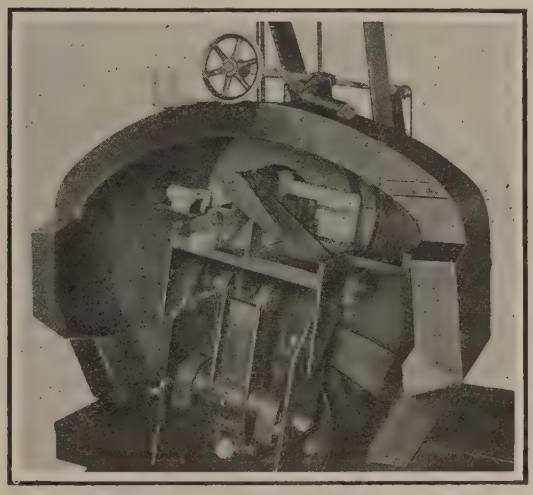
Rear View of the Machine

operating cam. With the completion of the cycle of the cam, the fixture automatically tilts back 45 deg. away from the emery wheel surface, giving the operator a clear field for removing his work. The work arm carrying the fixture oscillates back and forth across the emery wheel during the course of operation.

For dressing the wheel an emery wheel dresser is inserted in the fixture with the tilting table in grinding position. The swinging of the work arm in front of the wheel gives the latter a true surface relative to the oscillation of the arm. In accordance with the requirements of different jobs, the length of the stroke of the swinging arm may be varied from 2 in. to 24 in. and, by means of a change gear box, the time element may be varied from 10 sec. to 2 min. Thus, if it is determined that a certain piece can be finished in 45 sec., the gears are so set that the operating cam makes the cycle in that time.

Water is automatically turned on and off with the opening and closing of the tilting table. This arrangement protects the operator who would otherwise get drenched while locating his work on the fixture. A rotary pump supplies the cooling water through the center of the spindle to the emery wheel, and if delicate parts, such as harvester knives, edged tools, hardened steel pieces, etc., are to be faced, water is also supplied through the fixture.

The feed of the emery wheel is automatically controlled by a cam, the wheel being fed gently forward on to the work by a series of steps. This insures a true surface for the wheel and prevents the rounding of corners, thereby lengthening the life of the abrasive. Actual grinding is not started until the work has been placed in position, it then being accomplished by pulling a handle on top of the machine. The handle throws a belt on a tight pulley behind an arrest lever which holds the belt shifter in place until the cycle of the operating cam has been completed. The sheer drop on the cam releases the arrest lever and also raises the work into grinding position. By means of a lever and roller a series of steps on the radial part of the cam communicate the rotary action to the lever shaft



Inside of Wheel Housing, Showing Work in the Fixture in Process of Being Surfaced

which in turn drives the wheel housing forward a preconceived distance against the work. A quick return of the lever to its original starting point traps the shifter arrest lever, unlocks the tilting work table and stops the action of the machine. An emergency stop adjacent to the throw-in lever has also been provided. This stops the action of the grinding machine instantly. A noteworthy feature of the feed lever is the fact that it has been cushioned so that in heavy grinding of irregular castings the wheel is not subject to destructive resistance but has an opportunity to adjust itself through the action of the cushion spring taking the shocks and allowing the wheel to cut itself free.

Wear of the wheel, as well as the proper placing of the wheel housing in relation to the work surface is taken care of by a hand wheel, graduated in thousandths of an inch, convenient for the operator. Another lever adjacent to the change gear box allows the operator to stop the rotation of the cam without stopping the swinging of the work arm. This is advantageous when dressing the emery wheel, as feed during dressing would result in an irregular surface.

The entire working mechanism is supplied with positive oiling devices. The spindle, which is 42 in.

long and 4 in. in diameter, has forced lubrication. It is also equipped with a system of thrust bearings to counteract the thrust of the wheel.

The machine may be equipped with automatic magazine feed if so desired. In this case, two magazines would be used, one for receiving and one for delivery. If the receiving magazine should get clogged up, the machine would automatically stop. Likewise, if the raw material magazine is emptied to a certain point, the machine will stop. This method of grinding is desirable on such work as facing thin hardened pieces of steel up to 6 x 6 in., thrust washers, reamer plates, and, in fact, anything that can be stacked and magazined properly.

The weight of the machine is 7800 lb. and its floor space, 72 x 84 in. A 20 in. diameter cylinder wheel, 8 in. thick and with a 10-in. hole is used. A 20-hp. motor is required when operating at maximum cutting speed.

Mr. Osterhom, the designer, has patents pending in the United States and foreign countries. He was formerly mechanical engineer of the International Harvester Co., Chicago.

Large Cores for Turbine Castings

Difficult Foundry Operations in Making Castings for Steam Turbines for Scout Cruisers —Methods Employed in Making Cores

STEAM turbine castings for two scout cruisers, involving large core work, were a feature of after the war work of the Farrell Foundry & Machine Co., Ansonia, Conn. They were made by the Fore River works at Quincy, Mass., of the Bethlehem Shipbuilding Corporation, Ltd. During the war the Farrell company delivered considerably more than 100 of these castings to the shipbuilding company and as a result of this war work was awarded the 1921 sub-contracts. Each scout cruiser is equipped with four shafts and each shaft has one high, one intermediate and one low pressure turbine, making a total of twelve turbines to each vessel and necessitating 24 castings having a total approximate weight of 100 tons.

The steam turbine castings presented difficulties on account of their size and the danger of damage to cores in assembling. The cores were set by measurement. The final coring up was difficult because the bottom core prints were relied on to eliminate trouble during the lowering of the drag and cheek on the cores. It invariably was necessary to true up the larger cores by rocking, allowing fine sand to run in under the core during this process. In the case of the low-pressure turbine castings, illustrations of which are shown, there were eight cores in the upper half and nine in the lower.

The average thickness of the castings was ⅞ in. and the weight approximately 8200 lb. They were required to pass Government inspection before leaving the foundry. Specifications called for a transverse strength of 2200 to 2800 lb. per sq. in. and a tensile strength of 20,000 per sq. in.

In making the main cores the core box was set up on a plate, rammed up and bound by cast iron arbors. These arbors were provided with five hooks, which were screwed into nuts cast in the bottom of the arbors. The cores were picked up green, slicked up with a stiff blacking, placed on the oven car and thoroughly baked. After baking they were set up, preparatory to casting, the hooks were removed, and the resulting holes were filled with sand and smoothed over. The large cores were made by the same method, only fewer hooks were used. Small cores were made in the usual manner.

Each core, after being set in place, was carefully slicked to eliminate chipping of the finished casting. In view of the nature of the work there were few fins.

All inside surfaces of the castings, especially those in which the turbine blades operate, were machined at the Fore River works, but the amount of stock removed in this operation was slight. Machining was for the purpose of removing any particles of metal that might affect the course of the steam through the turbine. On the cope side of the machining surfaces an extra finish was allowed to take care of any dirt, but, aside from this and the flanges, little machining on the outside of the castings was necessary.

One illustration shows a pattern being rammed up, immediately in the rear of the cores assembled in the foreground. In this practice the drag is laid down and leveled and the bottom swept up 4 in. below the joint of the flask. The bottom flange is then laid down on the swept space and rammed up level with the joint of the flask. There the parting is made. A cheek is next laid down 18 in. deep, and arbors, cast to fit inside the flask ½ in. to ¾ in. away from the pattern, are laid in and hooked up to the top of the cheek. The cheek is then rammed up to the joint. Another is placed to complete the height of the flask to the top level of the pattern. These two cheeks are clamped together and the second rammed up to the joint, where parting is made. The cope, 10 in. deep, is then rammed on top of the cheek and pattern.

The cope is next taken off and the cheeks lifted complete, leaving the heavy pattern lying on the bottom of the flask. The molds are then slicked up with a very stiff blacking and placed in ovens, where they remain about 42 hr. As a rule the arbors are not broken after casting, as the workmen exercise care in extracting them from the sand. The flasks are 7 x 9 ft., inside measurement.

In assembling the drag is placed in a pit approximately 20 in. deep dug in the casting floor. The cores are then placed and anchored with chaplets. The cheek is then lowered into place and the cope set on, the whole being securely clamped down. The time consumed in making ready the flask for pouring is about three days. The flask is weighted down 14 or 15 tons just before pouring.

The patterns are made of 1½ in. white pine and require approximately 10,000 running feet of stock for a set of four patterns and the necessary core boxes. Those in use at Ansonia were made by the Hartford Pattern & Model Co., Hartford, the time consumed in this work being about two and one-half months. At the Fore River works, the upper half of the turbine castings are braced by seven 1¾ in. staybolts, and the lower half by one. In both instances the bolts are provided with inside as well as outside nuts to guard against internal and external collapse. The two castings are held together by 1¼ in. bolts.

Non-Ferrous Electric Furnace Built by Students

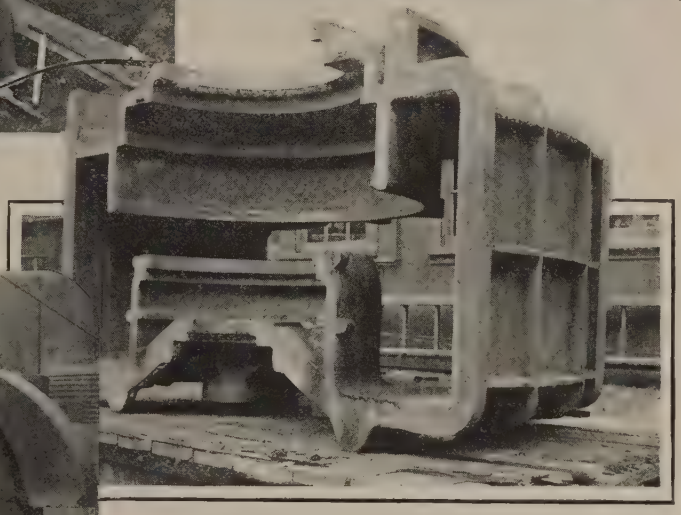
A 60-kw. electric brass melting furnace of 200 lb. capacity, designed, built and operated by students, has recently been installed in the chemical engineering laboratories of the College of Engineering, University of Wisconsin, at Madison. This is believed to be the smallest commercial furnace of this type in the United States, and the state university is the only institution of its kind which possesses such a unit.

The shell and driving mechanism were made in the university mechanicians' department; the fire sand was produced in an electric resistor furnace in the chemical engineering laboratories. The foundation and lining were built entirely by students. The actual cost was $350, compared with a market price of $1,000 for a commercially manufactured unit.

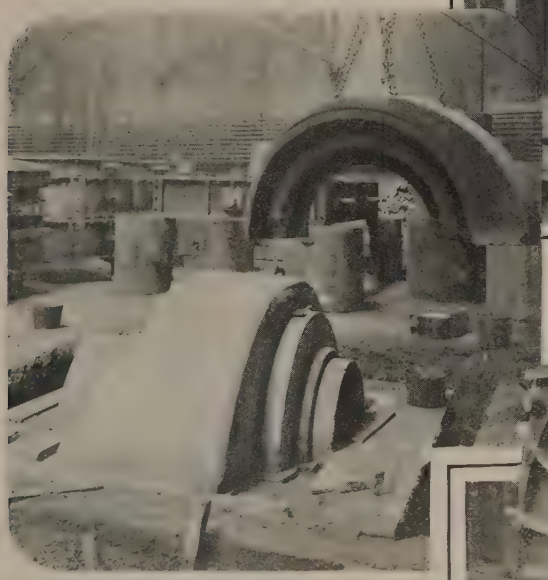
Upper Half of Turbine Cores, Covering Valve Chamber and Nozzle Core, Tied Back into Outside Casting Core

Below, Upper Half of Turbine Cores, with Main Core Eliminated, and Large Back Core, Suspended Preparatory to Lowering into Place. Setting this in position is a difficult operation on account of danger of breaking the steps on the core for the top space in which turbine blades operate

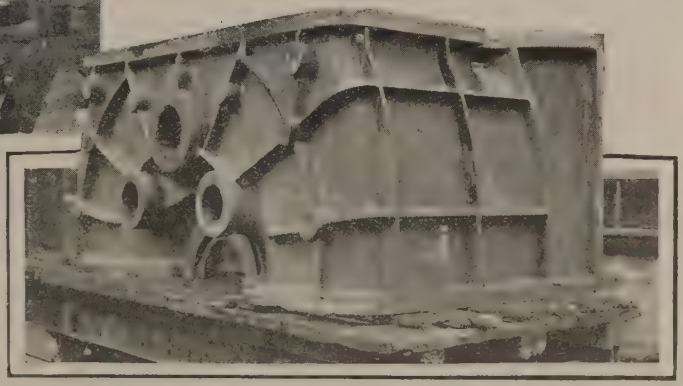
Below is the Lower Half of Turbine Casting with Main Core in Place. In the back core suspended in air are the steam ports



Interior View of Completed Casting



At Right Is Exterior View of Completed Casting



The furnace will melt copper, brass, bronze, zinc, tin and practically any non-ferrous alloy at a rate of 200 lb. per hr. and is of the rocking type. It is being operated several days a week throughout the summer session and handles a small volume of commercial alloy casting work for foundries in Madison which possess no such facilities.

The design and construction of the furnace was a development of the work of the chemical engineering laboratories at Wisconsin University, which are working on electric furnace processes in recognition of the need of conserving coal, oil and gas, and the greater efficiency obtainable from the electric furnace in comparison with fuel-fired types.

First Electric Steel Furnace for the Philippines

According to the American Chamber of Commerce *Journal*, Manila, P. I., the Atlantic, Gulf & Pacific Co. will have its electric steel furnace completed in the near future. It is the first installation of its kind in the Philippine Islands and will be used for manufacturing steel castings for cars for carrying cane sugar.

WHEELING OPERATIONS

Many Plants Still Idle—Resumption May Be Complicated by Union Labor Problem

WHEELING, W. VA., July 25.—Operations of the steel plants in this district remain at an extremely low notch and the promise is not very bright for an early revival. At the present time the activities of the Wheeling Steel Corporation are entirely centered at the Steubenville, Ohio, works of LaBelle Iron Works, where eight sheet mills, a jobbing mill and four open-hearth furnaces are in operation. The plant of the National Tube Co. at Benwood, W. Va., just outside this city, is entirely suspended and other plants of the Steel Corporation near here are down or running at a very low rate. As far as Wheeling proper is concerned, the issue is whether the plants will be operated on a closed or an open shop basis, and even with the receipt of orders it is doubtful whether some of the plants of the Wheeling Steel Corporation could be started without labor troubles.

It seems that before the formation of the Wheeling Steel Corporation two of the constituent companies, the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co., worked under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers, while the other subsidiary, LaBelle Iron Works, operated on an open shop basis. It is said that while the Wheeling Steel & Iron Co. and Whitaker-Glessner Co., as individual companies, were prepared to participate in the wage conference with the Amalgamated Association, and to renew the agreement, officials of the Amalgamated Association insisted upon the Wheeling Steel Corporation signing the agreement as a unit. This would have unionized the plants of LaBelle Iron Works without effort on the part of the Amalgamated Association and the result was an impasse. Neither the Whitaker-Glessner Co. nor the Wheeling Steel & Iron Co. was represented at the wage conferences, first at Atlantic City and later at Columbus, Ohio. Consequently these companies have not renewed their agreements with the Amalgamated Association.

Notices have been posted at the plants affected to the effect that the company hereafter will deal only with its own men. The notice also states that the scale of wages will be the same as that paid in mills operating under an agreement with the union. It can hardly be said that a strike exists for the reason that the Yorkville, Ohio, plant of the Wheeling Steel & Iron Co. and the several plants of the Whitaker-Glessner Co., which have been operating as union mills, all are down at the present time. No doubt a strike will be called by the union officials on the first attempt by the Wheeling Steel Corporation to start up at the affected plants. A test probably will not come for a few weeks at least, because current demands for sheets and tin plate are not especially large or urgent, and in anticipation of possible trouble, fairly large stocks were accumulated and these are likely to be ample to meet such demands as come out in the near future.

Plant Operations

The Remy electric division of the General Motors Corporation, at Anderson, Ind., has resumed operations with nearly 1000 employees.

The plant of the McGuire Car Works, Paris, Ill., idle since the close of the war, will be reopened, it is announced, a large order having been booked for cars for the Detroit municipal traction line.

The Clark Brothers' Bolt Co., Milldale, Conn., plant has resumed operations following a period devoted to inventory.

The Peck, Stow & Wilcox Co., Southington, Conn., tools, employing approximately 700 hands, has resumed operations after a shutdown of two weeks for inventory.

Operations have been resumed at the plant of the Velco Mfg. Co., Greenfield, Mass., broaching machines and broaches, after two weeks' shutdown. J. T. Sellar is general manager.

The Bristol Brass Co., Bristol, Conn., plant, closed for several weeks after running on short time for nearly a year, has resumed operations in several departments, with prospects of an increase in the near future to nearly normal capacity.

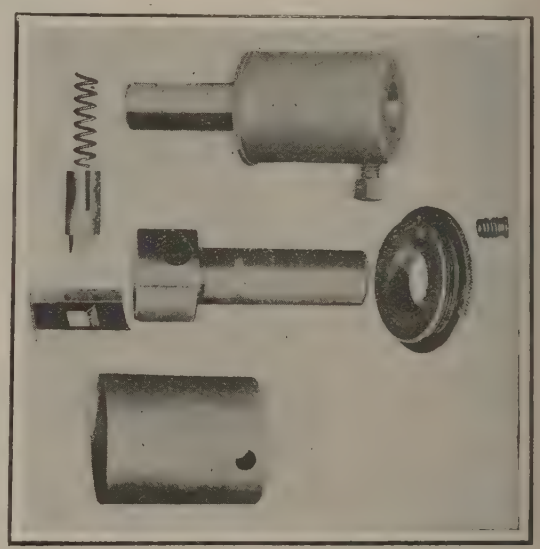
The Production Machinery Co., Greenfield, Mass., foundry, after a period of inactivity, has resumed operations with reduced forces, having secured considerable lawn mower castings business. Molders are receiving 40c. per hour for eight hours' work and extra compensation for overtime. This price compares with 90c. an hour in 1920-21. The company's machine shop remains closed.

Prospects for reopening important Greenfield, Mass., plants August 1, as anticipated July 1, when they closed, are not especially bright. It is estimated some 2000 are out of employment in that city, as against 700 during June. That the number is not larger is due to the fact that hundreds formerly employed in shops have secured work on New Hampshire, Vermont and Massachusetts farms and in cotton and woolen mills. On Jan. 1, 1920, Greenfield had a population of 15,462. The increase between that date and Jan. 1, 1921, according to unofficial estimates, has been lost and more too.

The Rowe Calk & Chain Co., Southington, Conn., following a shutdown of several weeks, has resumed operations on a 10-hour per day, six days per week schedule. The company has sufficient business on its books to keep the plant operating on this schedule for a period of three months.

New Clutch Tap and Die Holder

A new clutch tap and die holder exceedingly simple in design and containing only eight parts, but embracing all the features found in the company's old tool of this type, has been brought out by the Warner & Swasey Co., Cleveland. The new tool holds either



The New Warner & Swasey Holder May Take Either Right or Left Hand Taps or Dies

right or left hand dies or taps, making it two tools in one. To change from right to left a screwdriver is the only tool needed. After releasing one small tightening screw the change can be completed with the hands.

The difference in the tool when used for right and when used for left hand work is in the position of the pawl. To change from one to the other the pawl is turned half way around in its hole. A small pin holds the pawl in the position placed. When threading, the pawl holds the tool rigid by a metal to metal contact until the turret stop is reached, then the head moves forward on the work, pulling the cam over the pawl. This releases the head and allows it to revolve freely. The spring cushions the pawl so that the release is without a jar and practically noiseless.

Explosion Hazard and Its Prevention

Analysis of Characteristics of Fuels and Other Combustible Materials, with Special Reference to Powdered Coal Installations—Explosive Mixtures and How They Are Formed

BY JOSEPH F. SHADGEN*

VERY early the oil industries recognized the danger in connection with mixtures of vapors with air, and to-day all installations using combusible liquids are designed according to an accepted safety code, based on the same principles that guided the gas industry. All leaks are carefully avoided, and stop valves and automatic cut-off valves are provided to isolate lines, to separate units in case of danger. Under no circumstances are open tanks, permitting free vaporization, permissible. All pipes should be completely filled with liquid, and the formation of air pockets or dead holes should be impossible in the complete circuit of pipe lines.

Liquid fuel has been applied in a diversity of industries in connection with its production (refineries, etc.) as well as its uses (heating and combustion) for a period of time long enough to permit the development of the well-known requirements of the underwriters and insurance companies on the subject. Application of the lessons learned from accidents have served to reduce the risk. The fact that liquid combustibles are extensively used in internal-combustion motors, using the explosion of fuel-air mixtures, helped considerably to create an early understanding of the problems involved. In other words, the question was carefully studied for immediate utility and economy of use, which incidentally spread the realization of the dangers involved and called for methods of prevention.

Under this heading falls also the hazard in connection with sewers. Sewer pipes are built for a maximum flow, which seldom occurs, and therefore the lines are most of the time only partly filled with the soiled liquids to be disposed of. From the nature of the refuse waters. putrefaction may set in or vaporization may be produced, which both create dangerous air mixtures liable to oxidation. In case of ignition from any source, be it a glowing cigar stub dropping in through a manhole opening, a lightning spark or any other irony of fate, accidents may become inevitable under favoring circumstances. Such an accident occurred in New York in a sewer fed by the off-waters of a district where a large number of garages were located. The curative medicine will be quick removal of the air mixture, together with the water, to avoid accumulation in dangerous quantities, and the preventive medicine will be purification of the waters in the feed lines before reaching the main line, by syphons, separating or neutralizing the soiling oils that create the hazard.

Solid Explosive Mixtures

Dangers and risks in connecton with mixtures of air with finely divided solid materials of inflammable nature, or liable to oxidation, are not so obvious. Everyday familiarity with dust and the general ignorance concerning accidents create a sentiment of false safety that is the cause of general carelessness, or rather the ordinary underestimation of hazards really existing with fine dust and air mixtures. As knowledge and realization are the first steps to prevention, the Federal authorities have started an educational campaign to familiarize the industrial public with the hidden danger. After interest has been aroused, financial inertia will be overcome by the simple argument that all preventives are in the long run very profitable.

Most dust problems have also a hygienic side, as the majority of dusts are injurious to health. They are also very undesirable from the mechanical standpoint, as finely divided materials often are abrasive, and thus increase maintenance and lubricating costs. Elimination of all dust was first studied from these angles, as they were considered the main objections. They still remain the principal aims in installations dealing with dust or fine powders that cannot combine with the oxygen of the air.

In all other cases the explosive hazard has been pushed to the front, mainly on account of the enormous damage caused in case of conflagration. The annals of industries like coal mines, flour mills, sugar refineries, starch factories, relate scores of disasters due to explosions of dust mixtures. A kitchen-ware factory was recently the scene of a serious accident in its buffing department, where very fine aluminum dust exploded in an exhaust fan. Coal mines have always fought the dangers due to the fine coal dust, and the mining authorities of all countries have devoted an enormous amount of time and money to safeguard them. That pulverized fuel plants have to be designed to cope with these problems is obvious. Recurrences of such accidents must be made impossible by all means, in order not to compromise the future of this very efficient method of burning solid fuels.

In all industries producing impalpable powders the existence of dust and air-dust mixtures is inevitable. The contamination of the neighborhood by the dust should be minimized either by loose hoods over the machines or, better, by a completely tight design with no connection with the outside air. Even better is the solution when crushing, pulverizing, grading or mixing apparatus is installed to work under a slight vacuum, to render impossible all escaping and spreading of dust. Such machines are now on the market, and as they are superior from the safety standpoint, their use should be favored.

As pulverizing plants for the mechanical preparation of fuels have been largely standardized, as all operations are automatic and as all handling is done mechanically, preventive design is relatively simple. All elevators should be of inclosed type, all conveyors should be covered, all pulverizing mills of dust-tight design, mostly operating under vacuum. The only open machines used are the crushers, which really produce so little fine dust that they can hardly be called dangerous, although a hooded construction may be recommended.

Factors Governing Inflammability of Dusts

Before attacking the question of dust mixtures, it seems logical to study first the various characteristics of powders, and to analyze the factors governing their inflammability.

Of greatest importance is the fineness of the dust, for the simple reason that this fineness determines the surface of contact between material and air. Coarse material, furthermore, does not permit an intimate mixture, as the difference in specific gravity between solids and air produces a quick deposit. The fineness of a powder is characterized mostly by a sieve test, or what the author proposed to call a factor of fineness. Pulverized materials coarser than 60-mesh present no danger at all, but the fine particles passing the 100-mesh sieves do, and the impalpable powders, passing through the 200-mesh sieves, present so large a surface of contact as compared with their volume that the chemical affinities are hardly interfered with by the physical form of the material.

This leads to the natural conclusion that the finer the dust the greater the precaution needed. Practical experience confirms this rule every day. Crushing plants are not considered dangerous at all, while pul-

*Consulting engineer, New York. The article is concluded from page 130. Copyrighted, 1921, by Joseph F. Shadgen.

verizing or milling plants are rightly so considered, and equipped with all preventives to avoid dust-air mixtures.

The dryness of the powder is the second factor of importance, which is closely linked to the fineness. Moisture has to be excluded in some processes for the production of very fine materials to obtain economic conditions of production. Even a small amount of water produces coagulation of the dust to larger volumes by reason of adhesive surface tensions between material and liquid. These moist balls hinder the screening operations and reduce the capacity of production by dry-milling machines, and naturally reduce the relative surface of contact between material and air. Hence in all wet processes dust presents no dangers; only in installations dealing with dry and impalpable powders does the possibility of quick reactions exist.

The third factor governing the inflammability of a finely pulverized dry material is its nature itself. Some materials are easily combustible, others are hard to burn, and this relative eagerness to combine with oxygen influences the possibility of trouble. In other words, the intensity of the chemical affinity of the material for oxygen is a decisive factor. An expression of this force may be the heat generated per molecule-gram, as given in Table 1. This shows aluminum oxidation to be the most intense, with phosphorus a close second, and the various hydrocarbons near the top of the list. An aluminum explosion will be extremely destructive because of the great heat generated, and sugar, flours or starches, being mostly made up of hydrocarbon combinations, will create disasters.

Nowhere has the writer found this reasoning applied for gaging the inflammabilities of solid materials. It applies to coals, in particular to finely pulverized coals. As coals are heterogeneous solids containing, besides carbon, hydrocarbons of various composition and impurities of mineral nature, their reactions of combustion are the composite oxidation formulas of the different ingredients. It has been found in laboratory tests that finely divided dry coals and high volatile coals are more liable to explode than low volatile.

L. D. Tracy's report of December, 1919, of the Bureau of Mines, brings out this point very clearly, as the following quotation proves: "From experiments made with the Fraser apparatus it was believed that the division point between inflammability and non-inflammability would be found in dust containing between 10 and 15 per cent volatile matter." In other words, finely pulverized anthracite containing less than 12 per cent volatiles are inexplosive. This may not be absolutely true, as other factors interfere, and the Bureau of Mines would render the industries a real service by making a series of tests under comparable conditions, with varying factors of fineness, with a series of coals from various fields of origin and of typical analysis.

Dealing With Coal Dust Mixtures

Having determined the inflammability of the material itself, and the factors influencing the intensity of the reactions, the mixtures of those powders with air must be studied, and the method of propagation of the flame within those mixtures. The practical value of exact knowledge on this subject cannot be denied, especially on account of its influence on the safety of underground coal mines. The trap-like conditions in mines, with only one or two connections with the outside world, make it imperative to protect the worker by all means, and to reduce all hazards to an absolute minimum. Numerous accidents drew the attention of the authorities of all nations to this vital problem, which resulted in the experimental stations in Lievin, France; in Frameries, Belgium; in Altoft, England; in Babitz, Austria; in Gneisenau, Germany, and in Pittsburgh, Pa.

Valuable investigations on all phases of the problem were made by the best minds of each country. Most of the results were obtained in large galleries, where the explosion was started by the ignition of a small capsule of dynamite that stirred up the coal powder lying in shelves and produced the dust-air mixture. The original ignition was propagated or died out according to the circumstances. The results may be summarized for the purpose of this study as follows:

1. Very small quantities of coal dust will form an inflammable mixture.

2. The coal dust has to be well mixed with the air so as to float or to produce a cloud. This expresses the uniformity of mixture that characterizes all mixtures, as seen above. For mixtures of solids with air, the difference in specific gravity requires a certain agitation to obtain that effect. Practically, air currents of all natures, or previous explosions, produce that agitation. If the mixture is quiet, the coal dust separates by gravity in the form of a deposit and becomes harmless, the surface of contact between coal and air being reduced to such an extent that no quick reaction can take place. If the velocity of the air currents carrying dust is smaller than 1 meter (39⅜ in.) per second, the flame is extinguished, while currents above 4 meters (13 ft.) per second move the dust too rapidly to permit continuity of ignition.

3. The source of ignition has a great bearing on the inflammability of the mixtures. The higher the temperature of the igniting medium, the easier the mixture will respond. If the start is accompanied by a concussion, producing whirls, eddies or currents, the inflammability is greatly increased and the danger is multiplied many fold. For instance, a mixture of finely pulverized sugar with air propagated the combustion, with an arc lamp at a density of 72 grams per cubic meter, with a kerosene lamp at 180 grams per cubic meter and with an electric spark at 370 grams per cubic meter. (Respectively, 0.072, 0.18 and 0.37 ounce per cu. ft.) The ignition temperature of the sugar has previously been determined to be about 425 deg. Cent. (about 800 deg. Fahr.). This example shows the great influence of the nature of the ignition starting the phenomena. Our knowledge on this phase of the problem is still very fractional, but laboratory tests and investigations duplicating practical conditions are being made, and it is to be hoped that results will soon be available.

4. The cloud density or ratio of coal to air is most important. If the cloud contains too much coal, the presence of the solid checks the flame, and too much air kills the propagation for lack of combustible. In other words, there are an upper and a lower limit of inflammability for each solid material mixture, just as for gas mixtures. This varies with the nature of the coals. For anthracites with 15 per cent volatiles it has been found that 1 lb. of coal dust to 120 cu. ft. of air is the higher limit, and 1 lb. of coal dust to 220 cu. ft. is lowest limit; while for bituminous coals containing 30 per cent volatiles, 1 lb. to 60 cu. ft. of air is the highest limit and 1 lb. to 400 cu. ft. of air the lowest limit. These data must be considered as purely indicative, influenced by volatile matter content, dryness and fineness. For comparison it may be assumed that each coal requires 150 cu. ft. of air per pound for theoretical combustion.

5. The propagation of the flame takes place at slow velocities that vary with the cloud concentration. These velocities never exceed 1 meter (39⅜ in.) per sec., no matter how correct the agitation and uniformity of mixtures are. Mallard and Le Chatelier consider the propagation of the flame to be a complex function of the temperature of combustion, the temperature of ignition and the distillation of volatile matters contained in the dust. This last factor means the case of gasification of the hydrocarbons, which adds more or less to the mixture and creates most important side effects. The observed flames are mostly lazy, and contrast distinctly with the vivid aspects of the same phenomena in connection with gas mixtures.

6. Presence of foreign matter accelerates or retards the propagation of the flame, according to its nature. Water and mineral dust work against the phenomena, and porous surfaces and the presence of gases increase the original intensity.

7. Higher temperature of the mixture influences very favorably the oxidation effect, and considerably increases the liability to inflammation.

(*Continued on page* 239)

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Lower Freight Rates and Lower Steel

Few will dispute the justice in the demand of the railroads that they be allowed the benefit of the advanced freight rates and the reduced wage scales for a period long enough for putting their houses in order. The plea of the railroads that when the time comes for a rate reduction it should not be a horizontal or flat reduction is also reasonable and that opinion we have expressed heretofore. But some of the propaganda the railroads are putting out on the subject of freight rates is not likely to help their case. Whether in the publications issued directly by the railroads or in statements of their executives or otherwise, it must be said that there is altogether too much effort to show that the present rates mean only a few cents on a pair of shoes, a barrel of flour, a suit of clothes or a dozen lemons, while reference is carefully avoided to such commodities as iron, steel, coal and coke, on which freights are now so high as to be an obstacle to recovery from the depression.

Producers of iron and steel are losing money on every ton of material sold to-day. They feel that they owe something to their workmen, and in some cases they are able to get business at prices entailing less loss than would come from a complete shutdown. But there is a freight charge of $10 in assembling the materials for a ton of pig iron, and in some producing sections it runs higher. With pig iron selling at from $18 to $20 at furnace for the more common grades, there is left only $8 to $10 to cover the primary costs of the materials, depreciation, labor and all other expenses. It does not make any difference that many blast furnaces are idle to-day and that not much iron is being produced; for the ore that is being used and that will be used during most of the remainder of this year is "loaded" with present freight rates and such fuel and limestone as are being used or are on the furnace yards are loaded in the same way.

Labor costs and market prices have been reduced steadily in iron and steel in the effort to get the market down to levels which will stimulate demand. But it is unfair that labor and capital in this industry should stand the whole burden of the deflation. Freight rates should bear part of it. Such a reduction would help appreciably in bringing steel and iron prices down to levels where more business would be done. The railroads would benefit in buying steel at lower prices and would profit also by the increased traffic that lower steel prices would produce.

There should be no overdoing of the poverty plea of the railroads as a means of delaying needed reductions of rates on coarse freight. They have profited by the weeding out of unnecessary workers. The latest statements of earnings give encouraging proof of this. Higher man efficiency has worked savings of greater significance in many instances than those due to the wage reductions of July 1. Railroad executives have not been disposed to gainsay the claim of many shippers, made when the 40 per cent advance in rates became effective, that to raise freights on mineral and other bulk traffic by that amount was a serious injustice. With so much at stake, early consideration should be given to righting that injustice.

During the war, particularly in 1916 and 1917, the world's supply of zinc came almost entirely from the United States. The American zinc industry then enjoyed a prosperity unequaled in its history and unsurpassed in any other country. While the present depression in that industry is due to a large extent to the inactivity in galvanized sheets and brass products, the decline in foreign demand is no small factor. An examination of export statistics shows, however, that foreign demand for zinc in recent months has been heavier than before the war. In 1913 exports of American zinc were 15,365,324 lb., but for the eleven months ended with May of this year they were 39,831,883 lb. This is over two and one-half times the 1913 rate, though only a fraction of the 1917 total, 403,919,783 lb., representing the peak of the war demand. Great Britain has been the chief purchaser since the war, with France and Japan ranking next, but German competition is now being felt and American exports in May fell to 135,365 lb., of which 112,000 lb. went to Japan. The paralysis of British industry had stopped pur-

chases from that quarter. Undoubtedly the domestic zinc industry will revive with any improvement in business, but it is hardly likely that foreign demand will equal that before the war, with the revived German and Belgian zinc industries as competitors. England is already buying from those countries, having imported 18,913 tons from Germany and 5800 tons from Belgium in the first half of this year and only 274 tons from the United States.

Steel Mills in the Running

With a steel demand in the past few weeks equal to not more than one-fourth of the productive capacity, it is a notable thing that nearly all steel mills stay in the running. A few plants have closed for indefinite periods, but they are the smaller ones in all cases, such as have closed in past years when the decline in demand was much less extensive. The mills that have made no steel at all in the past 30 days probably do not represent more than about 10 per cent of the total capacity at the outside.

Obviously mills are not staying in business in expectation of making profits at this time. Production is at very high cost when the rates of output are so low, counting as cost simply the items of expense that would be eliminated by a complete closing. The overhead expense which would have to be stood in any event is of course a large item. The steel makers, however, have exhibited quite a different spirit from that shown in some other lines of industry in the past six months, where manufacturers have quit production, apparently piqued because they could not secure profits to which they had come to believe they were entitled.

To the steel industry as a whole, considered simply as a going concern, it no doubt would be advantageous if some mills withdrew altogether. The others would have a larger operation and could produce more cheaply. The large steel mills, however, show no disposition to make contributions of this sort. They wish to retain or build up clientele, and wish to give their employees such work as can be provided for them.

While the disposition of steel mills to stay in the running is conspicuous, there is seen another outstanding feature when comparison is made with the spirit that actuated manufacturers in many lines a quarter century or so ago. Those were the days when "destructive competition" or attempts at destructive competition were not uncommon. Some manufacturers then had the notion that if there was not enough business to go around a solution was to reduce the number of competitors. It was a short-sighted policy, and that is one reason why it was abandoned. It was possible in some cases to destroy a competitor, as a solvent corporation, but that did not destroy the plant. The promoter might come along, raise a little working capital among the townspeople by promising that there would be payrolls, and set up competition that had no regard for actual cost, and belonged to the general class known familiarly then as "bankrupt competition." In these more enlightened days there is no likelihood of there being "destructive competition" in steel or any other important commodity.

The steel industry is not making profits these days, but the average producing company is probably losing less than it would lose if it stopped entirely and met its fixed expenses by drafts upon surplus, and the probability is that this will be continued. As time passes the period is being approached, whenever it really is to come, that will see a materially heavier operation, and meanwhile costs are being reduced. At the farthest the time will be short compared with the preceding period of large earnings and each mill is disposed to continue actively in business until that time arrives.

Prosperity and Prices

In the past few months frequent references have been made by speakers and writers to the clash between the older and newer generation of business men in the past few years on various subjects of policy, arising from the divergence in training. While there have been numerous fluctuations, the general trend of prices was downward from 1865 to 1896, and upward from 1896 to 1920. Naturally men who had their business training in the one period would clash with those who had their experience largely in the other period.

The older generation had seen that it was a bad thing to mortgage a property or issue bonds. As values declined the obligation became a heavier and heavier burden. The newer generation found that the simplest way to make money was to borrow money and buy a property, payment proving easy if good judgment had been used in the purchase and the subsequent development. In the 1896 political campaign much was heard of "bloated bondholders" who were thought to be getting more than they really ought to get. In 1920 the bondholder was pitied, like the college professor, and promises were made that the cost of living would be reduced.

The tables had been turned. A vital question to-day for forward-looking business men is whether the tables have been turned again. Prosperity is not connected directly with either rising prices or falling prices, but for the individual is determined by the relation between income and outgo. The older generation was filled with the idea that producing at lower and lower cost resulted in prosperity, the newer generation that selling at higher and higher prices results in prosperity. Neither was right, of course. Profits can be made both when the general trend of prices and values is downward and when that general trend is upward. The individual should first decide which way the general trend is likely to be, and then adopt a system of conducting his business that will suit the expected trend.

While prosperity and an advancing market are associated in the average mind, one can scarcely avoid confessing that, viewed in the abstract, falling values furnish in the long run an incentive to men to work hard and efficiently. The years in the eighteen-nineties, following the Baring failure, brought declining prices for iron and steel. They

were also years of new and marked economies in the making of pig iron and steel. It is true, of course, that the fear of declining prices causes buying to be postponed and influences men to defer the inception of construction projects, just as the expectation of higher prices influences them to place orders and make contracts. It is to be noted, however, that it is not the higher prices but the expectation of the higher prices that induces men to buy or contract. This is an important difference and one that has been overlooked by those who noticed before the war that more construction work occurred when prices were at their higher levels than when they were at their lower levels, but did not ascertain that many of the contracts covering the construction had been made long before, in a period of low prices.

Many of the older generation of manufacturers and merchants found that money could be made even when the general tendency of prices was downward. Employment is the great essential. Once the amount of unemployment begins to decrease, the spending power is increased and that results in more employment. When falling prices are not causing an increase in unemployment they are not doing much harm. In the present movement they may have done their worst in that respect already.

The world-wide slump in demand for steel is clearly reflected in the American and British export data for May, the latest figures. British steel exports in that month fell to 99,000 gross tons, or about one-third of what they were in May, 1920, and only 24 per cent of the May movement in 1913. In the case of the United States, the May steel exports were only 104,000 tons or about 50 per cent of the 1913 rate and only 25 per cent of the 1920 exports. Taking the combined exports of these two countries as representative of present world demand, the May total of 203,000 tons compares with a monthly average of 684,500 tons in 1920 and of 655,100 tons in 1913. This is a falling off of over 66 per cent in either case. It is worth noting also that the combined exports of the two countries in 1913 and 1920 were about the same, with the exception that of the total the share of the United States in 1920 was about 60 per cent, whereas in 1913 Great Britain's proportion was about 62 per cent. At present the exports of the two countries are on about the same level. What this relation will be in the coming months depends on many conditions too uncertain to forecast.

German Competition in Japan

WASHINGTON, July 26.—German makers now are bidding on contracts for machines, tools, etc., in Japan, at prices from 30 to 50 per cent cheaper than American quotations, according to a report received by the Bureau of Foreign and Domestic Commerce. While the consumer has to agree to pay any export tax levied by the Allies, it is stated that, even if such a tax is as high as 25 per cent, prices of German materials will be less than for similar articles of American manufacture. This being the case, it is declared that to hold the market in Japan or to extend it, price reductions by American manufacturers will be necessary.

CORRESPONDENCE

The British Coal Strike Settlement and Domestic Labor Problems

To the Editor: The struggle between the British public and its Government on the one hand and the miners on the other in the attempt of the latter to effect nationalization of the coal industry has been watched by the writer, keeping in mind that though separated by thousands of miles this country had a lively interest in the outcome.

The *Coal Trade Bulletin* states that in the settlement the miners have gained a profit-sharing plan by which 83 per cent of all money earned after all charges have been paid is to be given to the worker and 17 per cent to the owner. While the fight for nationalization was lost, the miners can afford to discount that almost 100 per cent, as they secured the further concession of a subsidy of £10,000,000 to tide them over the low-wage period. This in itself is a great step toward socialization.

Of course, the leaders of the United Mine Workers of America have followed closely this controversy and will consider its outcome as altogether satisfactory. They no doubt feel that their stand against any reduction in wages, when that question again comes up for adjustment, will be greatly strengthened in that any terms will be acceptable to the owners in preference to combating an effort to nationalize our mines.

One daily paper remarks: "Should profit sharing solve the British coal mining problem enormous impetus will be given the movement generally." But it will not. Even if the miners had succeeded in imposing nationalization on the British public the problem would not have been solved. There are two reasons for arriving at this conclusion.

Whenever any class is persuaded that it is not getting all that is coming to it invariably the pendulum swings to the other extreme and, no matter what is conceded, it believes that something is held back or there is still more to be desired. This was illustrated in this country in connection with the Adamson law. If any of your readers had an opportunity to converse with individual members of the Big Four, how many were found that were satisfied with what they got?

The other reason is one which the leaders themselves failed to foresee, or if they did we must assume their advocacy of nationalization to have been dictated from motives of expediency if not solely a threat. If the industry were nationalized and there were no longer any owners against whom the leaders could direct that spirit of unrest and discontent which they have fostered, the attention of the workers would be focused upon these same leaders with unpleasant results. Their position eventually would become untenable because no condition which they succeeded in creating for the worker, whether it be nationalization or on the line of the present agreement, could secure uninterruptedly the benefits which have been so readily promised.

In view of the still insecure foothold which the doctrines of confiscation of private property and wage subsidizing have in this country, it is exceedingly doubtful that the United Mine Workers of America will do any more than threaten to make either an issue at present. Before the British plan can be used as a real argument on this side of the water we shall have observed its failure as a solution of Britain's coal mining problems or other labor troubles.

H. D. MURPHY.

Medford Hillside, Mass., July 19, 1921.

The cold-drawn department of Ellwood Works, National Tube Co., Ellwood City, Pa., has been awarded the prize for ranking first among the 139 plants of the Steel Corporation in safety work. This department has not had a lost-time accident in the past 20 months.

FOREIGN RAILROADS BUY

Chile, China, Morocco and Soviet Russia Active —Bolivian Projects—Belgian Iron Imported

NEW YORK, July 26.—While Japan and the Far East continue to improve from the standpoint of taking exports, the lower prices prevailing in Continental countries, although they exclude selling of American products, are enabling those exporters that have turned to importing under present conditions, to put down European material at American ports at sufficiently low prices to interest consumers here. The tendency in transactions of this kind is to deal entirely in dollars in order to avoid possible losses through the fluctuation of exchange. Despite the continued decline of pig iron in the three principal producing countries on the Continent, prices put down at ports on the Atlantic coast are still too high for even limited business, but with the high freight rates from Eastern furnaces to the Pacific coast, exporters in New York, who have taken over the representation of Belgian and German furnaces are finding it possible to deliver Belgian foundry iron, c.i.f. Pacific port, as low as $26 per ton. Little competition from this iron appears possible in the East, however, as the lowest quotation at present is in the neighborhood of $24 per ton, c.i.f. New York. One sale of 150 tons of Scotch iron from a Belgian furnace is reported to a California consumer.

Although stocks of canceled material at South American ports are still large and exchange rates generally show a decline, inquiries and orders from South American markets show a marked increase over conditions of a few months ago. Exporters with connections in Porto Rico report a fairly active demand for sheets and bars from this source. But orders are generally small and include a wide range of sizes, evidently being purchased for stock. An old 1000-ton inquiry for 35-lb. rails issued by a large sugar centrale at Manila has been revived and new quotations requested.

Chile in Market for Annual Rail Purchase

Foreign railroad buying continues to lead in export activity. An inquiry is in the hands of the New York office of the Chilean State Railways, 141 Broadway, calling for 12,000 tons of 90 to 100-lb. rails, switches, bolts, fish plates, crossings, frogs, etc. for 5-ft. gage track. This is the annual requirement of the railroads and will be closed about the end of August. Previous rail purchases made by the Chilean railroads have been placed either in the United States or with British mills.

The contract received by the Ulen Contracting Corporation, 120 Broadway, New York, from the Bolivian Government, reported in THE IRON AGE, July 21, calls for the construction of 128 miles of railroad from Atoche to Villazon. This will be a connecting link in trans-continental railroad construction that will give a complete coast to coast railroad of one gage. To finance this project the Bolivian Government is preparing the issue of $7,000,000 worth of 8 per cent bonds, backed by the entire equipment and income of the Bolivian railroads, with interest guaranteed by revenues from mineral taxation. These bonds will be underwritten by the Ulen Contracting Corporation and floated in the United States. Fred C. Lavis, construction engineer, and Paul C. Campbell, chief engineer of the company, will sail about Aug. 1 for surveys and location of the railroad, on which actual work is expected to begin about Jan. 1. The Ulen company is now finishing a contract for water supply and sewage systems at La Paz, Bolivia.

Rail Tenders from Morocco

It is reported from China that the Robert Dollar Co. has been awarded a contract by the Pekin-Suiyan Railroad for 17,000 tons of 85-lb. rails at a price said to be $38 per ton, f.o.b. New York. The tenders on a large tonnage of 85-lb. rails for the Pekin-Mukden Railroad will be closed this week. In addition to other rail inquiries in the market from foreign sources, the American Consulate-General at Tangier, Morocco, reports that American companies have been invited to submit proposals on 3000 metric tons of 36-kg. (about 72½-lb. per yd.) rails and 8000 pairs of fishplates for the Tangier-Fez railroad. Bids will be opened Aug. 20 by the Commission Generale des Adjudications et des Marches, Tangiers. Blueprints and specifications are in possession of the Bureau of Foreign and Domestic Commerce, Custom House, New York. They call for 5200 rails of 12 meters, 455 rails of 11.97 meters, 900 of 11.94 meters, 160 of 6 meters, 210 of 8 meters, and 210 of 10 meters. Delivery is to be made within 80 days at the port of Kanitra.

A $2,000,000 order for oil tank cars has been received by the Canadian Car & Foundry Co., Ltd., Montreal, from the Russian Soviet Government. The contract, which was obtained by the president of the company, W. W. Butler, while in Berlin in competition with European bidders, calls for 500 tank cars.

Chinese Buy American Copper

A number of orders for electrolytic and casting copper have recently been placed and are still pending from Chinese sources. One exporter, now shipping about 30 tons of casting copper to a Chinese consumer, is bidding on about 330 tons of electrolytic, 180 tons of casting and an additional 220 tons of casting copper for China. American sales of copper to the Orient have been rendered possible through the decline of the domestic copper market to a point where it is possible to bid on a basis as low as 12.50c. per lb. Japanese stocks purchased with copper 100 per cent higher and Australian copper are both unable to compete with the American trade at current prices.

Germany as a Competitor

Following a protracted visit in Germany, Fred Kling, chief mechanical engineer of the Carnegie Steel Co. in the Youngstown district, predicts that Germany is not likely to be a serious competitor of the American iron and steel industry in foreign markets for a number of years.

Mr. Kling points out that Germany lost 30 per cent of her steel making capacity by the terms of the peace treaty and 10 per cent of her population. "Her own reconstruction and the intensive industrial program being mapped out in addition to the relatively larger population to steel capacity, will leave no great tonnage for export—possibly 1,000,000 tons per year against 5,000,000 tons before the war," he states. "Furthermore, it is unlikely that the former German steel plants in French hands will be so efficiently managed for a period of several years at least. When world affairs become normal, there will be plenty of need for American iron and steel."

The Iron Age and Its Readers

Occasionally a reader asks why we do not publish the table of contents on the front cover, as do some other papers. The reason can be made perfectly clear. So much of THE IRON AGE is made up of articles in which the news factor is important, while many of the market pages consist of telegraphed matter which is not in the office until several days after the front cover has been completely printed, that any table of contents printed on the cover would necessarily be incomplete. It could not possibly include the last-minute information, nor could it take account of the fact that frequently, because of the compelling importance of some of this late news, articles which had been scheduled for the issue have to be left out at the last moment, which fact would make a contents page on the cover of no value.

For many months it has been the practice to print, on the upper right corner of the cover, the number of the inside page on which the table of contents would be found. This has proved of great help to those using it.

Year's Iron and Steel Exports About Normal

Heavy Exports in First Eight Months Offset by Later Reductions—Machinery Increases—Imports Fall Off About Half

WASHINGTON, July 26.—Figures of the Bureau of Foreign and Domestic Commerce for June, 1921, completing the fiscal year 1921, reflect an interesting study of imports of iron and steel and exports of iron and steel and machinery, showing that the imports made a large drop, while the exports of iron and steel showed a slight decline and exports of machinery registered a large increase as compared with the fiscal year ending with June, 1920.

Imports of iron and steel for the fiscal year just closed totaled 239,871 gross tons, valued at $44,236,077, as against 489,803 gross tons, valued at $37,423,289, for the corresponding period of last year. Exports of iron and steel for the present year totaled 4,168,619 gross tons, valued at $1,027,976,000, as compared with 4,212,732 gross tons, valued at $932,550,863. Machinery exports for the fiscal year 1921 totaled $441,497,245, as against $397,330,191.

Declines were shown in both imports and exports for June, when compared with May. Imports aggregated only 8,929 gross tons, valued at $2,539,926, as compared with 23,498 tons, valued at $3,144,643, in May. Exports of iron and steel for June amounted to 119,081 tons, valued at $39.975,035, as compared with 142,551 tons, valued at $41,365,886, for May. The imports of June, 1921, compare with 40,554 tons for June of last year, and were valued at $5,268,126, the values in all instances taking into account the entire total rather than merely those included in the tables herewith presented, and figures are given in accordance with revisions by the bureau.

Exports for June, compared with 402,707 tons for the same month of last year, which were valued at $88,787,349, give a clear idea of the decline since one year ago. Exports of machinery for June, $22,044,833, compare with a value of $36,493,736 for the same month of last year, and also show plainly the decrease made. Manganese ore imports for June totaled 17,169 tons, valued at $80,602, as compared with 54,663 tons for May, and for the 12 months totaled 682,770 tons, valued at $10,199,612, as compared with 323,901 tons, valued at $8,086,001, for the fiscal year ending with June, 1920. The sharpest decrease in exports in June was reflected in steel plates, the figure being 7,781 tons, as compared with 18,518 tons in May.

Distribution of some of the principal products, for the fiscal year 1921, was in gross tons in part as follows: Wire nails, 14,023 to Japan; 8,855 to United Kingdom; 8,742 to China; 6,689 to Dutch East Indies; 6,211 to Cuba; 1,744 to Canada; cast pipe, 22,202 to Mexico and 20,003 to Cuba; welded pipe, 154,884 to Mexico; 40,407 to British India; 30,650 to Japan; 25,753 to Dutch East Indies and 20,069 to Peru; steel rails, 79,430 to Dominican Republic; 60,302 to Japan; 56,320 to Dutch East Indies; 49,580 to Chile; 40,186 to China and 24,177 to Brazil; galvanized sheets and plates, 26,019 to Canada; 8,833 to Cuba and 7,610 to Argentina; plates, 183,860 to Canada; 137,718 to United Kingdom; 77,987 to Japan; 52,541 to the Netherlands; 50,940 to France and 45,180 to Italy; sheets, 57,741 to

Imports of Iron and Steel

	Gross Tons			
	June		Year Ending June 30	
	1920	1921	1920	1921
Ferromanganese	5,694	265	38,973	43,197
Ferrosilicon	1,497	520	16,855	7,361
Pig iron	11,036	3,688	126,264	51,757
Scrap	12,106	1,372	202,062	82,657
Bar iron	363	33	3,080	3,815
Structural steel	212	72	1,234	1,394
Billets, without alloys	779	245	68,758	995
All other billets	2,191	51	5,414	3,216
Steel rails	5,876	2,585	23,804	37,583
Sheets and plates	177	48	1,418	2,781
Tin and terne plates	27	26	377	503
Wire rods	596	24	1,564	4,612
Total	40,554	8,929	489.803	239,871
Manganese ore and oxide	80,329	17,169	323,901	682,770

Exports of Iron and Steel

	Gross Tons			
	June		Year Ending June 30	
	1920	1921	1920	1921
Ferromanganese	275	...	2,374	3,335
Ferrosilicon	31	52	398	577
Pig iron	16,799	1,637	245.354	125,629
Scrap	24,153	3,587	81,464	182.478
Bar iron	3,268	326	36,530	38,752
Wire rods	15,134	492	111,823	61,567
Steel bars	53.559	3,009	583,418	468,995
Billets, ingots, blooms	29 811	1,106	288,766	82,549
Bolts and nuts	3,061	1,175	34,910	37,613
Hoops and bands	3,488	1,302	45,188	38,405
Horseshoes	250	32	2,567	1,505
Cut nails	212	29	4,002	3,462
Wire nails	7,808	951	55,681	67,017
All other nails, including tacks	1 663	197	9,745	9,626
Cast pipe and fittings	3,764	4,076	46,415	54,183
Welded pipe and fittings	17,654	25,813	221,064	439,762
Radiators and cast house boilers	338	261	6,745	4.943
Railroad spikes	1.631	699	17,190	14,219
Steel rails	49,620	20,308	553,860	549,558
Galvanized sheets and plates	10,454	2,942	99.313	93.155
All other sheets and plates	3,049	948	33,354	22,722
Steel plates	61.555	7,781	721,828	761,022
Steel sheets	15,383	10,296	151,324	155.841
Ship plates, punched and shaped	1,112	1,951	26,926	32,089
Structural steel	34.669	18,058	339,908	526,482
Tin and terne plates	18,604	2,727	207,296	178.299
Barb wire	8.109	1.757	118 878	86 936
All other wire	17,253	2,569	166,411	167.898
Total	402,707	119,081	4,212,732	4,168.619

Exports, January, 1919, to June, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360.456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46.016
July	287,823	38,373	21.318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333.601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402.707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7 042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142 551*	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549

*Revised figure.

Machinery Exports

	June 1920	June 1921	Year Ending June 30, 1920	1921
Adding machines	$ 523,962	$ 239,846	$ 4,325,104	$ 5,978,541
Air-compressing machinery	407,016	292,807	4,371,107	5,675,504
Brewers' machinery	44,274	4,542	334,028	454,099
Cash registers	413,560	165,654	5,551,993	3,805,661
Parts of	74,561	37,613	402,821	407,985
Concrete mixers	55,462	41,102	516,949	1,024,026
Cotton gins	37,651	3,947	302,266	283,726
Cream separators	127,841	32,778	1,133,068	801,851
Elevators and elevator machinery	140,136	188,935	1,976,279	2,024,254
Electric locomotives	.....	252,771	1,464,157	825,753
Gas engines, stationary	50,876	65,173	803,151	643,544
Gasoline engines	2,965,458	699,901	33,190,177	23,526,568
Kerosene engines	1,026,138	7,222	8,543,699	6,235,530
Steam engines	4,509,466	4,336,935	46,381,621	50,265,517
All other engines	337,687	143,329	3,387,579	3,898,616
Boilers	315,853	209,263	6,358,175	8,893,878
Boiler tubes	477,373	165,386	4,459,253	6,614,227
All other parts of engines	1,783,935	713,807	21,763,421	20,363,872
Excavating machinery	158,792	124,573	1,441,857	2,756,581
Milling machinery, flour and grist	117,965	58,198	1,639,948	2,238,374
Laundry machinery	73,950	56,477	1,105,118	1,139,309
All other	77,778	18,956	519,917	827,933
Lawn mowers	34,566	29,710	376,603	584,696
Lathes	846,583	131,140	8,915,519	5,375,690
Other machine tools	1,127,297	267,344	12,950,721	10,060,505
Sharpening and grinding machines	395,903	60,499	4,371,978	2,576,498
All other metal-working machinery	1,134,940	1,029,230	22,790,373	16,427,727
Meters, gas and water	57,149	73,302	743,214	805,432
Mining machinery, oil well	419,235	1,234,392	4,195,119	12,007,423
All other	376,508	471,489	8,243,034	9,613,392
Paper mill machinery	185,449	108,908	2,686,274	3,562,585
Printing presses	700,111	357,004	6,283,729	10,383,632
Pumps and pumping machinery	1,130,687	827,624	10,617,940	16,804,050
Refrigerating and ice making machinery	245,045	102,631	2,422,789	3,390,763
Road making machinery	150,952	81,447	1,207,000	1,182,183
Sewing machines	1,188,709	483,820	14,617,065	11,280,128
Shoe machinery	160,067	110,675	2,628,857	2,302,105
Sugar mill machinery	1,010,080	1,596,972	1,547,518	29,108,909
Textile machinery	2,395,800	1,045,095	12,378,115	13,513,228
Typesetting machines	297,022	166,136	3,875,947	4,536,013
Typewriting machines	2,478,623	723,797	23,012,903	18,867,513
Windmills	145,228	84,265	1,419,758	2,762,657
Wood working machinery, saw mill	78,218	54,941	922,838	1,392,454
All other	254,520	110,653	3,319,529	3,835,711
All other machinery and parts of	7,969,719	4,965,949	79,981,888	99,356,649
Total	$36,493,736	$22,044,833	$397,330,191	$441,497,245

Canada; 39,152 to Japan and 13,108 to Argentina; structural steel, 116,159 to Canada; 78,037 to Japan; 59,232 to British India and 50,661 to Cuba; tin plate, 44,107 to Canada; 25,004 to Japan; 13,436 to Brazil and 12,052 to China; barbed wire, 18,537 to Brazil; 13,283 to Argentina and 12,283 to Canada; other wire, 47,842 to Argentina; 24,708 to Canada and 21,156 to Australia.

Meeting Cleveland District, Pig Iron Association

Sentiments that the pig iron market may be at the bottom and that buying may be expected to gradually increase were voiced July 21 at a meeting of the Cleveland District of the American Pig Iron Association, held at the Youngstown Country Club, Youngstown, Ohio. T. W. Friend of Pittsburgh, president of the association presided. John A. Penton, Cleveland, related impressions of his recent trip to Europe.

The inability of Joseph G. Butler, Jr., chairman of the board of directors, founder and for many years president of the organization, to attend was the occasion of many expressions of regret.

Will Handle U. S. Shipping Board Claims

WASHINGTON, July 26.—Unliquidated claims to the amount of $211,000,000 will be handled by the United States Shipping Board Claims Commission whose appointment was announced last Friday by Chairman Lasker of the Board. The chairman of the commission is Judge Walter D. Meals, former associate justice of the Appellate Court of Ohio. The associate members are President Homer Ferguson of the Newport News Shipbuilding & Dry Dock Co.; F. W. Wood, former president of the Maryland Steel Co.; Captain Richard W. Watt, construction corps, United States navy and Arthur W. Teele of the accountant firm of Patterson, Teele & Dennis.

The Truscon Steel Co., Youngstown, Ohio, is erecting a large warehouse in Chicago. Cranes and electrical equipment are now being installed under supervision of G. A. Hughes, electrical engineer.

Tin-Plate and Terne-Plate Manufacture

WASHINGTON, July 25.—A preliminary statement of the 1920 census of manufactures with reference to the tin-plate and terne-plate industry has been issued by the Census Bureau. The bulk of the tin and terne-plate product is made by establishments that roll the black plates, and in most cases the report for the rolling mill carries the general statistics for the dipping department. Only in cases where the dipping plant is separate and distinct from the rolling mill, or the black plates were purchased, was the establishment included in the classified industry, though at previous censuses full segregated reports were made and the dipping departments were included in the classified industry.

Present figures are based upon returns from 43 establishments with products valued at $181,789,200. This includes 23 establishments constituting the classified industry, with products amounting to $97,398,700; 17 dipping departments of rolling mills, with $82,920,700; and 3 establishments primarily engaged in other lines of manufacture, but making tin and terne-plate products to the value of $1,469,800. The foregoing includes 8 retinning establishments with products valued at $143,700, chiefly custom work. At the census of 1914 there were 31 establishments in the classified industry, with products valued at $68,343,000 and 1 establishment making some terne-plate as a subsidiary product, for which figures could not be published.

The increase in value of products, 1914 to 1919, was $113,446,200, or 166 per cent. The production of tinplate in 1919 was 2,388,867,000 lb., valued at $165,846,100, as compared with 1,901,332,000 lb., valued at $60,258,100, in 1914, an increase of 25.6 per cent in quantity, and in unit value from 3.17c. per lb. to 6.94c. This was chiefly coke plate, the production of charcoal tinplate in 1919 being but 36,550,000 lb., 19.5 per cent less than in 1914; the comparative unit values being 4c. in 1914 and 8.4c. in 1919. The output of terne-plates was 124,920,376 lb., and 50,860,455 lb. of long ternes, a total of 175,780,800 lb., valued at $11,351,462, a quantity increase of 15 per cent, and in unit values from 3.94 to 6.46c. per lb.

There were used 2,655,481,000 pounds of black plates, all of domestic origin, of which only 1.6 per cent was purchased; 43,897,000 pounds of pig tin, an increase of 20 per cent with respect to 1914; 870,800 pounds of pig lead, a decrease of 62 per cent and 7,687,400 pounds of purchased terne mixture, an increase of 16 per cent. The increases in unit values were, for black plates, 1.9c. to 3.8c.; pig tin, from 39c. to 58c.; pig lead, 4.14c. to 6.3c.; and terne mixture, from 11.8c. to 19.8c.

Tin Plate and Terne Plate

	1919 Quantity, Thousands of Pounds	1919 Value	1914 Quantity, Thousands of Pounds	1914 Value
Total products	.....	$181,789,200	.....	$68 343 000
Tin plate	2.388,867	165,846,100	1,901,332	60,258,100
Coke	2,352,317	162,762,100	1,855,893	58,450,900
Charcoal	36,550	3,084,000	45,439	1,807,200
Terne plate	124,920	8,296,600	152,624	6.012,300
Other sheets (long ternes)	50,860	3,054,900		
Plates redipped and amount received for custom work	.....	177,800	.....	2,072 600
All other products, including tin dross, scruff, scrap, etc.	.....	4,413,800		
Principal Material		Cost		Cost
Black plates or sheets, steel	2,655,481	$100,444,300	2,107,788	$39,803,600
Produced by the establishment reporting	2,612,635	99,123,900	2,084,537	39.335,100
Purchased (all domestic)	42,846	1,320,400	23,250	468,500
Coating metals	52,455	27,124,000	45,430	15,044.800
As purchased:				
Pig tin	43,897	25,545,700	36,543	14,167,200
Pig lead	871	55,100	2,269	94.000
Terne mix	7,687	1,523,200	6,618	783,500
Metal totals:				
Tin	45,659	.....	38,050	.....
Lead	6,796	.....	7,381	.....

Hartford, Conn., structural iron workers have agreed to a reduction from $1.06¼ to $1 per hour, effective at once, following a conference of representatives of employers and employees.

Senate Committee Begins Tariff Hearings

Plans to Expedite Passage of Fordney Bill—Strong Protests Against Duties on Ferromanganese and Manganese Ore—Details of Changes Made by House

BY L. W. MOFFETT

Washington, July 26,
THE IRON AGE BUREAU,
816 Fifteenth Street.

BECAUSE of its desire to report the tariff bill to the Senate and to act on it as quickly as possible, the Committee on Finance expects to devote only two weeks to hearings, which were begun yesterday with the American valuation proviso as carried in the House measure taken up first. Opponents and proponents of this basis of assessing duties will be given until Thursday to present their views. So that duplication may be avoided, the committee proposes that persons desiring to submit their views regarding the same item agree upon one representative and it is planned to devote less than a day to each schedule, hearings on which will be held according to their order in the bill. Many protests against items and provisions throughout the bill already have been received. The duties on ferroalloys and on certain ores, such as manganese, and tungsten are the object of protests before the Finance Committee and it is assumed representatives in favor of and against these duties will appear before the committee. Independent steel manufacturers are strongly opposed to the House duties on manganese ore and ferromanganese and are expected to protest. There is also considerable opposition by steel makers against the duties of ¾c. per lb. on grain magnesite and ½c. per lb. on crude or ground magnesite, left unchanged from the way they were reported to the House.

Proposed Duty on Magnesite

Supporters of the proposed duty on magnesite state that it was originally intended in passing the Underwood bill to put crude magnesite on the free list and have a tariff of 10 per cent on magnesite brick, but a decision put grain magnesite on the free list. Grain magnesite is the prepared calcined material which reduces one-half in burning from the crude material, and magnesite brick are merely formed from this material and re-burnt. So all material came over in this form and no duty has been paid under the Underwood law. The manufacturers contend that the Fordney bill straightens this matter out, as it provides a duty on calcined grain magnesite, so that some revenue can be obtained from this material by the Government and protection can be given the manufacturers who developed material in this country during the war. It is further stated that all of the crude material for magnesite in this country is in Washington or California, and that the tariff asked for on the Fordney bill does not cover the difference in freight from California and Washington to the steel producing districts in Pennsylvania, which is now about $24 per net ton against the present freight rate from abroad of 30 shillings, or about $7.50 per net ton. Therefore, it is asserted, the American manufacturers are asking only for a protection against the difference in freight rate.

The opposition to the duties on fluorspar has been increased as the result of the adoption of an amendment offered by Chairman Fordney of the Ways and Means Committee, which fixes the duty on a net ton basis instead of the gross ton basis, usually recognized in importations, but which was not specifically mentioned in the paragraph as originally drafted. The duties proposed are $5 per net ton, immediately effective, and $4 per net ton after one year following passage of the act.

The bill passed the House last Thursday by a vote of 289 to 127, seven Democrats voting for and seven Republicans voting against it. As stated in THE IRON AGE of last week, changes made in the metal schedule were only of a comparatively minor character. In addition to those published, two others were made, the latter being acted upon during the last day the House had the bill before it when it resolved itself into the Committee of the Whole House on the State of the Union. One of these changes affected the zinc ore paragraph, 390, and increased duties as follows: 10 per cent or more zinc and less than 20 per cent, from ¼c. to ½c. per lb.; 20 per cent or more zinc and less than 25 per cent, from ½c. to 1c. per lb., and 25 per cent or more zinc from 1c. to 1½c. per lb. These higher duties were originally carried in second proviso of the paragraph, which were to apply to the zinc ores for two years beginning on the day following passage of the act, the proviso being struck out. The effect of the change is to make the higher rates permanent. The other change made and not previously noted increased the duty on quicksilver from 7c. to 35c. per lb. This was done on the strength of a letter from Secretary of War Weeks, who pointed out that mercury is necessary to the manufacture of munitions and that the domestic industry, now depressed, partly because of importations, should be encouraged.

Debate on Ferroalloys

The most spirited debate in the House in connection with the metal schedule related to duties on ores for making ferroalloys and on ferroalloys, Representative Wingo, Democrat, of Arkansas attacking especially the duties on manganese ore and ferromanganese, while others also criticised them.

Representative Wingo assailed an amendment made by Representative Tilson, in charge of the metal schedule, adding the words "manganese or silicon" to the alloy steel paragraph 305 providing an additional duty of 15 per cent when the alloying material is in excess of 1 per cent manganese or silicon. Representative Wingo stated that the schedule carried a duty of 1c. per pound on manganese ore or concentrates on the manganese content when in excess of 30 per cent and asked Mr. Tilson if it were the intention to put the same rate on the crude manganese ore as applied to the concentrate. Mr. Tilson said the amendment related only to the metallic content and that if it is a concentrate there is a greater metallic manganese content.

"As a matter of fact, if you put it on the ore which contains a certain metallic content—that is, on a percentage basis—would not the tariff on that be a great deal higher?" inquired Mr. Wingo.

"Well, the freight rate would be more on the leaner ore," replied Mr. Tilson. "The concentrate, of course, would have less weight to pay freight upon than the ore; but the duty is upon the metallic content."

"No, it is on either the manganese ore or concentrate with the metallic content in excess," said Mr. Wingo. "In other words, you might have more than 30 per cent or 31 per cent of metallic ore and yet you might have a concentrate that had an arbitrary figure of 60 per cent. Would not there be a difference?"

"Not at all, because it is only upon the metallic content that the duty is laid," Mr. Tilson contended.

Mr. Burton Receives Protests

Representative Burton, Republican, of Ohio, said that he had received strong protests against duties on ferrosilicon and manganese ores. He said he did not

think these exist in commercial quantities in the United States sufficient to afford more than a bare minimum of supply and consequently was compelled to enter dissent in regard to these duties.

"Again, a very important invention, designated as alpax, has recently been made as a substitute for aluminum, for which ferrosilicon, 95 per cent and more of silicon, is the essential raw material," said Mr. Burton. "I understand that silicon, 95 per cent pure, cannot be obtained in this country. That duty, which, I believe, is 8c. per lb., is sure to be a serious handicap in the manufacture of this new metal, which is a substitute—I do not say it is exactly a substitute—for aluminum. At least it is a very similar metal."

Representative Green, Republican, of Iowa, a member of the Committee on Ways and Means, said the committee would consider a brief of protest if it were presented, stating that the matter of using ferrosilicon for the new substitute had not come before the committee. Representative Burton replied that he had written a letter to the chairman of the committee.

Mr. Burton also said he had received a letter from a maker of high speed tools for which tungsten is a requisite, saying that the tungsten duty amounts to about 300 per cent and might place the maker referred to out of competition in the markets of the world. Representative Cooper, Republican, of Ohio, said he had received similar protests from Ohio steel makers. Representative Timberlake, Republican, of Colorado, a member of the metal subcommittee, attempted to support the rate by saying the cost to consumers would amount to not more than 3c. per ton of steel, and Chairman Fordney made a similar reply. Representative Wingo interrupted to say, humorouly, "I know enough about it to know that when you seek to defend it (the duty) by suggesting that the tax will amount to only a few cents on a ton of steel you might as well say that a tax on feathers would be a tax on angel wings."

Increases of the molybdenum and tungsten content to more than 1½ per cent in paragraph 305 in order to get additional duties of $1.25 and 72c. per lb., respectively, were explained by Mr. Tilson. Like most other amendments, the change was recommended by the Tariff Commission and was made, Mr. Tilson said, because it was found that a number of steels contain a minute fraction above 1 per cent of the alloys affected and that the amount of computation and calculation necessary to ascertain the additional duty would be great. By raising the content to 1½ per cent, it was stated, customs officials are relieved of much labor.

Details of the Changes

A telegram from Washington, published on page 153 of THE IRON AGE of July 21, gave the important news of the passage of the metal schedule of the Fordney tariff bill by the House of Representatives and indicated in brief the changes which had been made since the bill was introduced. More explicitly these changes are stated as follows, so that those who wish to do so can compare the amended sections with the sections as found in the bill as introduced in the House and published in THE IRON AGE of July 7:

In paragraph 301, after the word spiegeleisen the words "containing more than 1 per cent of carbon" are inserted, and spiegeleisen is defined for the purpose of this act as an iron-manganese alloy containing less than 45 per cent of manganese.

In paragraph 302 ferromanganese is defined as such iron-manganese alloys as contain 45 per cent or more of manganese and the words "and spiegeleisen" are inserted after "ferromanganese" in line 16, so that ferromanganese and spiegeleisen when containing not more than 1 per cent of carbon take a duty of 2 1/5c. per pound of manganese content plus an ad valorem rate of 28 per cent. The change is not particularly significant and was made at the suggestion of the Tariff Commission. There is only one concern in the United States making spiegeleisen containing 1 per cent or less of carbon and the material, made in extremely limited quantities, and selling at 80c. per lb., is used by the chemical industry as a compound.

In paragraph 304 "tapered or beveled" bars are omitted as is also the word "mill" before shafting. The Tariff Commission suggested the first words omitted added nothing to the word "bars," and that the word "mill" before shafting limited the meaning of the word "shafting," the intention of the framers of the schedule being to include all shafting.

In paragraph 305, the required content of molybdenum in order to get the additional duty of $1.25 per lb. was changed from 1 to 1½ per cent and a similar change was made in regard to tungsten content before application can be made of the additional duty of 72c. per lb. The amended provisos read as follows: "That manganese and silicon shall not be considered as alloying material unless present in steel in excess of 1 per cent manganese or silicon; Provided further, That an additional cumulative duty of $1.25 per lb. on the molybdenum content in excess of 1½ per cent, and 72c. per lb. on tungsten content in excess of 1½ per cent shall be levied, collected and paid on any articles containing molybdenum and tungsten."

In paragraph 316 (wire), a change was made so as to include wire made of "iron, steel and other metal" instead of "iron or steel," coated by dipping, galvanizing, sherardizing, electrolytic and any other process with zinc, tin or other metal, the duty being 2/10 of 1c. per lb. in addition to the rate imposed on the wire of which it is made. The revision was explained by Representative Tilson on the ground that copper, brass and other wire was struck from paragraph 378, taking rates ranging from 1½c. to 4c. per lb.

In wire paragraph 317 words "except gold, silver, or platinum" struck out because articles of this description whose value consists chiefly of these metals are covered in paragraph 393.

In paragraph 350, relating to pins, an amendment makes the paragraph read as follows: "Pins with solid heads, without ornamentation, including hair, safety, hat, bonnet, and shawl pins; and brass, copper, iron or steel or other base metal pins with heads of glass, paste or fusible enamel; all the foregoing not plated with gold or silver, and not commonly known as jewelry, 28 per cent ad valorem."

In paragraph 354 relating to penknives, pocket knives, etc., amendment is made so that blades, handles or other parts of knives or erasers shall be dutiable at not less than the rates imposed upon knives and erasers valued at more than 50c. and not exceedingly $1.25 per dozen; that is, 5c. each and 30 per cent ad valorem.

In paragraph 377 amendment made so as to include nickel silver with German silver, unmanufactured, the rate being unchanged at 20 per cent ad valorem.

In paragraph 378 by omitting the words relating to "wire not coated or covered," copper wire and copper-clad wire coated with tin, brass wire and bronze wire, these wire products become automatically covered by the basket clause, (paragraph 393) which assesses ad valorem duties of 45 and 35 per cent, as compared with specific duties ranging from 1½c. to 12c. per lb., originally contained in paragraph 378.

In paragraph 383 relating to quicksilver duty was increased from 7c. to 35c. per lb. as a result of letter to committee on Ways and Means from Secretary of War Weeks stating that importations of mercury, essential to manufacture of munitions, had depressed domestic mining which it was urged should be encouraged as a matter of national defense.

In paragraph 390, relating to zinc-bearing ores, words "including calamine" struck out with explanation that "calamine" is a zinc-bearing ore and therefore need not be specifically mentioned; and duties on 10 per cent or more of zinc and less than 20 per cent increased from ¼c. to ½c. per lb. zinc content; on 20 per cent or more zinc and less than 25 per cent increased from ½c. to 1c. per lb. on zinc content and on 25 per cent or more increased from 1c. to 1½c. per lb. on zinc content. The entire proviso of this paragraph which contained the increased rates mentioned was struck out so that higher rates become permanent instead of obtaining for two years after the passage of the act.

Causes of Wastes in Metal Trades

Management of Operations and of Men Blamed for Largest Share—Cost Placed at Nearly One Billion Dollars

IDLE men and machinery are causing an annual loss of nearly $1,000,000,000 a year in the metal trades industry, says a report issued by the Committee on Elimination of Waste in Industry of the American Engineering Council. This estimate covers the value of labor only, and does not include the value of materials that would be utilized if the productivity of labor were increased. The value of increased possible production in the United States even in normal time would, it is estimated, be over $500,000,000.

The metal trades findings are a part of the general report made by the committee on its national assay of industrial waste, directed by L. W. Wallace as vice-chairman. The metal trades investigation was in charge of Fred J. Miller and William B. Ferguson. The report presents the views of managing executives in 32 of the plants visited. Being asked their opinion as to the main cause of waste or inefficiency, their answers were as follows:

Eight plants referred particularly to present business conditions, and cited the most important cause as the uneven volume of business, or the fluctuation in the demand for the product; lack of enough business to keep going at normal capacity. In four plants the cause given concerned the railroad situation and the functioning of the Railroad Adjustment Board. In three plants the cause given was lack of standardization of design of products. In two plants the cause given was labor turnover and strikes, one executive saying that these had been caused by war-time conditions.

In four plants the cause given was lack of planning —the exact words used being "lack of proper planning and routing"; "lack of correct planning and material control," "unscientific planning and management," and "lack of efficient planning and management methods." In six plants the cause given was lack of co-operation between management and labor. Other causes given in various plants follow:

Lack of intensive study of methods; cost control systems needed; daily cost reports needed; lack of scientific management applied to all phases of the business; inefficiency of labor; excessive overhead.

In other plants special causes in the machine tool business were given, including failure of machine tool builders to supply what the public wants. Most of the metal trades shops are very small, and require personal handling by the manager of such important problems as are handled elsewhere by systems of production control. Insufficient capital is available to develop sales and to improve facilities. Purchasing in small quantities, by the small plants places them at a disadvantage as to favorable prices and as to transportation and handling expense.

General Business Conditions Responsible for Waste

The major cause of waste or non-production in the metal trades industry at present is the unemployment of available labor and equipment, due to general business conditions which affect all other industries, the report says, adding:

The United States Bureau of Labor Statistics reports on a survey of 1423 firms in the metal trades industry, employing 1,643,253 men, that the decreases in the number on the payroll from February, 1920, to February, 1921, were 24.2 per cent in the iron and steel industry, 42.3 per cent in the automobile industry, and 16.6 per cent in the car building and repairing industry*. The Employers' Association of Detroit reported March 10, that 79 shops were employing 67,137 hands, compared to 198,705 employed April 7, 1920. In Philadelphia, out of 150,000 hands employed in the metal trades in July, 1920, about 30,000 were out of work March 1, 1921.

Present industrial conditions in the United States and abroad affect the metal trades very seriously, and the industry as a whole is operating at only about 60 per cent of normal output. Manufacturers can undoubtedly hasten a return to normal conditions by producing goods as economically as possible, so as to make selling prices low enough to attract buyers.

Management Held Responsible for Most of Waste

There are nearly 2,000,000 people engaged in the establishments of the metal trades industry, and an enormous increase in total production is possible. It is estimated that at present about 80 per cent of the responsibility for waste, or non-production, rests with management; i. e. with the managers and executives in the plants.

The estimated waste in fifteen representative plants selected by the committee averages 28 per cent for them all, and ranges from 8 per cent waste for the best plant to 56 per cent for the worst. The size of the plant, whether large, medium or small, does not necessarily affect its efficiency, as some large plants as well as some small ones have a large waste factor.

The metal trades, says the report, constitute the largest manufacturing industry in the United States, in the number of employees engaged and in the value of products. The industry is pretty much concentrated east of the Mississippi River, in the New England States, the Middle Atlantic States and in the Middle West. Pennsylvania and Ohio lead in the industry; then follow New York, Illinois, Massachusetts, Connecticut and New Jersey. The metal-making branch of the industry is not included in this survey—that is, the branch which produces what are usually known as "raw materials," plates, shapes, wire, pipe, etc.

Proper Relations Between Management and Labor Needed

A comprehensive study and survey was made of fifteen representative plants, of various sizes and types, distributed through the states which lead in the industry. In addition to these detailed surveys, a number of other plants were studied, and general information obtained through the co-operation of various metal trades associations.

The major causes of waste or non-production, applicable to normal times as well as to the present abnormal times, are attributed to instability of labor employment and to inefficient management. Most of the plants surveyed gave very little thought to the instability of labor employment.

Proper relationship between management and labor, such as exist in the most productive plants investigated, is more than ever a controlling factor. The plants with the highest labor turnover (which reflects discontent) are in general the most wasteful of human effort; hence secure the smallest production per man-hour. It is found further that, generally, the best relationship exists, and the best understanding and least friction prevail, in plants where the most thorough and scientific study of organization methods and standards have been made by the management in co-operation with the workers.

Careful planning of work, providing and moving materials by means of effective and recognized methods of material control; comparison of output of departments and of individuals with fair standards of performance, fairly and scientifically determined; these are the practices of those concerns which have been most free from labor unrest, and where greatest

*These figures were given on page 719, THE IRON AGE, March 17. Later figures of similar import have since been published, as they became available.

mutual confidence and co-operation exist between employer and employed.

Provision by the management of proper facilities and conveniences for developing the latent productivity of the workers, and provision of fair incentives for those who "make good," play a large part in eliminating waste in the best establishments. It is shown by experience of the plants visited, as well as by general experience, that considerable improvement can be brought about by means of modern employment methods, which provide, among other features, for a close study of "why men quit."

Heavy Cost of Labor Turnover Stressed

Dealing with the cost of labor turnover, the report says:

The average labor turnover for the year 1920, for the plants covered by these studies (wherever records were kept, which was the case in less than half of the plants), was 160 per cent, the percentage given in most cases being the ratio between the number of "separations" and the average number on the payroll. The highest turnover was 366 per cent.

There is a practical minimum to the labor turnover in a shop or factory, which cannot be excelled in special cases. There are separations that are unavoidable, due to deaths, marriages, etc., for which 60 per cent may be allowed, which still leaves an avoidable or preventable turnover of (say) 100 per cent annually. This of course can be eliminated only by a most thorough understanding and co-operation of all concerned: management, labor and the public.

In this industry, then, with its 2,000,000 employees, with the average plant virtually renewing its entire working force, or filling each position, every 8 months, we have 2,000,000 unnecessary separations, the equivalent of 2,000,000 workers annually leaving and rehired somewhere else, and at what cost? Expert estimates of the cost of labor turnover vary from $50 to $250 per employee hired, trained and separated. An average figure of only $50 each, applied to 2,000,000 employees turned-over, means an average waste of $100,000,000, due to avoidable labor turnover, in this one industry.

Instability of labor employment resulting from strikes and lockouts has not been as serious in the metal trades industry as in some others, with the exception of the shipbuilding branch of this industry.

Co-operation and Frank Conferences Urged

Open interchange of ideas and business results by managements, both in the particular industry and in other industries, should lead to a higher level of methods, service and general business ethics. If carried on through definite channels, such interchange might easily result in a combined study of the possibilities of the future, and the avoidance in the years to come, of such conditions as we are now facing. It is evident that management of labor must be elevated to a higher plane. Because labor is the major factor in most if not all industries, it should be led by recognized intelligence, rather than by radical agitators on the one hand or by stupid reactionaries on the other.

Remarkable and very favorable results have been secured in labor relations and in improvement of efficiency, simply by establishing frank and open conferences and free interchange of opinions, usually in genuine open shops (shops in which no prejudice or discrimination is allowed to exist either for or against men who do or do not belong to labor organizations); and sometimes by collective bargaining and dealing with a shop committee, to which is delegated all responsibility for keeping the men to agreements fairly made between management and employees.

Standardization of Design Called For

The great variety of designs called for by those who buy street cars, locomotives, trucks and other transportation equipment, is well known to be capable of beneficial limitation if all manufacturers and users could, through some agency, get together and by scientific study of the problems, not only from a utility or service standpoint, but from a manufacturing standpoint as well, reduce as much as possible the enormous number of varieties, styles, and types now required to be built. Many of these varieties are largely a matter of personal opinion or judgment of the buyers, who have not had opportunity to study the subject in all its phases. A great deal can be done toward standardizing the designs of these products, and thus promoting the best interests of all concerned.

The report cites numerous examples of waste elimination through improved management methods. Regardless of the industry or of the method by which it is conducted, human nature is always to be dealt with, if the highest success is to be attained. The report emphasizes the necessity of adequate cost control methods. Successful plants have management systems, says the report, which concludes:

"It will take time to bring the entire industry up to the higher level. During that time some establishments will probably be eliminated by the competition of the more advanced; but in this direction lies the only hope of eliminating industrial wastes."

LOWER PRICES

Reductions on Silica Brick at Chicago and on Kentucky Fire Clay Brick

PITTSBURGH, July 25.—There is no improvement in the demand for refractories and in the lack of any appreciable increase in blast furnace and steel plant activities, not much hope is entertained of early betterment. The monthly charts of the Refractories Manufacturers' Association giving production, shipments, unfilled orders and stocks on hand of fire clay and silica brick note a moderate increase in production, a decrease in shipments and a consequent gain in the stocks on hand as of June 30. Unfilled orders for fire clay brick at the end of June were practically the same as those at the end of May, or slightly in excess of 45,000,000 brick. Unfilled orders for silica brick declined rather heavily in June, the bookings as of June 30 amounting to somewhat in excess of 15,000,000 brick as compared with about 18,000,000 one month before. The figures for July are not expected to show any change in the drift.

Although business lately has been extremely quiet, it is evident that some inquiries are coming out for we note lower prices on silica brick in the Chicago district and also on Kentucky fire clay brick, and it is doubtful whether these reductions would have been made unless there were inquiries. Chicago silica brick now is quotable at $38 to $43 per 1000, f.o.b. works, a drop of $2 to $4 per 1000 from the former quotations. The decline in Kentucky fire clay brick is a matter of about $3 per 1000. Other quotations are unchanged but are purely nominal and probably would be shaded on the appearance of attractive orders. Plant operations, taking the country as a whole, are about 15 per cent of capacity.

We quote per 1000 f.o.b. works:

Fire Clay:	High Duty	Moderate Duty
Pennsylvania	$36.00 to $43.00	$30.00 to $36.00
Ohio	36.00 to 40.00	30.00 to 35.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	40.00 to 45.00	30.00 to 40.00
Missouri	45.00 to 50.00	35.00 to 40.00
Silica Brick:		
Pennsylvania		35.00 to 40.00
Chicago		38.00 to 43.00
Birmingham		46.00 to 50.00
Magnesite Brick:		
Standard size, per net ton		70.00 to 75.00
Chrome Brick:		
Standard size, per net ton		60.00 to 65.00

The W. R. Miller Co., designers and builders of metallurgical furnaces, Pittsburgh, has moved from the House Building to Boggs and Jasper streets, where it has erected its own office building. The company recently received patents on a new mechanical gas producer.

Iron and Steel Markets

PRICES GO LOWER

Sharp Declines in the Central West

Further Domestic and Export Inquiries from Railroads

Further settling of steel prices has come in the past week and in some products the downward movement has been rapid. Informal announcement of a 1.75c. price for steel bars and of 1.85c. for plates and structural shapes—a $3 per ton cut below the July 5 schedule—was made in the week by several independent producers, but already somewhat lower prices are reported, indicating more aggressive competition in practically all markets.

Some encouragement is found in the larger tonnage under inquiry, but it is well recognized that in such a market no approach to price stabilization is to be expected. Every producer is meeting competition as it develops.

That the Steel Corporation's earnings for the second quarter were better than most predictions is ascribed in part to its unique advantage in railroad ownership and the fact that for nearly all the second quarter Chicago business was done on the Pittsburgh base. Lake navigation and cement earnings were also a factor.

The Central West has developed the most marked price concessions of the week. In semi-finished steel the new level is about $3 per ton below what has been considered the market. Sheet bars have sold at $32, Pittsburgh, as against $35. A Cleveland inquiry for 2500 tons of slabs has brought out some low quotations. On rerolling billets $30, Pittsburgh, is now the market and $35 for forging billets, both down $3.

In sheets several late Ohio transactions indicate a third reduction of $5 per ton within five weeks, and at that the market is irregular. The basis on the larger sales is 3c. for No. 28 black, 2.25c. for No. 10 blue annealed, and 4c. for No. 28 galvanized. The Ford Motor Co. has been a buyer of high-grade blue annealed sheets for crank cases.

A Mt. Vernon, Ohio, inquiry for 6900 tons of bars, plates and shapes has brought out new low prices, about two-thirds of this tonnage being for the stadium at Columbus on which the accepted bid was $69.50 for the steel erected. On 1000 tons of hard bars for reinforcement work on the stadium the low price was 1.62c., Pittsburgh.

Prices on hoops, bands, hot rolled strip steel and light rails have weakened in line with heavier products.

Operations by Steel Corporation mills are running close to 30 per cent this week, an improvement over the previous July average.

There is new pressure from blast furnace and steel companies for lower freight rates. An early meeting between these interests and traffic officials of lines serving Pittsburgh and Valley districts will be held at Pittsburgh.

The expected opening of bids next week on the Bombay, India, pipe line, requiring more than 70,000 tons of plates is of moment to large steel and contracting interests in this country and Great Britain. The advantage in price rests with this country and this may yet outweigh British Government influence.

More optimistic sentiment in some parts of the country in respect to pig iron is due to insistence of buyers upon prompt delivery rather than to increased demand. At several important centers the downward trend of prices seems to be arrested, at least temporarily.

Railroad car repair work is gradually being arranged for. The New York Central has distributed orders among eight builders for 4000 cars and may double the amount. One late contract is for 500 car repairs for the Buffalo, Rochester & Pittsburgh. The tank work for the 500 tank cars reported taken from the Russian Soviet Government by the Canadian Car & Foundry Co. would probably be undertaken in the United States.

Railroad material inquiries continue to feature the international markets. In August 12,000 tons of rails are to be bid on for Chile and 3000 tons for Morocco. Some 12,000 tons will be bought for a new Bolivian railroad and 1000 tons of light rails are wanted in Manila. Germany is figuring on 8000 tons of heavy rails for Finland, and Switzerland is sounding the market.

A second reduction in wages at the Steel Corporation's Lake Superior iron mines is announced, effective Aug. 1. It amounts to 10 per cent, whereas the May 16 reduction was 20 per cent. The corporation will also curtail further its mining operations. At all Lake Superior mines the outlook for winter work has grown more unfavorable as pig iron production has declined.

Pittsburgh

PITTSBURGH, July 26.

Sentiment in iron and steel trades here is still inclined toward hopefulness, notwithstanding that the past week has seen further slashing of prices in practically all steel products. Independent steel companies quite generally have revised "official" quotations downward, and now are on a basis of from $3 to $5 per ton below the prices established in the first week of July. So far there has been no public announcement of a change by the Steel Corporation, but it is generally understood that this company is meeting the reduction of the independents. Price concessions have been more severe in sheets than in any other finished product, at least two mills having gone to 3c. on black sheets for production tonnage against an inquiry recently put out by a Pittsburgh fabricating interest. This compares with 3.50c., the nominal quotation of the American Sheet & Tin Plate Co., and 3.25c., the quotation regarded as "official" by a number of independent makers. A quotation of 3.75c. is reported to have been made to a Pittsburgh district consumer on galvanized sheets and this also is said to have been for production sheets as distinct from those out of stock. Little real stability is observed in the prices of any of the steel products, but apparently more business is developing as a result of the fact that buyers can come pretty near naming their own prices, and this seems to be the basis for feeling that the industry is rounding the corner from the recent intense dullness.

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	July 26, 1921	July 19, 1921	June 28, 1921	July 27, 1920
No. 2X, Philadelphia‡	*$21.35*	$21.85	$25.50	$49.15
No. 2, Valley furnace†	19.50	19.50	21.00	45.00
No. 2 Southern, Cin'ti†	24.50	24.50	26.00	45.60
No. 2, Birmingham, Ala.†	20.00	20.00	21.50	42.00
No. 2, foundry, Chicago*	18.50	18.50	20.00	46.00
Basic, del'd, eastern Pa.	21.25	21.25	23.50	44.40
Basic, Valley furnace	19.00	19.00	20.50	46.00
Bessemer, Pittsburgh	22.46	22.46	24.46	47.40
Malleable, Chicago*	18.50	18.50	20.00	46.50
Malleable, Valley	20.50	20.50	22.50	45.00
Gray forge, Pittsburgh	21.46	21.46	21.96	44.40
L. S. charcoal, Chicago	36.00	36.00	37.50	57.50
Ferromanganese, del'd	70.00	70.00	70.00	225.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	*30.00*	33.00	37.00	65.00
O.-h. billets, Pittsburgh	*30.00*	33.00	37.00	65.00
O.-h. sheet bars, P'gh	*32.00*	35.00	39.00	70.00
Forging billets, base, P'gh.	*35.00*	38.00	42.00	85.00
O.-h. billets, Phila.	*35.74*	38.74	42.74	69.10
Wire rods, Pittsburgh	42.00	42.00	48.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh.	*1.90*	2.00	2.20	3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.10	2.10	2.25	4.75
Iron bars, Chicago	*1.85*	1.90	2.15	3.75
Steel bars, Pittsburgh	*1.75*	1.80	2.00	3.50
Steel bars, New York	*2.13*	2.18	2.38	4.02
Tank plates, Pittsburgh	1.80	1.80	1.90	3.25
Tank plates, New York	2.18	2.18	2.28	3.77
Beams, etc., Pittsburgh	1.85	1.85	2.00	3.10
Beams, etc., New York	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh	2.50	2.50	2.50	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	July 26, 1921 Cents	July 19, 1921 Cents	June 28, 1921 Cents	July 27, 1920 Cents
Sheets, black, No. 28, P'gh.	*3.00*	3.25	3.75	7.50
Sheets, galv., No. 28, P'gh.	*4.00*	4.25	4.75	9.00
Sheets, blue an'l'd, 9 & 10.	*2.40*	2.50	2.85	6.00
Wire nails, Pittsburgh	2.75	2.75	3.00	4.00
Plain wire, P'gh	2.50	2.50	2.75	3.50
Barbed wire, galv., P'gh.	3.40	3.40	3.65	4.45
Tin plate, 100-lb. box, P'gh.	*$5.50*	$5.75	$6.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$12.50	$12.50	$13.25	$35.50
Carwheels, Philadelphia	16.00	16.00	18.00	40.00
Heavy steel scrap, P'gh	12.00	12.00	12.00	27.00
Heavy steel scrap, Phila.	11.00	11.00	11.00	23.00
Heavy steel scrap, Ch'go.	10.00	10.00	10.25	24.50
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	38.00
No. 1 cast, Ch'go (net ton)	*11.50*	12.50	12.50	36.00
No. 1 RR. wrot, Phila.	13.50	13.50	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	9.00	9.00	9.50	24.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$18.00
Foundry coke, prompt	4.00	4.00	4.25	19.00
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*12.50*	12.75	12.62½	19.00
Electrolytic copper, N. Y.	*12.25*	12.62½	12.62½	19.00
Zinc, St. Louis	4.25	4.25	4.25	7.85
Zinc, New York	4.75	4.75	4.75	8.20
Lead, St. Louis	4.35	4.35	4.15	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	*26.00*	27.00	29.00	48.50
Antimony (Asiatic), N. Y.	4.65	4.65	4.87½	7.25

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, July 26, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

July 19, 1921,	2.407c.
June 28, 1921,	2.607c.
July 27, 1920,	3.974c.
10-year pre-war average,	1.684c.

Some slight increase in plant activities is observed here and there. The Carnegie Steel Co. this week started up its Clairton, Pa., plant which had been idle for several weeks and the American Steel & Wire Co. has turned on the blast at one of its furnaces at Donora, Pa. The American Sheet & Tin Plate Co. this week started up its Guernsey works at Cambridge, Ohio, increased the number of active hot mills at Shenango works at New Castle, Pa., and is planning to start up its National works at Monessen, Pa., at an early date. While these increases are due to the fact that stocks have dwindled to a point where they need replenishing, they are important as showing that stocks in second hands are growing smaller and needs are increasing. It is probable that steel plant operations will continue irregular for a time because at the moment there is nothing to give buyers real confidence in prices and consequently they are likely to continue to take on supplies as they are needed. Such buying makes difficult the building up of rolling mill schedules. Outside of the Steel Corporation plants, where the rate remains 37c. an hour for common labor, the going rate in this and nearby districts is 30c. an hour. Structural interests view with some satisfaction the recent action of a bricklayers' union here in adopting a wage schedule cutting the rate from $12 to $10.40 per day. There is no scarcity of labor here at present; in fact, the contrary is the case and thousands of men are seeking work at practically any rate the employers will pay. It is noted that railroad labor now is the best paid of any class. Deflation of labor has been pretty drastic and in the iron and steel industry there is a fairly general belief that only the deflation of freight rates remains to complete the cycle.

The downward drift of pig iron prices seems to have been halted temporarily at least and some seem to believe that the market is dragging on bottom, and even with a drop in ore prices and in freight charges current prices are low enough. The coke market has been featured by the sale of 30,000 tons of furnace grade for a Buffalo consumer for August and September shipment at a price of $2.75 per net ton, Connellsville oven.

Ferroalloys.—Business shows no improvement and prices are quite as nominal and indefinite as they have been for several weeks. Ferromanganese is held by domestic producers at $75, delivered, for 80 per cent material and $72.50 for 76 to 78 alloy, but against one or two small inquiries selling agents were instructed not to let the business get away, if a cut of $3 or $4 a ton would get the order. There are no definite offers of English material much under $70, Atlantic seaboard, but the reports will not down that $65 and even $60 would be accepted on contracts. Spiegeleisen still is inactive and prices are holding only because production is nil and available stocks small. Inquiries are out for a few carloads of 50 per cent ferrosilicon against which $65, furnace, freight allowed, has been quoted by a couple of makers. Indications are that this business will be closed at less than that figure.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $67.50 to $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 to $28 furnace quoted by makers on direct business and $25 to $26 furnace on resale tonnages; 50 per cent ferrosilicon, $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces, as follows: 9 per cent, $41.50; 10 per cent, $45; 11 per cent, $48.50; 12 per cent, $51.60. Silvery iron, 6 per cent, $32; 7 per cent, $33.50; 8 per cent, $35.50; 9 per cent, $37.50; 10 per cent, $40; 11 per cent, $43.30; 12 per cent, $46.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Pig Iron.—The market again has lapsed back into dullness, sales having run entirely to lots of one to

two carloads, but there seems to be a more optimistic undercurrent in the trade, due possibly to the fact that the consumers of foundry iron have been pretty insistent on early delivery of their purchases. We make no change in our quotation on Valley iron this week. Possibly some further liquidation of furnace yard stock will bring even lower prices than now prevail, but it is noted that if buying has not increased lately, at least consumers are showing more interest in the market and have been asking whether purchases of supplies for the remainder of the year would not be safe at current levels. Selling prices are so far out of line with actual costs that it may be said safely that none of the idle merchant furnaces is likely to be blown in until there is either an appreciation in the price or a decline in costs. Lower prices for ore are being urged, but blast furnace interests generally regard freight charges as the obstacle to a reduction in producing charges. We note one sale of 150 tons of No. 2 foundry iron from a western Pennsylvania furnace at $19.50. The most recent business in basic iron was at a delivered price equivalent to about $17.75 at Valley furnaces, but the iron moved from a furnace having a low freight rate to the consuming point.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00
Bessemer	20.50
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.50

Billets, Sheet Bars and Slabs.—There has been some matching by independents of "official" quotations with those which have been privately quoted against such recent inquiries as have been up. The Steel Corporation as yet has made no change in its schedules, but is reported to be meeting lower quotations when provided with the right sort of evidence. The new prices average about $3 per ton below those named as of July 5. Sheet bars, which it is reported recently sold down to $32, now are being quoted at that price, and slabs are available at $31. A recent inquiry for a sizable tonnage of slabs brought a quotation of $31, but the business was not obtained, the report being that the price was $2 or $3 a ton above what the material could be had for.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—All makers still are quoting $42 for the base size of soft rods, but this price is finding almost no basis in sales. There is almost no stability to prices of rivets and bolts, and suggestions are common that on wire products the prices established the first week of July are being shaded. Inquiries for rods are altogether insufficient to provide a test of the price. Prices are given on page 233.

Plates.—The independent mill price has quite definitely settled to 1.85c. Pittsburgh, but this figure is looked upon as referring merely to small tonnages and would be shaded on sizable lots. Indeed, 1.75c., Pittsburgh, recently was quoted against an inquiry for 1200 tons of tank plates. Railroad equipment companies in this district are getting very little business, even in repair work, but hopes are strong that the Government financing of the railroads will be productive of purchases. Most of the companies are carrying fairly large stocks of steel and railroad buying might not instantly bring plate orders.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Structural Material.—Fabricating interests in this district have not been successful bidders against any of the important structural projects recently placed. The largest of these was the new stadium for the Ohio State University which involves about 4100 tons of steel and went to the Mt. Vernon Bridge & Iron Co., Mt. Vernon, Ohio. This job is said to have been let at $70 per ton, fabricated and delivered. Plain material prices are weaker in that independents now are publicly quoting a base of 1.85c. for plates and structural shapes. This base is observed fairly well against small lot inquiries, but on sizable tonnages some mills have given protection at a lower figure. Plain material prices are given on page 233.

Iron and Steel Bars.—Independent makers of soft steel bars generally are quoting 1.75c., and this price, it is understood, is being met by the Steel Corporation. No very large inquiries are out, but orders for small lots for prompt shipment are fairly numerous. The Navy Department inquiry, for which bids were to be opened Aug. 5, and which included a large tonnage of bars, has been withdrawn. [The policy of the Government is explained in our Washington correspondence.—Editor.] Reinforcing bars rolled from billets also are quoted at 1.75c., base, with only a moderate inquiry. These bars, rolled from old rails, are quoted at 1.75c., but this price hardly can be obtained in competition with new steel bars. Iron bars are inactive and nominal at 2.50c. for refined iron. Representatives of the Amalgamated Association of Iron, Steel and Tin Workers and the Western Bar Iron Association are in conference in Chicago in an effort to agree upon a wage scale for the year ending June 30 next. The Atlantic City conference early in June adjourned without results. Union mills are in operation because the Amalgamated contract allows an additional month beyond the scale year for the reaching of an agreement.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.75c.; refined iron bars, 2.50c., in carloads f.o.b. mill, Pittsburgh.

Steel Rails.—Light rails rolled from new steel are no longer quotable at above 1.90c. for 25-lb. to 45-lb. sections, Tonnages are freely offered at that price and a quotation of even 1.85c. has been made against some recent inquiries. These prices would indicate about 1.75c. for light rails rolled from old sections, as there usually is a spread of $2 to $3 per ton between the two kinds. Demands are few and small.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c. to 1.90c.; rolled from old rails, 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—Quoted discounts and prices mean absolutely nothing as far as sales are concerned. Desire to sell is much more urgent than the desire to buy, and prices all along the line are being shaded. Manufacturers outside the Pittsburgh district are leading the way in price cutting and makers here, rather than lose a regular customer, are meeting the lower prices. Price cutting in nuts is especially severe and also is sharp in bolts. It is frankly admitted that quotations are above what can be done, but the disposition of Pittsburgh makers is to wait on more settled conditions before naming new quotations. Prices and discounts are given on page 233.

Spikes.—Shading of the prices established early this month has begun to crop out, and the stabilized price of $3 per 100 lb. has become merely an asking quotation. A price as low as $2.75 is reported. Demand is purely hand to mouth. The Pittsburgh Railways Co., which is in the market for 69,000 tie plates, is reported to have been quoted less than 2.50c., the nominal quotation of makers. Prices are given on page 233.

Cold-Finished Steel Bars.—Settling of the price of hot-rolled bars to 1.75c. is reflected in a price of cold-finished steel bars, which now are obtainable in carloads at 2.50c. base. Makers feel that a conversion charge of $15 per ton is as little as they can get by on, in view of the character of the current demand which seldom calls for more than a carload and usually involves a number of sizes.

Hoops and Bands.—Demand shows no appreciable increase and the going price is very indefinite. Nominally makers are quoting 2.50c. to 2.60c. base, but 2.50c. is maximum on sales and buyers with orders to place would not have to try hard to get a lower quotation.

Hot-Rolled and Cold-Rolled Strips.—Public quotations are unchanged at 2.50c. to 2.60c. for hot-rolled and 4.25c. for cold-rolled strips. However, some business in hot-rolled recently has been placed as low as 2.40c. and cold-rolled strips have been placed at 4c. flat. Demand shows some increase from both automobile manufacturers and the makers of builders' hardware, but there is still considerable eagerness on the

part of some makers to get orders and this explains the shading of prices.

Iron and Steel Pipe.—Reports from jobbers indicate a good movement of merchant pipe, sales for June having shown a substantial increase over those for May, while the May sales were larger than those for April. This development is finding some reflection in orders upon the mills, but the jobbers are careful not to over-order and are merely specifying for supplies to round out the depleted sizes. Oil country pipe still is in light demand because of the curtailment of drilling. Some inquiries still are coming out for line pipe and we note one sale of 10 miles of 18-in. pipe to the Ohio Fuel Supply Co. Discounts are given on page 233.

Steel Skelp.—The stabilized price of 2c. is finding no basis whatever in sales and it is believed that an inquiry, even of moderate proportions, would bring the price of 1.90c. and possibly less.

Wire Products.—Business still is of extremely limited proportions because buyers are not convinced that prices have struck bottom and consequently are merely taking on only such supplies as are urgently needed. Buyers generally are stipulating that they must be guaranteed against a decline in prices on such business as they are placing. Some manufacturers are meeting such requests while others are refusing them. Rumors have been common lately of quotations of $2.50 on nails, but makers deny having made such a concession, although there seems to be some equalizing of freights on competitive business. Ironton, Ohio, makers are reported to be quoting nails at 2.75c. f.o.b. Ironton, which in some of the territories served by these mills would figure back close to $2.50, Pittsburgh.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Sheets.—Business in general is somewhat better than it has been, evidence of which is found in a further slight gain in mill operations. The American Sheet & Tin Plate Co. last week operated 40 per cent of its sheet mills and had the best run of orders and specifications of any week this year. Independent plant operations have increased somewhat since the agreement was reached with the Amalgamated Association of Iron, Steel and Tin Workers on a wage scale for the year to end June 30, 1922. The drive for business, however, still is pretty strong, and some very low prices are being named to attract orders. The American Sheet & Tin Plate Co. nominally is quoting the July 7 bases of 3.50c. for black, 4.50c. for galvanized and 2.65c. for blue annealed, in the base gages. The company, however, is meeting competition when provided with the right sort of evidence by its regular customers. Independent mills are quoting as low as 3c. on black sheets, 4c. on galvanized sheets, and 2.40c. on blue annealed. These quotations are said to be against material in stock and not for new rollings, but a quotation of 3.75c. recently was made on galvanized sheets and the mill naming it gave as a reason that it was desirous of starting up some idle capacity. The situation in sheets is extremely indefinite as to prices. Each maker seems to have his own ideas as to prices and the terms are largely a matter of negotiation. A Pittsburgh fabricating interest which has an inquiry out for 750 tons of sheets for roofing and sidings in connection with an Eastern structural project has been quoted 3c. for production sheets by two makers and 3.10c. by another. Prices are given on page 233.

Tin Plate.—There is still a fair amount of business in tin plate for condensed milk cans and for tobacco boxes, but in other kinds of material demand still is extremely slack and hopes are low of any decided betterment over the remainder of the year. The more common quotation on production plate still is $5.75 per base box Pittsburgh, but some makers operating their plants on an open shop basis recently revised wage scales of tonnage men to a point where they can take on business at $5.50 and even less, and escape serious loss. The market is quotable at $5.50 to $5.75 per base box, Pittsburgh, but it is not firm at these prices.

Coke and Coal.—The Wickwire-Spencer Steel Corporation, late last week, closed against its inquiry for 500 tons a day of furnace coke for August and September shipment, at a price of $2.75 per net ton oven. Otherwise the market has developed no new features. Spot tonnages of furnace coke continue to be available at $2.75, oven, although the larger operators are holding to $3 and are disinclined to sell for less. The claim is set up that a price of less than $3 should not be regarded on the ground that the coke is not going to blast furnaces. But the fact that coke is not finding the ordinary use is ascribed to the small number of active blast furnaces. Foundry activities are increasing and this finds reflection in the demand for standard 72-hr. coke. Prices are unchanged, ranging from $4 to $4.50 per net ton, oven, but there is more firmness within that range than there was recently. Reduction in the freight rates on coal that will make possible the shipment of Pennsylvania coal into such markets as Chicago, on practically even footing with Illinois and Indiana coal, has not yet found reflection in sales. Prices remain rather weak in this market. Mine run steam coal ranges from $1.50 to $2 per net ton, mines, and the same range will cover a recent business in by-product grade. These prices refer to coal from non-union fields. Gas coal is almost exclusively the product of union fields and while the demand often before has been better, operators seem disinclined to consider less than $2.25.

Cut Nails.—Both the Reading Iron Co. and the Wheeling Steel Products Co. now are quoting a base of $3 per keg, f.o.b. mill, for carload lots, and 3.10c. for less than carloads. Demand is very light in this district.

Old Material.—No material change can be made in quotations which, as for some time, represent largely what dealers would pay for material to throw down on their yards, but if there is any definite tendency, it is in the direction of firmness, due to an increasing tendency among railroads and other producers to hold rather than sell their material at current quotations. The Pennsylvania Railroad, Eastern Region, withdrew 11,000 tons of old rails offered in the July list because the bids were regarded as too low. These rails and some other material will be offered in the August list. Current prices on turnings also are so low that the automobile companies and other producers are letting their stocks accumulate. Some users of turnings who have been seeking tonnages find that bids of $7 and even $7.25 have not brought out many. Bids of $14 for heavy breakable cast have been equally without responses. Steel companies which would lay down some heavy melting steel at $12 to $12.50, have not been offered much material at those prices. Dealers have cut the prices they are willing to pay for some grades, but this may be ascribed to the fact that present signs do not indicate an early revival of demand and they are keeping in mind the carrying charges when figuring the prices they will pay. Indicative of the difference between prices the dealers and mills are paying, it is noted that a Pittsburgh independent recently bought some scrap rails at $13.50 per gross ton from the Pennsylvania Railroad and for some knuckles and couplers about $1 a ton more.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	15.50 to 16.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.00 to 9.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	13.50 to 14.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	11.50 to 12.00
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, July 26.

With the announcement of a further price reduction of $3 per ton on plates, shapes and bars, the independent steel companies have again taken official cognizance of the price cutting which has been going on for some weeks. The Steel Corporation, following its policy of meeting competition, is also quoting the new prices, which are 1.85c. for plates and shapes and 1.75c. for bars. These are to-day's ruling prices for small-lot business, but in case of plates and shapes particuarly, tonnages had been sold prior to the announcement at prices lower than those which the independent companies now name as their official quotations.

The effect of the reduction mainly is to give both buyers and sellers a new basis from which to work. In other than these three major products, there is also marked price weakness, particularly in sheets. Open bids taken by the Big Four Railroad on 450,000 tie plates brought out a price as low as $40 per net ton, Pittsburgh.

Mill operations in this district continue virtually unchanged, the leading interest maintaining a 30 per cent rate and the leading independent a 25 per cent rate. A slight improvement in operation of sheet mills and wire mills is noted. Wire trade during the past week has shown a marked betterment, jobbers buying in fair quantities for quick replenishment of stocks.

Pig Iron.—The principal purchases of pig iron during the past week were made by a cast-iron pipe company for its Ohio plant. A few thousand tons of No. 2 foundry were divided among two or three sellers, some of the business going at $18, Northern furnace. Although some sellers report a slight improvement in demand for iron, business is confined almost entirely to carload lots, on which the ruling quotations are $18.50 for No. 2 and $19 for No. 1. An inquiry from the St. Paul Railroad for 2500 tons of malleable is still pending.

Quotations on Northern foundry, high phosphorus, malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$36.00 to $36.50
Northern coke, No. 1, sil. 2.25 to 2.75	19.00 to 19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.50 to 19.00
Northern high phos	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25	26.67
Malleable, not over 2.25 sil	18.50 to 19.00
Basic	18.50 to 19.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	35.00
Silvery, sil. 8 per cent	37.53

Ferroalloys.—A car wheel company is in the market for 300 tons of ferromanganese. The quotation on carload lots has been around $78, delivered, but it is believed that a tonnage the size of the one inquired for can be bought for $75. Fifty per cent ferrosilicon has been sold at $71, delivered, for a single carload.

We quote 78 to 82 per cent ferromanganese, $78 delivered; 50 per cent ferrosilicon, $71 delivered; spiegeleisen, 18 to 22 per cent, $36 delivered.

Plates.—A $3 per ton reduction by the leading independent mills which has been met by the Steel Corporation, now fixes the "official" price at 1.85c., Pittsburgh, but lower prices have been quoted, it being possible to buy at 1.75c., Pittsburgh, even in relatively small lots. The rapidity with which steel prices have softened in the past few weeks has left buyers in an uncertain state of mind with regard to the future course of the market, with the result that this week there is comparatively little business of importance upon which to quote.

The mill quotation is 1.75c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 3.03c. for plates out of stock.

Structural Material.—The new price of 1.85c., Pittsburgh, on plain material is merely an official recognition by the mills of the prices which have been quoted on some structural jobs during the past two or three weeks. One recent order placed by a fabricator, amounting to 1200 tons, is said to have been taken at 1.80c., Chicago, equivalent to 1.42c., Pittsburgh. In that instance the fabricator's price for the material fabricated and delivered was extremely low—$61 per ton. A number of projects which have lately come into the market are still pending. Among the lettings of the past week are the following:

Palace Theater Building, South Bend, Ind., 300 tons, Rochester Bridge Co.

Extension to township high school, Joliet, Ill., 774 tons, to Hansell-Elcock Co.

State of Montana, three steel truss spans across Clark's Fork, Noxon, Mont., 366 tons, to unnamed fabricator.

Commercial National Bank Building, Madison, Wis., 138 tons, to unnamed fabricator.

Midwest Refining Co., two oil storage tanks and one additional steel roof, 544 tons, to Chicago Bridge & Iron Co.

Bids have been taken by the United States Smelting & Refining Co. on 180 tons for a steel plate flume at Salt Lake City, Utah.

The mill quotation is 1.80c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 3.03c. for materials out of warehouse.

Bolts, Nuts and Rivets.—There has been continual shading of prices on bolts, nuts and rivets. New discounts are brought out with almost every inquiry. Some mills decline to go to the extreme limits which their competitors are quoting to get business. The market is quite irregular and prices are not well defined. Jobbers' prices unchanged.

Jobbers quote structural rivets, 4.03c.; boiler rivets, 4.13c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—The new price on bars with the $3 per ton reduction announced by independent mills and met by the Steel Corporation is 1.75c., Pittsburgh, but even this price, now but a few days old, has been shaded. Bar iron is also lower, it being quite easy to do 1.85c., Chicago mill, with every indication that a fair-sized order would bring out an even lower quotation. No new concrete reinforcing work is reported and some of that which was reported last week is still pending. Rail carbon steel bars are quoted freely at 1.90c., Chicago, it no longer being possible for the mills to get above that figure. Jobbers' prices on bars are unchanged, except that an effort is being made to obtain an $8 spread over the mill price on hard and deformed steel bars for reinforcing purposes. That is, jobbers are quoting 2.53c., Chicago, but it is still possible to buy at 2.38c., Chicago.

Mill prices are: Mild steel bars, 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.85c., Chicago; rail carbon, 1.90c., mill or Chicago.

Jobbers quote 2.93c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.35c. for rounds and 50c. extra for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—The sheet market is very weak, and while the usual prices are 2.45c. for No. 10 blue annealed, 3.25c. for No. 28 black and 4.25c. for No. 28 galvanized, Pittsburgh, sales have been made at lower figures. The bottom quotations at which sales have been made appear to be 2.25c. for blue annealed, 3c. for black and 4c. for galvanized. Demand is light, but the low prices have brought out some business.

Mill quotations are 3.25c. for No. 28 black, 2.45c. for No. 10 blue annealed and 4.25c. for No. 28 galvanized, all being Pittsburgh prices subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.68c.; No. 28 black, 4.90c.; No. 28 galvanized, 5.90c.

Rails and Track Supplies.—Following the reduction a week or so ago to 2.30c., Chicago mill, on tie plates, bids were opened on 450,000 tie plates, about 2250 tons, for the Big Four Railroad. These were open quotations, the lowest being $40, Pittsburgh, by the Dilworth-Porter Co., the others being uniformly $46 per net ton, Chicago. The Chicago, Burlington & Quincy Railroad will shortly issue an inquiry for tie plates. Fair orders for railroad spikes are being received by Western mills.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.90c. f.o.b. makers' mills.

Standard railroad spikes, 3c., Pittsburgh; track bolts with square nuts, 4c., Pittsburgh; steel tie plates, 2.30c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, iron, 2.30c., f.o.b. makers' mills.

Warehouse Prices.—No further price changes have been made in the past week by local warehouses.

Cast Iron Pipe.—Detroit has advertised for 1500 tons of 8-in. Class B pipe, bids closing July 29. Hammond, Ind., has set Aug. 8 as the closing date for bids on 4000 tons of 36-in. pipe. Litchfield, Ill., is getting preliminary figures on about 800 tons, but formal bids will not be asked for until estimates have been compiled. Bay City, Mich., will receive bids up to Aug. 8 on 5000 tons of 20, 24 and 36-in. water pipe. On the Bay City job bids are also asked for on steel and wood pipe.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $51.10; 6-in. and above, $48.10; class A and gas pipe, $3 extra.

Wire Products.—A gradually improving demand for wire products, especially wire nails, has been in evidence during the past three weeks. Orders in the past week were surprisingly good, ranging from carload lots to 100 tons, but there was a considerable number of them, indicating that jobbers' stocks have run pretty low. Nearly all of the orders were for rush shipment. The better business has already been reflected in a slight improvement in mill operation especially by the leading maker. Prices are holding fairly well, there being less talk of price cutting on wire and nails than on any other steel products.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Railroad Equipment.—The New York Central has placed orders with several car builders for the repair of 4000 freight cars. The Chicago & Northwestern Railroad may be in the market soon for car repairs.

Old Material.—The most important business of the past week was the purchase by two mills of about 2000 tons each of heavy melting steel. In one instance $10, delivered, was paid and in the other $10.50 to $10.75, delivered. A mill also bought machine shop turnings at $3.50, delivered. New railroad offerings include 5000 tons by the Chicago, Burlington & Quincy and 2500 tons by the Pennsylvania Northwestern Region, while blank lists have been issued by the New York Central and Big Four.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards, cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.25 to 13.75
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.00 to 12.50
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	8.50 to 9.00
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.25 to 9.75
No. 2 railroad wrought	9.00 to 9.25
Steel knuckles and couplers	10.25 to 10.75
Coil springs	11.50 to 12.00
No. 1 machinery cast	11.50 to 12.00
Low phos. punchings	10.50 to 11.00
Locomotive tires, smooth	9.75 to 10.25
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.00 to 11.50
Grate bars	9.50 to 10.00
Brake shoes	9.50 to 10.00
Railroad malleable	11.00 to 11.50
Agricultural malleable	11.00 to 11.50
Country mixed	7.00 to 7.50

The paper on the use of powdered fuel under steam boilers presented by H. D. Savage, of the Combustion Engineering Corporation, 43 Broad Street, New York, before the American Iron and Steel Institute, at its May meeting, has been printed in pamphlet form for general distribution by the company. The paper is offered as a complete summary of powdered coal progress up to date.

New York

NEW YORK, July 26.

Pig Iron.—The effect of the prolonged period of reduced production and decreasing stocks in the hands of furnaces and melters is being shown in the increasing difficulties of foundrymen in obtaining deliveries promptly on the iron which they need. As many of them have followed a policy of buying from hand to mouth, they need immediate delivery when they place orders, and not infrequently discover that their favorite iron or iron of the analysis desired cannot be promptly obtained. This is an indication that before long there must be a buying movement, although heavy buying is not expected. Inquiries this week are more numerous than the preceding week and amount to from 1500 to 2000 tons for prompt shipment. Difficulty is also being experienced in obtaining prompt delivery of coke.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.02 to $25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 24.52
East Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—Absolute stagnation is reported in the market for all grades of ferroalloys. Prices for ferromanganese and spiegeleisen are nominal and represent the asking price of sellers, but not the prices which it is believed a fair test of the market would bring out. It is confirmed that a carload lot of domestic ferromanganese was recently sold at $72.50, delivered, but the asking price is still $75, delivered. Some sellers of British alloy are quoting as low as $70, seaboard. There is no demand for spiegeleisen and the quotation varies from $26 to $31, furnace, depending upon the analysis, quantity and delivery. There is no demand for manganese ore. Ferrosilicon, 50 per cent, is nominally unchanged, the sale of two cars having been reported at around $65, delivered, in the Middle West. We quote prices as follows:

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$70.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Manganese ore, foreign, per unit, seaboard	22c.

Warehouse Business.—Slackness continues and with recent lower prices by mills, warehouses here are looking forward to another reduction of prices in a short time. In brass and copper, business is poor and further reductions within a fortnight are generally considered inevitable. While the majority of dealers in sheets are maintaining a price of 4.50c. per lb. base on black sheets; 3.68c. per lb. base for blue annealed and 5.50c. per lb. base for galvanized sheets, there is a tendency to shade these prices, particularly in galvanized sheets, sales of which are being made by some dealers at 5.25c. per lb. Warehouses handling pipe are meeting competition on a basis proportionate to the mill reductions, but generally have not issued any new price schedule. The pipe prices quoted on page 252 represent the basis of from 60 to 70 per cent of sales, the remaining transactions being from 5 to 10 per cent under these discounts. In all materials, prices are largely nominal.

High-Speed Steel.—The market shows no change for the better. A few small orders continue from textile machinery builders. Producers generally are quoting about 90c. per lb. for 18 per cent tungsten high-speed steel with some sales reported at 85c. per lb. A good order would probably bring out a price satisfactory to the purchaser.

Finished Iron and Steel.—One of the interesting developments of the week is the placing with a jobber of 750 tons of concrete reinforcing bars for the Federal Reserve Bank at John and Nassau streets. A stipulation that the bars must be delivered in small lots on 24 hr. notice, cut to length, and thus requiring storage and cutting facilities not far remote from the point of use, was enough of an obstacle to keep mills from bidding low enough to get the work. It is understood that the unit price was somewhat higher than the minimum mill quotation on a delivered New York basis. Steel bars are now pretty generally obtainable

at 1.75c. base, Pittsburgh, and the common quotation for both plates and structural material is 1.85c., although these quotations are made on such relatively small lots that they do not represent what could be done on a large attractive order. Railroad car repair work is slowly materializing. It is believed that the New York Central has already distributed among eight car builders orders for repairs on 4000 cars and that possibly the volume of work will be doubled. The Buffalo Steel Car Co. will do the repairs on 500 cars for the Buffalo, Rochester & Pittsburgh Railroad; this car builder is also reported to have booked like sized orders for the Delaware & Hudson and the Erie. Elsewhere is reported the contract placed with the Canadian Car & Foundry Co. for 500 tank cars for Russia; it is believed that the tank parts at least will be made in the United States. In fabricated steel lines some activity is noted in apartment house construction on the part of builders who have refrained for months until now to engage on such ventures. One involving 1100 tons is to be erected at 110th Street and Riverside Drive. Another actively considered is to go up at Madison Avenue and Eighty-fourth Street. According to the report of the Bureau of Buildings for the Borough of Manhattan, business buildings other than those of the office type increased in number, measured by construction permits, about 67 per cent and in estimated cost about 150 per cent in the first six months of 1921 against the corresponding period of 1920. New tenement and apartment houses have increased from 15 last year to 42 this year. A viaduct at 134th Street and Riverside Drive is a project of the immediate future and will take 350 tons. The marine terminal at Wilmington, Del., 1000 tons, is still open. Contracts awarded include 900 tons for the Nesquehoning bridge of the Central Railroad of New Jersey to the Bethlehem Steel Bridge Corporation, which has also taken 250 tons for two or three bridges; 750 tons for the Amoskeag bridge to the Phoenix Iron Co., for which the Boston Bridge Works will do the erecting; 4800 tons for 50 tanks for the Sinclair Consolidated Oil Co., one-half to the Chicago Bridge & Iron Works and one-half to the Graver Corporation, Chicago.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c. to 2.28c.; plates, 2.18c. to 2.38c.; structural shapes, 2.18c. to 2.38c.; bar iron, 2.28c.

Cast Iron Pipe.—The usual mid-summer lull has finally struck this line of industry, there being a halt to inquiries and orders. Some pipe foundries are shutting down temporarily, ostensibly to make repairs, but probably because of lack of business as well. The 1500 ton contract which the City of New York was to have awarded last week has been postponed, specifications having been recalled and no reasons given. We quote f.o.b. New York, carload lots, as follows: 6-in. and larger, $52.30; 4-in. and 5-in., $57.30; 3-in., $67.30, with $4 additional for Class A and gas pipe.

Old Material.—The chief feature last week was the buying of an eastern Pennsylvania consumer, other than the Bethlehem Steel Co., of heavy melting steel at a delivered price of $12 a ton, which it has laid down in its yards. Some of the purchases were made in this district. There is less change in prices this week than for some time, indicating perhaps that prices have reached a somewhat permanent bottom.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.00 to 10.50
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	3.50 to 4.00
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	7.00 to 7.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Buffalo

BUFFALO, July 26.

Pig Iron.—The volume of sales from week to week does not change and while the week just closed was no better than its immediate predecessors in point of tonnage, there is an appreciable feeling of optimism. Depletion of the stock of iron with one combination interest to the point where it must blow in a furnace or buy iron elsewhere, will probably result in the former step—thus accounting for its inquiry for a large tonnage of coke and the receipt of the first ore of the season. Decision to operate a blast furnace for its own use is expected daily. Present prices on pig iron are not attractive to this producer and the furnace operation will be generally confined to tonnages sufficient for its own use. In the same connection this interest continues to quote at $25 and $26, but of course these prices are prohibitive. On the basis of present sales the furnace which expected to blow out its only stack in blast will find sufficient to keep going for the present. Its total movement last week was 1000 tons at $20 and $22 base. Inquiry has fallen off with the steelmaking producer which sold Buffalo iron at Eastern points and total orders are less than 500 tons. The necessity of filling orders on old contracts has practically forced one producer out of the market—at least for new business. Its stocks are depleted to the point that it will not figure actively on inquiries amounting to 4100 tons. Sales of 100 tons of malleable at $23 and 500 tons of extra high silicon at $23 represent the only new business. The largest local buyer is known to be in the market for 1700 tons for use in Buffalo plants.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75 to $22.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75 to 22.00
No. 2 plain, 1.75 to 2.25 sil.	20.00 to 21.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—Several factors unite to justify an expression of better feeling. There is a probability of increased operation and requests are in for bids on a number of sizable structural jobs which have been held up many months awaiting normal prices. The general trend of mill business is about the same scale which has characterized this year's activity. Bars and pipe show better movement while plates are dull. Branch offices of national mill interests have been instructed on new prices they will quote. Pipe business shows local improvement with the purchase of 500 tons for use in the plumbing work on the new Hotel Statler and an inquiry for 800 tons for the steamfitting work on the same job. A number of orders for steel piling, ranging in size from 100 to 300 tons, reveal improvement. In structural work bids for the J. N. Adam hospital at Perrysburg, N. Y., involving 1000 tons; and three buildings as additions to the Eastman Kodak Co., Rochester, N. Y., exceeding 1000 tons, and announcement by the successful bidder for the new schools at Buffalo, to the effect that the city will be refunded any saving resulting from further reduction in prices of materials, all indicate improved demand. Bars are now quoted at 1.75c.; shapes 1.85c. and plates 1.85c.; black sheets 3.25c. and galvanized 4.25c. Canadian business is quiet and in proportion mills are doing less than their border competitors. A number of reinforcing bar inquiries are out, but the one mill which is the chief contender for the business and which expects to start operations if the business comes its way has not announced the names of the prospective customers or the tonnages involved. A sheet mill down for several weeks expects to operate August 1.

Warehouse Business.—Price reductions are expected daily with announcements from mills that new schedules are in force. Orders have been more frequent—particularly for structural shapes and sheets. Railroad inquiry indicates not only repairs to rolling stock but a definite program for new equipment. Some of this is in the warehouses, but the general volume of

railroad business is small. A more settled feeling is reflected among warehouse customers; in substance, it is that the next price announcement will be the last and that a stabilized market will follow.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 3.05c.; plates, 3.05c.; plates, No. 8 gage, 3.65c.; soft steel bars and shapes, 2.95c.; hoops, 3.65c.; blue annealed sheets, No. 10 gage, 3.70c.; galvanized steel sheets, No. 28 gage, 5.80c.; black sheets, No. 28 gage, 4.80c.; cold rolled strip steel, 7.15c.

Old Material.—Inquiry for heavy melting steel revived talk that the railroad equipment maker who bought heavily in the winter was again in the market, but no sales were consummated. While trading is at a standstill, in general dealers are more encouraged.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$11.50 to $12.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Boston

BOSTON, July 26.

Pig Iron.—One New England melter this week bought two 500 ton lots special analysis iron at a price based on $21 Buffalo furnace for No. 2X, an eastern Massachusetts foundry increased an order for 200 to 500 tons eastern Pennsylvania No. 1X at $23.50 furnace or $27.56 delivered, and another Massachusetts concern purchased 300 tons Lake charcoal iron at a price understood to have been below the market, but aside from these transactions, business was confined to scattered car lots, mostly to Massachusetts melters. Indications are the flurry in buying has spent itself inasmuch as the ratio of daily melts, the amounts of iron in yards and due foundries on old contracts are such that further purchases other than filling-in orders to round out mixtures are not warranted. Buffalo high silicon iron is offered on a basis of $20 furnace for No. 2 plain in large lots and at $20.50 in small. The supply of eastern Pennsylvania iron at $20 is drying up, while Virginia and Alabama furnaces are not anxious for business on any such basis. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$25.06 to $28.81
East. Penn., sil. 1.75 to 2.25	24.56 to 28.31
Buffalo, silicon 2.25 to 2.75	25.96 to 28.96
Buffalo, silicon 1.75 to 2.25	25.96 to 28.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	32.16 to 32.66
Alabama, silicon 1.75 to 2.25	31.66 to 32.16

Coke.—Additional tonnages of coke were booked this week on a $10.91 delivered basis where the freight rate does not exceed $3.40. The volume of new business was not sufficiently large to noticeably change the ratio of production and daily shipments of New England by-product fuel makers. Among foundries there appears a tendency to buy on a spot basis rather than a contract. One large textile machinery interest, however, this week covered on last half requirements for one of its plants.

Old Material.—Consumers' interest in old material continues at a minimum. A large majority of the New England foundries have sufficient material on hand to supply needs during the next month or two, at least. For that reason, yard interests are more inclined to shade prices on stock consumed in this section. Massachusetts melters this week took four cars No. 1 machinery at $16.50 to $17 delivered, otherwise the market is lifeless, according to local dealers. Two cars of stove plate were taken by nearby foundries at $14.50 and $15 delivered, or about 50c. a ton under the general quotation a fortnight ago. A small tonnage of relaying rails sold at $1.65 per 100 lb. and another lot at 2¼c. per lb. shipping point, which in this case was Cape Cod. Negotiations are on between dealers for a round tonnage of steam car wheels, but there is some hitch on price. Three cars of rolling mill borings were taken by Pennsylvania mills at $9 a ton delivered. Sentiment among New England yard interests is that steel mills will be in the market for large tonnages of heavy melting material by the middle of August provided they can purchase at prices ruling to-day or cheaper.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$16.50 to $17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	14.50 to 15.00
Railroad malleable	12.50 to 13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Cincinnati

CINCINNATI, July 26.

Pig Iron.—An increase in both inquiries and sales over last week is noted in nearly every quarter. In most cases, however, only carload lots for prompt shipment are wanted, but two 100-ton lots of Southern iron for the Pittsburgh district are included in the inquiries. A West Virginia steel maker was in the market last week for a car of 50 per cent ferrosilicon which it is believed was bought at $65, delivered, and a carload sale of Bessemer ferrosilicon, 10 to 12 per cent, to an Illinois car manufacturer was made at lower than $45.25, delivered. A radiator company is inquiring for 250 tons of foundry iron. A Michigan melter is considering prices on 3000 to 5000 tons for shipment to Dec. 31 next.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$24.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	25.00
Ohio silvery, 8 per cent sil.	38.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	23.52

Finished Iron and Steel.—There is a slight improvement noticed in both inquiries and sales, although quantities continue light. Orders for the most part specify immediate delivery. In wire and wire nails, the demand has been fair, prices being fairly firm. In pipe, despite the recent price change, the volume of business remains virtually the same. A carload sale of cold-rolled steel is noted and some activity in cotton ties is reported. The Masonic Temple at Birmingham involving 180 tons, was awarded to the Ingalls Iron Works, Birmingham, during the week. The Covington station project, previously reported, will involve 80 tons of structural material. The proposed plans of a new 11-story club house for the Business Men's Club, Cincinnati, are on display for the members. No actual work is contemplated, however, until expected adjustment of wages and materials in the building trades has taken place. The plant of the American Rolling Mill Co., Middletown, is expected to continue in operation throughout next week. The plant of the Newport Rolling Mill Co. is still shut down.

Warehouse Business.—Local jobbers report that buying is, if anything, better, although quantities are still light and for current needs. Orders for plates and concrete bars, in one house at least, have been the leading activity. Prices remain unchanged.

Iron and steel bars, 3.15c. base; hoops and bands, 3.85c. base; shapes, 3.25c. base; plates, 3.25c. base; reinforcing bars, 3.22½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, 4.92c.; No. 28 galvanized sheets, 5.92c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.10 per 100 lb.

Coke.—The coke market was very quiet during the week. A sale of 1150 tons and another of 1100 tons

are noted. There has also been some scattered carload business. Prices remain unchanged.

Old Material.—The scrap market continues at a standstill. There is practically no trading.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

St. Louis

ST. LOUIS, July 23.

Pig Iron.—A sale of 300 tons of foundry iron to the American Radiator Co. for its Edwardsville, Ill., plant is reported at about $18.25 Chicago for No. 2. A survey of foundries in this territory made by a manufacturer reveals that for the most part they are running very light and are well stocked. But there is some improvement in the demand for a general line of castings from the railroads and foundries catering to that trade are operating 50 per cent or more of capacity. A St. Joseph, Mo., foundryman here this week was optimistic over the railroad situation. There was an inquiry in this market for one car of ferromanganese and the first sale in months of a car of spiegeleisen was reported.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$21.30 to $21.80
Northern malleable	21.30 to 21.80
Basic	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25	25.74 to 26.24

Finished Iron and Steel.—A stir was caused here this week by the announcement of a cut to 1.75c. Pittsburgh for bars and 1.85c. for structural shapes by one of the large independents, which was quickly met by other independents. The Illinois Steel Co., the Steel Corporation's subsidiary here, has made no change from its readjustment of July 5. A few sales of bars were made at the price quoted. Additional inquiries for structural steel create a better feeling in the trade. Sanguinet & Staats, architects, Dallas, Tex., are receiving bids until August 1 for the Frost National Bank Building, San Antonio, involving 350 tons of structural steel and 350 tons of reinforcing bars. For the new Missouri Pacific hospital, 150 tons of bars will be required. The building trade labor situation looks better, the unions now voting on the final draft of an agreement designed to prevent strikes and lockouts and to fix wages by arbitration. The railroad situation is improving. The Missouri Pacific let a contract for repairs to 500 cars to the Sheffield Car & Equipment Co., Kansas City. While these are wooden freight cars, a fair tonnage of castings is involved. The Western Steel Car & Foundry Co., Davenport, Ia., has an order to repair 300 combination cars for the Wabash. These two lettings are regarded as hopeful signs of a resumption of railroad car activities. Then, too, the railroads are beginning to buy wheels, structural shapes and bars in small lots for repairs. The purchase by the St. Louis Terminal Railway of two carloads of standard track spikes is reported. The railroads and the United (Street) Railways seem well covered on rail tonnage. Warehouse business is light and so far mill reductions noted above have not been met.

For stock out of warehouse we quote: Soft steel bars, 3.02½c. per lb.; iron bars, 3.02½c.; structural shapes, 3.12½c.; tank plates, 3.12½c.; No. 10 blue annealed sheets, 3.77½c.; No. 28 black sheets, cold rolled, one pass, 5c.; No. 28 galvanized sheets, 6c.; cold drawn rounds, shafting and screw stock, 4.45c.; structural rivets, $4.12½ per 100 lb.; boiler rivets, $4.22½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Coke.—The demand for coke is still confined to a few carload orders, with most of the business being handled by the Laclede and Granite City by-product plants. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, Granite City by-products meeting this price, while Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered in the St. Louis industrial district.

Old Material.—Consumers continue to decline to come into the market and prices of some grades have again declined. Re-rolling rails, however, are holding firm at $12 to $12.50. One dealer reports the sale of a tonnage of light section relaying rails around $30, gross ton, St. Louis. The following railroad lists were before the market this week: Chicago, Burlington & Quincy, 5000 tons; Texas & Pacific, 750 tons; Kansas City Terminal, 200 tons.

We quote dealers' prices, f.o.b. consumer's works, St. Louis industrial district and dealers' yards as follows:

	Per Gross Ton	
Iron rails	$12.50 to	$13.00
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft.	10.00 to	10.50
Relaying rails, standard section	28.00 to	30.00
Cast iron car wheels	11.00 to	11.50
No. 1 railroad heavy melting steel	9.50 to	10.00
No. 1 heavy shoveling steel	9.00 to	9.50
Ordinary shoveling steel	8.50 to	9.00
Frogs, switches and guards, cut apart	9.50 to	10.00
Ordinary bundled sheet	4.00 to	4.50
Per Net Ton		
Heavy axle and tire turnings	$5.00 to	$5.50
Iron angle bars	10.50 to	11.00
Steel angle bars	8.00 to	8.50
Iron car axles	17.00 to	17.50
Steel car axles	12.00 to	12.50
Wrought iron arch bars and transoms	12.50 to	13.00
No. 1 railroad wrought	9.00 to	9.50
No. 2 railroad wrought	8.50 to	9.00
Railroad springs	9.50 to	10.00
Steel couplers and knuckles	9.50 to	10.00
Locomotive tires, 42 in. and over, smooth inside	8.00 to	8.50
No. 1 dealers' forge	6.00 to	6.50
Cast iron borings	5.50 to	6.00
No. 1 busheling	9.00 to	9.50
No. 1 boilers cut in sheets and rings	5.50 to	6.00
No. 1 railroad cast	11.50 to	12.00
Stove plate and light cast	10.50 to	11.00
Railroad malleable	9.00 to	9.50
Agricultural malleable	9.00 to	9.50
Pipes and flues	6.50 to	7.00
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.00 to	3.50
Railroad grate bars	7.50 to	8.00
Machine shop turnings	4.00 to	4.50
Country mixed iron	6.00 to	6.50
Uncut railroad mixed	7.00 to	7.50
Horseshoes	9.00 to	9.50
Railroad brake shoes	7.50 to	8.00

Birmingham

BIRMINGHAM, ALA., July 26.

Pig Iron.—The last week in July began with a base of $20, the bulk of business being done at that figure, but some at $19.50 and some was reported but not confirmed at $19. Indications pointed to settling around the $20 base. The largest transaction coming to the fore was 500 tons for a sanitary manufacturing interest. One furnace interest sold 1500 tons during the week ending July 23 and two others in proportion. The make had dwindled to one merchant stack and four on basic for company use. Manufacturing interests not now making iron have turned over customers to one another when out of certain grades on yards. Ill assortment of stocks is becoming more pronounced and begins to interest the consumer. Furnace operators do not report much progress in requests for lower assembling and shipping rates that have been made to the trunk lines. The only reductions of importance have been those in export rates, which, effective July 15, became, to Mobile, as follows: Pig iron, $2.75 instead of $4.13; pipe, $3.13 instead of $4.60. These rates are the same as the rates to Mobile when products are intended for the Pacific Coast.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.50 to $20.00
Basic	19.00
Charcoal	35.00

Finishing Mills.—The Tennessee company closed down the Fairfield plate mill at the end of the week, but will operate its Bessemer mill in a small way. Four blast furnaces will continue in operation and the rail and car mills are around normal. The new car plant

is taking on additional men and speeding up. Ingalls Iron Works is on full turn, making steel bridges for the Philippines, office buildings and structural steel with more business in sight. The Conners-Weymann Co.'s steel hoop mill at Woodlawn resumed at Woodlawn on single turn this week. The Gulf States Steel Co.'s bar mill went from two to five days turn this week. New business shows a marked gain over the recent low mark.

Coal and Coke.—By-product coke is offered at $6 with beehive ruling at $6.50. Coke market is fair. Governor Kilby will announce Aug. 1 his fair price list on domestic coals for householders.

Cast Iron Pipe.—Little was done in high pressure pipe, the United States Cast Iron Pipe & Foundry Co. and the National Pipe Co. securing small Middle Western orders. Flange pipe for oil wells is not heard of at this time. The leading interest is operating part time at Bessemer and Anniston, while Birmingham and Chattanooga are down. The base is $40 for large sizes and desirable business. The Emory Pipe Co., which recently resumed, is on full turn in its Anniston sanitary pipe shop. The base is $40.

Old Material.—The scrap market remains listless with no interest outside of No. 1 cast and similar materials.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cleveland

CLEVELAND, July 26.

Iron Ore.—With not an inquiry developing nor a sale reported during the week, the market is at a standstill. Shippers expect that there will be virtually no sales within the next few weeks but look for a limited volume of business early in the fall from consumers who will want a little more ore to carry them over the winter. Only one report has appeared of any price shading on Lake Superior ore. A concession from the regular schedule was offered by a small mining company that markets its own ore and its production is not of sufficient size to make it any factor in the market. It is not unusual for a few of the very small producers to shade regular prices during a dull season. July shipments will show little gain over June. The lake coal traffic has fallen off and more boats are being laid up.

Reports from Duluth announce that the Oliver Iron Mining Co. has made a further reduction in miners' wages of approximately 10 per cent to become effective August 1. This is the second wage reduction by this company, the first being 20 per cent, which was placed in effect May 16. A further curtailment in the company's mine operations will also be made.

Semi-Finished Steel.—While a further reduction of $3 a ton has been announced on billets, sheet bars and slabs, prices on these are not established. A Cleveland mill is in the market for 2500 tons of slabs on which it has been quoted $31 by a Pittsburgh district mill, but claims to have previously been able to purchase slabs at $30.40, Youngstown, and expects to be able to shade that price considerably.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Some of the furnaces in the Cleveland district seem inclined to take no further part in the downward movement in prices and state that $20 for foundry iron is as low as they will go at present. Although lower prices have appeared in the Pittsburgh district, $20 for foundry iron is generally quoted as the minimum base price in this market, but there is considerable irregularity in the price differential for higher silicon irons. The volume of business during the week was very light. One interest sold 1100 tons in lots of 200 tons and under at $20 and $20.50 for No. 2. Almost no sales were made in the immediate territory. Quotations were named on inquiries for 200 tons for the U. S. Sanitary Co., Pittsburgh, 250 tons for the Union Radiator Co. and 200 tons for the American Radiator Co. The Ford Motor Co. is reported to have taken additional work away from Ohio foundries and centered it in Detroit, and this has had the effect of curtailing the consumption of Ohio iron, although the Ford company has for some time been supplying these foundries with much of the iron for its own castings. Two sales of low phosphorus iron, each of 100 tons, are reported at $36 and $36.25. A Valley producer reports that Alabama competition in low phosphorus iron has developed in the Northwest, where this grade has been offered at $33, Birmingham.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.46 to $20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	38.86
Standard low phos., Valley furnace	36.00 to 36.25

Coke.—The market shows no change. Quotations on standard Connellsville foundry coke range from $4 to $5, and sales during the week were limited to a few car lots, mostly of the higher priced grades.

Bolts, Nuts and Rivets.—Bolt and nut prices are weak, regular quotations being shaded from 5 to 10 per cent on desirable orders. However, in spite of the recent price reductions on steel bars, makers do not seem inclined to make a further formal price reduction, saying that present steel bar prices were fully anticipated in the reductions that had been made on bolts and nuts. The market is a little more active. Some fill in orders are coming from the jobbers and there is more inquiry from the railroads. The rivet market continues very dull. The leading Cleveland maker is declining to shade 2.75c. for structural rivets and 2.85c. for boiler rivets, although prices $2 a ton lower are evidently appearing in other districts.

Finished Iron and Steel.—Prices on finished iron and steel again declined sharply during the week and there is now an open market on nearly all items. Several mills late in the week informally made a $3 a ton reduction on steel bars, plates and structural material from the prices that were formally named July 5 but which were not closely adhered to. These new prices are 1.75c. for steel bars and 1.85c. for structural material. While these prices may be holding a little better than the previous ones, lower quotations are appearing. The plate market particularly is weak with quotations as low as 1.70c. for tank plates. However, it is claimed that boiler plates are holding fairly well at 1.85c. While the Steel Corporation has made no formal announcement of lower prices, it is meeting competition. The lower prices are bringing out more inquiry for small lots, mostly for immediate delivery, indicating that stocks are low. Interest in the price situation is centered in an inquiry from the Mt. Vernon Bridge Co. for 6900 tons of steel bars, plates and structural material. This company during the week took the steel work for the Ohio State University stadium, Columbus, 4360 tons, for $303,000, or $69.50 a ton delivered and erected, and is about to place the steel for this and other work taken recently. It is freely predicted in the trade that this steel will be purchased at about 1.60c. Regular quotations on hard steel bars have declined $1 a ton to 1.70c., but an inquiry for 1000 tons for reinforcing work for the Ohio State University stadium brought out a quotation of 1.90c. delivered or 1.62c., Pittsburgh. A local order for 230 tons of reinforcing bars for an apartment house was taken by a Cleveland warehouse for stock shipment at about 2c. delivered on the job. Following a court order enjoining the placing of a contract for the Baldwin reservoir, Cleveland, the city has decided to readvertise for that work requiring 1700 tons of reinforcing bars. Some round lot business in soft steel bars has been taken at 1.75c. Lower quotations than have

previously appeared are being made on various items. Hoops are quoted at 2.40c. or lower, bands on a 1.90c. bar base with the old bar card extras, hot-rolled strip steel at 2.35c. to 2.40c. and light rails at 1.75c. to 1.80c. Akron has awarded 1800 to 2000 tons of lock bar pipe to the East Jersey Pipe Co. of New York.

Jobbers quote steel bars 2.79c.; plates and structural shapes, 2.89c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.44c.; cold rolled rounds, 4c.; flats, squares and hexagons, 4.50c.

Sheets.—The sheet market is weak and unsettled with prices appearing on all grades $5 a ton lower than those that prevailed a week ago. Quotations are being made as low as 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, and there are reports of a 3.90c. quotation on the latter. Price reductions have done little to stimulate sheet business. The Ford Motor Co. during the week placed 1000 tons of high grade blue annealed sheets for crank cases with a Valley district mill at 2.50c. Mills report small lot sales at 3.15c. for black and 4.15c. for galvanized.

Warehouse Business.—A leading local jobber has reduced warehouse prices $5 a ton on black and galvanized sheets and $3 a ton on blue annealed sheets. Other local warehouse prices have not yet been changed. Detroit jobbers reduced warehouse prices July 22 from $3 to $5 a ton.

Old Material.—The market is almost at a standstill and many dealers are not attempting to do any business. One local mill is still accepting shipments of heavy melting steel on old contracts and dealers are paying $11 for selected material to fill its orders. One dealer is buying heavy melting steel for yard stock, making purchases of this grade at $10.50 to $10.85. Prices generally are unchanged, although cast scrap is lower, evidently being affected by the recent decline in pig iron prices.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft.	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.50 to 7.00
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3 50 to 4.00
Steel axle turnings	8 00 to 8.50
No. 1 cast	15 00 to 15 50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6 00 to 7.00

Hurrying Taxation Legislation

WASHINGTON, July 26.—Speeding up of the revised tax legislation in response to the demands of the country is indicated by the fact that it was stated by high authority to-day that the House may be able to pass the measure and turn it over to the Sena e by Aug. 6. While not assured this will be done, efforts are understood to be under way in that direction, despite the claim of prominent House leaders that the measure cannot pass the House before Sept. 1.

Hearings on tax revision were begun to-day before the Committee on Ways and Means. The evidence points to the fact that some of the fundamental principles of tax revision will include elimination of excess profits tax, modification of the surtax and restoration of a higher tax on first-class mail in order to make up the deficit of the parcel post. An effort is to be made by Congress to bring about diminution of taxes by reducing expenditures, though some leaders of Congress think decrease, if any made, will be small. Should the new tax bill get over to the Senate before the completion of hearings on the tariff, which will last two weeks or more, it is proposed to pass the tax legislation first. Sentiment for a recess of Congress after tax legislation passes the House is increasing.

Philadelphia

PHILADELPHIA, July 26.

Further price reductions have been made in semi-finished steel and mild steel bars, to which is attributed improvement in orders, particulary from jobbers who are taking this opportunity to round out stocks. The improvement has inspired one prominent steel company with plants in both eastern and western Pennsylvania to increase operations to a general average of 40 per cent, new business having come in just when some departments were on the point of shutting down.

Rerolling and forging billets and slabs have been reduced $3 from a week ago, now being quoted at $30, $35 and $31, respectively. Mild steel bars have been lowered to 1.75c. from 1.90c. a week ago.

A Buffalo steel plant, doing business in the Philadelphia district and down for some time, is rumored to be on the point of starting up in a week; the Midvale Steel & Ordnance Co., favored with some of the Belmont Iron Works orders and other new business, has either resumed idle departments or failed to shut down departments which it previously contemplated doing. The Reading Iron Co. started two mills Monday. The Alan Wood Iron & Steel Co. expects to resume partial operations next week.

On the contrary, two furnaces are seriously considering going out of blast. A certain degree of optimism exists in the pig iron trade, though to a less extent than in steel lines, because of the severe price slashing. There are 100,000 tons of iron piled in furnace yards in eastern Pennsylvania. Though no sales absolutely prove it, foundry iron is obtainable at $19 base.

Brokers in old material realize that there is a scarcity of scrap, owing to low production of manufacturers. Consequently they are hastening to cover on short buying.

There is a report of a purchase by an oil refining company of 8000 tons of plates, 1200 tons of bars and shapes and 15 or 20 carloads of pipe. There is one inquiry for 600 tons of foundry iron.

Pig Iron.—Furnaces have viewed with some concern the keen competition which has brought iron down to a $20 base. Now, positive offerings have been made at $19, base, though no sales at this figure have come to light. Prices are very mixed, in some cases little price distinction being made between No. 2 plain and No. 2X; some of the higher silicon iron has been sold at a rate that, if the usual $1 were observed, would bring the base, price below $20, the old-time differentials being ignored. Some optimism is expressed on the part of those who believe that the recent slash was the last and that the market will work upward. However, it is estimated that there are 100,000 tons of iron piled in eastern Pennsylvania yards and that it will take considerable buying to raise prices. There is talk of two more furnaces going out of blast, one of which recently blew in on low phosphorus. The Ingersoll-Rand Co. is inquiring for 700 tons of foundry iron, 500 of which is 1.75 to 2.25, the rest 2.25 to 2.75 silicon. There is another inquiry for about 250 tons of foundry iron, half of which is No. 2 plain and half No. 2X. A sale of 100 tons of basic was made a few days ago at $23, furnace, but it is agreed that basic could be obtained at $20 today, and possibly $19, furnace. One iron agent reports sales for July as five times as great in volume as in June. Some state that no more iron will be sold at a sacrifice for liquidating purposes because the banks are now more ready to loan cash.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.35 to $20.75
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.35 to 22.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	21.25 to 22.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Because of the low operations of steel plants, there is but little demand for ferromanganese or spiegeleisen. The most general quotation for the former is $75, delivered east of the Mississippi, for do-

mestic, and $75, seaboard, for British. It is rumored that it was offered to a West Virginia steel plant at $65. Spiegeleisen is generally quoted at $27. The Bettendorf Co. is reported to have bought a carload of spiegeleisen.

Plates.—The price at which the plates were sold recently to the Belmont Iron Works is carefully kept secret, but a lower price is reported. It is rumored that the Gulf Refining Co. has purchased 8000 tons of plates, part of which will be used for storage tanks on the Delaware River. No action will be taken on bids on plates for ships for the Red D line for a month. The chief plate demand is for oil tanks, with some inquiries from railroads for car repair work. The rumor persists that the Pennsylvania Railroad will soon ask for large tonnages.

Structural Material.—It is also stated that the Gulf Refining Co., in addition to its purchase of plates, has bought 1200 tons of shapes and bars. Structural shapes are generally quoted at 1.85c., but there are evidences of shading. There are considerable inquiries for structural shapes for new buildings and especially for extensions and remodeled structures, though few orders result.

Semi-Finished Steel.—The Midvale Steel & Ordnance Co. now asks $30 for re-rolling billets, $35 for forging billets and $31 for slabs, all Pittsburgh, which is a $3 reduction within a week on each.

Sheets.—It is rumored that a Youngstown plant secured the order for the 1500 tons of sheets bought by the Belmont Iron Works. Blue annealed are usually quoted at 2.50c., black at 3.25c. and galvanized at 4.25c., Pittsburgh.

Bars.—Steel bars are uniformly 1.75c., Pittsburgh, as against 1.90c. a week ago. Bar iron is also 1.75c. The Reading Iron Co. started some of its mills Monday.

Pipes and Tubes.—The Midvale Steel & Ordnance Co. has revised its schedule on charcoal tubes as follows: 1¾ and 1⅞ in., list, less 10 per cent; 2 and 2¼ in., list, less 20 per cent.; 2½, 2¾ and 3 in., list, less 25 per cent; 3¼, 3½ and 4 in., list, less 27 per cent.

Bolts and Nuts.—The Belmont Iron Works is asking for 7000 turnbuckles and 2500 bolts, both ¾ in. Railroads are fairly active in buying spikes and bolts.

Old Material.—A better feeling exists, and it is more difficult for brokers to obtain material from dealers at present prices. Brokers who bought short are hastening to cover requirements. The improvement is partly due to the purchases by the Bethlehem Steel Co. of railroad and industrial heavy melting steel at the higher price of $12, delivered Bethlehem. Two concerns have been furnishing the bulk of this material, one in New York, the other in Philadephia. There has been some inquiry for stove plate and borings for delivery to the Philadelphia district, but at the prices offered difficulty was experienced in obtaining it. One inquiry called for No. 1 cast delivered to Baltimore.

No. 1 heavy melting steel	$11.00 to $12.00
Scrap rail	11.00 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	13.50 to 14.50
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	12.00 to 12.50
Iron car axles	No market
Steel car axles	No market

Warehouse Business.—Price revision downward was contempated Wednesday of this week, in view of the lower prices offered by mills. Jobbers have been inspired by reductions to lay in more stock and have themselves made sales of a trifle greater tonnages.

Soft steel bars and small shapes, 2.90c.; iron bars (except bands), 2.90c.; round edge iron, 3.20c.; round edge steel, iron finish, 1½ in. x ½ in., 3.20c.; round edge steel, planished, 3.95c.; tank steel plates, ¼-in. and heavier, 3c.; tank steel plates, 3/16-in., 3.20c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.50c.; galvanized sheets, No. 28 gage, 5.50c.; square twisted and deformed steel bars, 2.90c.; structural shapes, 3c.; diamond pattern plates, ¼-in., 4.75c.; 3/16-in., 4.95c.; ⅛-in., 5.05c.; spring steel, 4.40c.; round cold-rolled steel, 4.50c.; squares and hexagons, cold-rolled steel, 5c.; steel hoops, No. 13 gage and lighter, 3.85c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.60c.; iron bands, 4.20c.; rails, 3.20c.; tool steel, 12c.; Norway iron, 6.50c.; toe steel, 4.50c.

Will Consider Freight Rates

PITTSBURGH, July 26.—The question of railroad freight rates on ore, coke and limestone will be thoroughly threshed out at a meeting to be held here soon between traffic officials of the railroad serving this section of the country and blast furnace and steel plant interests of the Pittsburgh and Valley districts. Statistics compiled by the traffic manager of one of the Pittsburgh independent steel companies shows that the present cost of assembling the materials used in making a ton of pig iron, including a charge of 40c. for slag disposal, is $10.44. This compares with $5.18½ in 1913 and $5.34½ in 1912. Comparison is made with 1912 and 1913 as being the last normal years prior to the war. In view of the fact that the market for basic pig iron in this district is not quotable at higher than $19 per ton at furnace, and that some iron recently has been sold at even less, pig iron producers must produce the raw materials, pay the cost of conversion and absorb other expenses for about $8.50. This, of course, cannot be done. If ore were still further reduced 50c. a ton to around $5 per ton at lower lake docks for non-Bessemer, it still would be impossible, even with labor at 30c. an hour, according to furnace operators, to get the producing cost of a ton of pig iron below $20 on current freight charges. These features of the situation will be presented to the railroad officials in the hope that something will be done in the direction of reducing freight rates.

Ore Rate Hearing at Chicago

On Monday, Tuesday and Wednesday of this week hearings were held at the Great Northern Hotel, Chicago, in the complaint of 82 independent iron mining companies against the ore carrying railroads of Minnesota, Wisconsin and Michigan. The hearing was held before Examiner Hosmer, acting for the Interstate Commerce Commission. The ore mining companies contend that the present freight rates on ore carried from the mines to upper lake ports are excessive and above the actual cost of the service plus the 6 per cent return to the railroads guaranteed under the Cummins-Esch law. The complainants in their brief filed with Examiner Hosmer say that the rates should be 70c., 60c. and 50c. per ton from the three rate districts in the ore region. The Lake Superior Iron Ore Association was represented at the hearing by its counsel, Jean Paul Muller, of Washington.

Associations Would Like to Intervene

WASHINGTON, July 26.—A petition was filed to-day with the United States Railroad Labor Board at Chicago by the National Association of Manufacturers, the National Founders' Association and the National Erectors' Association asking for permission to intervene as shippers in the case known as the Federated Shop Crafts, a union labor organization, against the Pennsylvania Railroad bearing on a decision of the Labor Board and relating to the negotiation of labor agreements. The decision is a substitute for the so-called national agreements effective under Government control of the railroads, and under it the Pennsylvania, through a ballot, attempted to ascertain who should represent its employees in negotiation with its officers. Unions of the shop crafts objected and sent out a counter ballot, warning all shop crafts employees not to vote the company's ballot, but to vote the union's ballot. A blank space on the union ballot would permit a vote for any other organization, but not for an individual representative.

British Iron and Steel Market

Iron Makers Starting to Resume Production—Continental Competition Active

(*By Cable*)

LONDON, ENGLAND, July 26.

Five Cleveland furnaces are now working, and it is expected that two more will be relighted shortly; but as ironmasters generally decline to resume production until costs are cheaper, stocks of the better grades of iron are diminishing, despite the fact that consumers are holding off on orders.

Continental producers are still receiving the bulk of the steel orders. German merchant bars are subject to irregular quotations ranging from £7 15s. ($27.59) to £8 5s. ($29.37) f.o.b. Quarter-inch plates are being sold at £8 5s. f.o.b. Number 5 gage wire rods are selling at £11 5s. ($40.05) cost and freight to Japan.

Vickers has been closed until Aug. 9, on account of a strike of woodworkers. No orders for ships or machinery have been received this year. Some North Lincolnshire steel works have restarted operations.

Tin plate quarters are sold to the East at 26s. to 27s. ($4.63 to $4.81) f.o.b. Prime stock plates of 20 x 14 in. are practically unobtainable at 28s. ($4.98) basis f.o.b. More mills are starting up; it is anticipated that there will soon be 20 per cent in operation.

Sellers of Belgian 24-gage galvanized sheets are asking £26 ($92.56) cost and freight to Buenos Aires. German 24-gage black sheets for galvanizing are being sold at £12 10s. ($44.50) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.56 per £1 as follows:

Durham coke	£2 2		$7.48
Cleveland basic	6 0		21.36
Cleveland No. 1 foundry	7 0		24.92
Cleveland No. 3 foundry	6 15 & £7 0*		24.03 & $24.92
Cleveland No. 4 foundry	6 15 & 7 0*		24.03 & 24.92
Cleveland No. 4 forge	5 17½		20.92
Hematite	7 0*		24.92
East Coast mixed	8 0 & 7 5*		28.48 & 25.81
Ferromanganese	18 0 & 14 0*		64.08 & 49.84
Ship plates	14 10		51.62
Boiler plates	19 0 to 21 0		67.64 to 74.76
Tees	14 10		51.62
Channels	13 15		49.95
Beams	13 10		48.06
Round bars, ¾ to 3 in.	13 10		48.06
Rails, 60 lb. and up	10 0 to 15 0		35.60 to 53.40
Billets	11 0 to 11 10		39.16 to 40.94
Sheet and tin plate bars, Welsh	10 10		37.38
Galvanized sheets, 24 g.	22 0 to 23 0		78.32 to 81.88
Black sheets	18 10†		65.86
Tin plate base box	1 4 to 1 8		4.27 to 4.98
Steel hoops	17 0		60.52
Cold rolled steel strip, 20 g.	26 10		94.34

*Export price. †Nominal.

Resumption of Operations Slow—Pig Iron Scarce—Continental Competition

LONDON, ENGLAND, July 14.—Now that the coal trouble is settled and work resumed in the mines, there is a natural disposition to look for some revival in trade. It is beginning to be realized that improvement is going to take much longer than was formerly thought. At one time it was believed that whenever the coal trouble was out of the way, brighter conditions would at once follow. This is now seen to be impossible, but there is a confident feeling that the worst is over and, now that labor has settled down and that there are prospects of some settlement of the Irish question, there is a feeling of confidence without, however, undue optimism.

About the beginning of the month work was begun in all the collieries where conditions were favorable, but large bodies of men were nevertheless unable to find employment. Supplies of coal are now coming forward and at cheaper prices, but the figure demanded is still too high to enable economic working in many industries. Apparently 20s. per ton is considered to be the ideal price for coal if iron and steel manufacture is to be conducted at a profit and, despite pessimistic utterances that cheaper fuel seems a long way off, other opinions tend to the belief that such prices will be seen before the year is out. A fact to be remembered is that a decline in the demand for British pig iron may react on the coke demand. It is understood that very little blast furnace coke is being bought. It is also understood that coke will ease in price before long, and if so it will certainly be a great help to the iron and steel trades.

Up to last week there had been little resumption among iron and steel plants of the country. This was partly due to the fact that the amount of coal drawn from the mines had been disappointing, while prices have been prohibitive. It is believed, however, that when the first demand for fuel has been filled there will be a fall in values, but nobody can foretell accurately what the cost of industrial coal will be, and ironmasters are in no hurry to commit themselves to a resumption of operations until they have some more assurance that they will be able to produce at a profit. Meanwhile the cost of production of pig iron has been reduced in another direction. The official ascertainment of the average selling price of No. 3 Cleveland G. M. B. for the past quarter showed the figure to be 126s. 11.56d. per ton. As a result of the sliding scale, the blast furnacemen's wages on the North East Coast will be further reduced, which means that taking into account the reduction a few months ago, their wages are reduced this year from 170¼ per cent to 72¾ per cent above the standard.

At the moment supplies of foundry pig iron are pretty nearly exhausted owing to the stoppage of production. Consequently when foundries get started again it is likely that prices will firm up, although, of course, imports of foreign pig iron will increase. This competition continues keen and it is obvious that if the industry is to live here at all, lower selling prices must be made practicable.

In manufactured material, the resumption of operations must necessarily be slow. One or two works started last week and it is expected that some more will begin during this week, while in other cases it is possible operations will not be started for some time. As a matter of fact the bulk of these works are short of orders and, although there is a certain amount of inquiry, business is slow to mature, as the low quotations for Continental material naturally lead to the expectation that domestic manufacturers must make further cuts in prices. Fuel is, however, being accumulated for a resumption, but in some cases the managements are making no move and say they will not do so until there is a radical change in the situation.

Early Good Results Expected

WASHINGTON, July 26.—Impetus to iron and steel and other industries from which railroads buy heavily is expected to result from the request made of Congress by the President to-day in a special message asking that the War Finance Corporation be empowered to purchase railroad funding securities accepted by the Director General of the Railroad Administration in expediting settlements with carriers.

The President states, as had been anticipated, that $500,000,000 may be necessary, and that no appropriation from Congress will be required. His message carried nothing that had not been anticipated, but nevertheless was the source of considerable satisfaction and verified the understanding that the Administration and carriers had agreed upon a plan looking to quick settlement between the Government and the railroads by the latter informally agreeing to waive claims based on inefficiency of labor. This had been the greatest obstacle in conducting negotiations. It is believed the legislation required will be quickly enacted and that railroads will use money not only to settle obligations they owe to manufacturers, car builders and other suppliers of equipment, but will come into the market for new requirements, the amount of which has not been indicated. This, it is stated, will be an important factor in stimulating industry.

Sentiment Growing Better, Says Judge Gary

Issues Statement Following Meeting of Finance Committee of Steel Corporation — Sharp Decline in Earnings with Deficit After Paying Dividends

THE report of the United States Steel Corporation for the second quarter of 1921 shows the smallest net earnings since the first quarter of 1915, being $21,892,016, compared with $32,286,722 for the first quarter of 1921 and $12,457,809 for the first quarter in 1915. The lowest net earnings on record were for the last quarter of 1914, being $10,933,170. After deducting from the net earnings all charges and allowances and interest on bonds there remained a balance of $8,087,032 for the second quarter of 1921. The usual dividends of 1¾ on preferred and 1¼ on common were declared, requiring $12,638,700 and leaving a deficit of $4,571,668 compared with a surplus of $2,816,905 for the first quarter of 1921. The net earnings for the quarter ending June 30, the preceding quarter and the preceding three years were as follows:

Quarters	1921	1920	1919	1918
First	$32,286,722	$42,089,019	$33,513,384	$56 961.424
Second	21,892,016	43,155,705	34,331,301	62,557,391
Third	.....	48,051,540	40,177.232	42,961,589
Fourth	.....	43,877,862	35,791,302	36,354,165
Net earnings each year	.....	$177,174,126	$143,813,219	$198,834,569

The statement of earnings for the quarter ending June 30 was as follows:

Earnings

	Earnings Before Charging Interest on the Subsidiary Companies' Bonds Outstanding	Less Interest on the Subsidiary Companies' Bonds Outstanding	Balance of Earnings
April, 1921	$8,010,975	$674,320	$7,336,655
May, 1921	8,404,522	672,873	7,731,649
June, 1921	7,496,424	672,712	6,823,712
	$23,911,921	$2,019,905	
Net earnings			$21,892,016
Less charges and allowances for depreciation, and sinking funds on bonds			8,665,507
Net income			$13,226,509
Deduct:			
Interest for the quarter on U. S. Steel Corporation bonds outstanding		$4,934,477	
Premium on bonds redeemed		205,000	
			5,139,477
Balance			$8,087,032
Dividends on stocks of the United States Steel Corporation, viz.:			
Preferred, 1¾ per cent		$6,304,919	
Common, 1¼ per cent		6,353,781	
			12,658.700
Deficit			$4,571,668

Judge Gary's Statement

Following the meeting of the finance committee Judge Gary, chairman of the board, issued the following statement in regard to the business outlook:

"The business results of the Corporation for the last quarter, which were not exactly determined until to-day, are not surprising to anyone familiar with general conditions.

"Shipments have been small and prices received on products delivered have been very low compared with the cost of production. Many manufacturing concerns have been operating at a loss. This is about as censurable as insisting upon unconscionable profits. It cannot be long continued.

"We have been paying somewhat higher wage rates than many other basic lines of industry. We think reductions in these rates should follow, rather than lead, selling prices, particularly those involving the costs of living, which in some respects are still unreasonable. These are being surely, if slowly, forced down to a fair basis by the withholding of purchases on the part of consumers. Up to the present time, we believe, wage earners generally have not been paid too much, excepting always certain trades or vocations in which rates were, during the war, on one pretext or another, arbitrarily tripled or quadrupled, and still are attempted to be maintained. This does not apply to the steel industry.

"While business in many lines, including iron and steel, is still dull and hesitating, the outlook is not discouraging or doubtful. Sentiment has been for some time, and still is, growing better.

Headed in Right Direction

"As stated at the meeting of the American Iron and Steel Institute last May, industry is headed in the right direction. This means a great deal, for at some date in the future there awaits the biggest business this country has ever witnessed. The fundamental facts for this conclusion are assured. The undisputed figures amount to a demonstration.

"Just at present there are many reasons for believing our conditions are improving, even though we may not as yet have experienced, to a large extent, the good results. Readjustments were necessary and they have been and are progressing with beneficial effect. During the war extravagance in expenditures in many ways and departments, from the Government down, was stupendous. Energy and effort were bent in the direction of building up new and expensive organizations ostensibly to assist in winning the war; and hundreds of millions were squandered. There was an orgy of overcharging, over-spending and waste. This was natural and perhaps inevitable. Now we are witnessing a contrary disposition, also from the Government down, although not every man, woman and child is yet included in the effort to reduce, to economize and to save.

Co-operation After Conflict

"Apparently, we shall soon have actual peace throughout the world. Construction, co-operation and wisdom will supplant destruction, conflict and folly. Legislation will be calculated to assist rather than obstruct legitimate progress. Taxes, which now burden almost to the point of stagnation, will surely be gradually and reasonably modified. Our President has said publicly that business is the biggest thing in the world, which is equivalent to saying that food, shelter and clothing are first to be considered in discussion; therefore prosperity is essential to the progress and happiness of the nation. International, national and industrial peace will become stabilized, not as a result of combined force, but because of the good will and honest desire of righteous-minded people.

"The financial aspect of this country and other countries has been improving, and to most of us at least, looks bright. The banking institutions of the United States are sound. Our resources are enormous. Our people are ready, anxious and able to do business. Everyone is called upon to do his or her part in the endeavor to return to a sane and reasonable basis, and the sooner this opinion becomes practically unanimous the earlier will we reach the goal of prosperity, the apparent distance of which depends upon individual vision.

"We need not shout in triumph, but we are not compelled to feel despondent. The world has been very sick. Therefore full recovery is longer delayed. The further we proceed in the direction we are now going the faster will be the pace. With the continuous maintenance of law and order, securing individual freedom of action in legitimate effort, the economic position of this country will be invincible."

GERMAN MARKET IMPROVES

Demand Good Particularly for Export—Foreign Buying of Rails and Rolling Stock

(By Aerial Mail to London)

BERLIN, GERMANY, July 12.—Improvement in the tone of the German iron and steel market has made rapid progress during the past 10 days and compared with the recent dullness, demand for some rolled products has become pressing. The condition of the export market confirms the assumption that there is a general improvement. Not only is there an increase in foreign inquiries but the number of transactions closed and contracts awarded is larger. Germany is benefiting by the fact that England is at present counting very little in iron and steel export and added to this is the curtailment of production in the United States. Thus, the world's business in iron and steel is at present largely shared by the three principal Continental iron countries—Belgium, France and Germany. This has resulted in a slight relaxation of ruthless price cutting, but business with the Entente countries is still impeded by the prevailing uncertainty in regard to the 26 per cent export levy.

Average export prices to Holland at the beginning of July were as follows:

	Per Ton Fl.	
Bar iron	79	$24.57
Heavy sheets	79	24.57
Medium sheets	81	25.19
Light plates	84	26.12
Wire, rolled	82	25.50
Wire, drawn, per 100 kg	9.65	3.00

Rhenish-Westphalian mills are booked with orders until October and many works are introducing new shifts. Industrial circles feel confident that business will register further improvement by autumn. Although the coal quota for smelters has been cut, supplies are regarded sufficient for present requirements. French minette ore is still offered in large quantities but demand is rather light, active propaganda being carried on to urge smelters to withhold purchases pending the removal of the Entente sanctions. Supplies of Swedish ore are satisfactory. There is slightly more activity in pig iron demand but there is still the pressure of stocks on hand. Foundry iron No. 3 (1.80-2.50 per cent silicon, 1 per cent manganese, 0.9 per cent phosphorus, 0.06 per cent sulphur) which is officially quoted at 1100 m. per ton ($14.30) plus a rebate of 50 m. per ton, is offered in the free market at 990 m. ($12.87). Ferromanganese, 75 per cent of English origin, is offered at £13/10 ($48.15) c.i.f. Dutch, and £15 ($53.50) German, seaboard.

Foreign Railroads Buy in Germany

Indications are that structural shapes are livening up. Fabricators have lately booked substantial export orders. Jugo-Slavia recently placed a large bridge order with two German firms. In the rail market, price changes have been slight. Finland is reported to be in the market for 8000 tons of rails and the Swiss Federal Railroads are also expected to invite tenders for rails before long. A movement is in progress to establish a German rail syndicate to handle foreign business more efficiently. Inquiries for bar iron are brisk and terms of delivery now average 6 to 8 weeks. Several mills, such as the Gutehoffnungshütte and the Rheinische Stahlwerke, are booked solid for the third quarter. Demand for sheets is slightly better but prices still tend downward. Following upon the dissolution of the wire convention, quotations immediately dropped below official list prices. Drawn bright wire last quoted at 230 m. per 100 kg. is now 200 m., while nails have receded from 270 m. to 230 m. Only the large works are in a position to close at these prices, the smaller plants being unable to follow in face of the high prices for rods, which have steadily advanced during the past fortnight and are now quoted around 2000 m. per ton. Supplies from the larger mills, as Krupp's, Gutehoffnungshütte, and the Hösch steel works, are limited, causing a scarcity in the market. We quote:

	Per Metric Ton Marks	
Ingots	1170	$15.21
Billets	1300	16.90
Iron bars	1800	23.40
Shapes	1750	22.75
Angles and tees	1670	21.71
Reinforcing bars	1780	23.14
Hoop iron	2200	28.60
Hoop iron, cold rolled	3400	44.20
Rounds, drawn, bright	2730	35.49
Flats	1730	22.49
Squares	1720	22.36
Rounds	1740	22.62
Sheets, heavy	1750	22.75
Sheets, medium	1800	23.40
Plates, light	1850	24.05
Plates, tank	2200	28.60
Wire rods	2000	26.00

Negotiations have been opened at Berlin with the Russian Soviet Government for another order for 100 locomotives, 3000 cars and 150 tons of rails. Representatives of Vickers, Ltd., of London, have arrived in Berlin to confer with German interests on joint action in Russia. The Saechsische Maschinenfabrik, vorm, Richard Hartmann Aktien Gesellschaft, at Chemnitz, recently booked an order for 500 locomotives for Japan. An offer has been made to the Jugo-Slav government by Germany to settle part of the war indemnity by the delivery of 85 complete railroad trains (locomotive and 50 cars) through the Barkhaus works. The cabinet council is stated to have principally accepted this offer provided no objections are raised by the Entente.

German manufacturers and exporters are displaying activity in the Palestine market. The Standard Bau und Industriebedarfs G.m.b.H. of Berlin, an oriental trading company specializing in trade with Palestine and border countries, which lately booked several orders for industrial equipment for Palestine, has consolidated with the Berlin export company of Hecht, Pfeiffer & Co.

Return to Piece Work

A statement has just been issued showing that the return to piece work is progressing. At the Erfurt plant, for instance, 50 per cent of the present pay roll is for piece work, compared with 16 per cent at the beginning of the year while the figures for the Lippstadt, Kassel and Spandau plants are 57 per cent against 20 per cent, 28 per cent against 7 per cent, and 50 per cent compared with no piece work, respectively.

M. Stomoniakoff, the newly appointed representative of the foreign trade department of the Russian Soviet Government at Berlin, is stated to have resumed negotiations with the trade organizations of the German machine tool industry for the delivery of precision machine tools. From a reliable source it is learned that an order for textile machinery, for which flax and wool are offered, is also under consideration. The monthly capacity of the rolling stock department of the Rheinische Metallwaren und Maschinenfabrik Aktien-Gesellschaft, at Düsseldorf, is given as 30 locomotives and 300 cars. Locomotives form one of the new products of this company.

Living Costs Increase

The employers' associations in the Thuringian metal and engineering industries have decided upon a wage cut of from 1 to 16 per cent in the machine industry, and 10 to 50 per cent in the small iron ware industry, for competitive reasons. The heavier cuts will be made in the wages paid to juvenile workers. The cost of living is again on the increase. The index number of German wholesale prices comprising 77 commodities and compiled by the *Frankfurter Zeitung* is given at 1466 at the beginning of July, compared with 1375 at the beginning of June and 100 in the middle of 1914. A further rise is believed certain in view of the further depreciation of the mark and impending taxation. The Wanderer works at Chemnitz have plenty of orders for all lines, excepting machine tools. This company ranks among the leading bicycle and typewriter manufacturing concerns. The turnover in typewriters during the past 9 months is stated to have reached nearly 100,000,000 m., and business in bicycles and motorcycles is equally brisk.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; nolished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets.....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads.....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts.....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S..30, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....4c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.85 to $3 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.85 to $3 base; 5/16-in., $2.85 to $3 base. Boat and barge spikes, $3 to $3.20 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 base per 100 lb. Tie plates, $2.50 per 100 lb.; angle bars, $2.75 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.50c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.30–2.55	Nos. 11 and 12	2.50–2.75
Nos. 9 and 10 (base)	2.40–2.65	Nos. 13 and 14	2.60–2.85
		Nos. 15 and 16	2.70–2.95

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70–3.20	No. 28 (base)	3.00–3.50
Nos. 22 to 24	2.75–3.25	No. 29	3.10–3.60
Nos. 25 and 26	2.90–3.40	No. 30	3.20–3.70
No. 27	2.95–3.45		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00–3.50	Nos. 25 and 26	3.70–4.20
Nos. 12 to 14	3.10–3.60	No. 27	3.85–4.35
Nos. 15 and 16	3.25–3.75	No. 28 (base)	4.00–4.50
Nos. 17 to 21	3.40–3 90	No. 29	4.25–4.75
Nos. 22 to 24	3.55–4.05	No. 30	4.50–5.00

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80–3.30	No. 28 (base)	3.00–3.50
Nos. 17 to 21	2.85–3.35	No. 29	3.05–3.55
Nos. 22 to 24	2.90–3.40	No. 30	3.05 3.55
Nos. 25 to 27	2.95–3.45	Nos. 30½ and 31	3.10 3.65

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
20.....	12.62½	12.50	26.50	4.40	4.35	4.75	4.25
21.....	12.62½	12.50	26.75	4.40	4.35	4.70	4.20
22.....	12.50	12.37½	27.00	4.40	4.35	4.70	4.20
23.....	12.50	12.37½	....	4.40	4.35	4.70	4.20
25.....	12.50	12.25	26.50	4.40	4.35	4.75	4.25
26.....	12.50	12.25	26.00	4.40	4.35	4.75	4.25

New York

NEW YORK, July 26.

All the markets are spasmodic as to buying and in some cases quotations are difficult to define. Buying of copper is light and confined to second hands with prices lower. The tin market has been moderately active at a lower level. Lead is quiet and fairly firm. The zinc market continues stagnant with prices fairly steady.

Copper.—As the month of July draws to a close it is evident that some copper held by dealers for speculation has had to be sacrificed and this has resulted in sales of moderate quantities at price concessions which have weakened the market. Various reports are current as to the levels at which some sales of electrolytic copper have been made. An unconfirmed report is to the effect that one sale was made as low as 12.12½c., delivered, but the general level of prices at which the limited amount of sales have been made and at which further sales could be negotiated is 12.25c., New York, or 12.50c., delivered, from some of the smaller producers and dealers. The leading producers are fairly firm in maintaining quotations at 12.75c., delivered, or 12.50c., New York. Buying for foreign account is reported as fair with larger producers disinclined to sell much at present low levels. The Lake copper market is exceedingly dull at 12.50c. to 12.75c., delivered.

Tin.—About the middle of last week there was moderate activity which resulted in sales of about 500 tons of future shipment Straits tin, dealers and consumers being buyers with the former predominating. Outside of that there has been but little business since. There have been few sellers as well as few buyers, the latter being confident of lower prices, and this was justified by a sharp drop in the market yesterday and to-day, Straits tin being quoted at 26c., New York, to-day, as against 27c. to 28c. last week. London prices are also lower to-day, with spot standard quoted at £158 5s., future standard at £165 5s. and spot Straits at £158 15s. per ton, all lower than a week ago. Arrivals thus far this month have been 1270 tons with 2865 tons reported afloat.

Lead.—This market is exceedingly dull and barely steady. There is apparently enough metal at the price of the leading interest to supply the light demand and very little is heard of offerings in the outside market. We quote the market at 4.35c., St. Louis, or 4.40c., New York, for early delivery.

Zinc.—A slight improvement is reported in inquiry as well as sales this week over last week, which has been characterized by one seller as the quietest ever recorded, there having been no inquiries of any kind for three successive days. Metal which was being offered as low as 4.20c., St. Louis, last week, from one or two sources, has disappeared and the market is slightly firmer for prime Western for early delivery at 4.25c., St. Louis, or 4.75c., New York. Sales of several 100-ton lots are reported, mostly to galvanizers who have orders to fill.

Antimony.—Wholesale lots for early delivery are unchanged in a dull market at 4.65c., New York, duty paid.

Aluminum.—The quotation of the leading interest continues at 24.50c., f.o.b. plant, for virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery. Imported aluminum of the same grade is obtainable at 22c. to 23c. per lb., New York.

Old Metals.—Business is very quiet and the tone of the market is easy. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	10.50
Brass, heavy	7.00
Brass, light	5.25
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	5.00
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

July 27.—Copper and tin are lower in this market. Very little business is being done. We quote Lake copper at 13c., in carload lots; tin, 28c. to 28.50c.; lead, 4.35c.; spelter, 4.35c.; antimony, 7.50c. On old metals we quote copper wire, 7.50c.; crucible shapes, 7.50c.; copper clips, 7.50c.; copper bottoms, 6.50c.; red brass, 6.50c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 17.50c.; block tin, 20c., all being buying prices for less than carload lots.

St. Louis

JULY 22.—The non-ferrous markets are duller than they have been for months. Lead is quoted at 4.20c. and zinc at 4.25c., car lots. We quote Lake copper car lots at 12.98½c. to 13.23½c.; tin, 28.11c., and antimony, 5.38½c. On old metals we quote: Light brass, 4c.; heavy yellow brass, 6c.; heavy red brass, heavy copper and copper wire, 8c.; light copper, 7.50c.; pewter, 17c.; tinfoil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c.; aluminum, 9c.

Secondary Metals in 1920

Recovery of secondary copper, brass, lead, zinc, tin, antimony, aluminum and nickel during 1920 is reported by the United States Geological Survey at $188,507,260, compared with $181,841,500 in 1919. Quantities increased for nearly all items, as shown (in short tons) in the following table.

	1919	1920	Per Cent Increase
Brass scrap remelted	249,700	259,800	4.0
Other copper	112,400	130 600	16.2
Lead as metal	55,684	56,350	1.2
Lead in alloys	66,416	68,300	2.8
Zinc as metal	39 910	42 850	7.4
Zinc in alloys,* etc	6,062	7,650	26.2
Tin as metal	5,977	7,200	20.5
Tin in alloys	18,056	16,300	9.7†
Antimony as metal	48	200	....
Antimony in alloys	4,351	5,400	24.1
Aluminum as metal	6,017	5,000	16.9†
Aluminum in alloys	12,674	10,500	17.2†
Nickel as metal	163	270	65.6
Nickel in non-ferrous alloys	2,284	1,930	15.5†
Total	579,742	612,350	5.6

*Other than brass. †Decrease.

The Youngstown Metal Products Co. has been formed at Youngstown, Ohio, with a capital of $50,000 and has acquired the property on Manning Avenue and the business of the Ungar Sheet Metal Products Co. The new owners will continue the manufacture of stovepipe and will add a line of metal specialties. Samuel H. Weinreich, president, will have charge of sales and Fred S. Ullman, secretary and treasurer, will direct production. A. M. Frankle is vice-president. E. H. Hughes will continue as plant superintendent.

Plans have been completed for the second basket picnic, this year, of the National Tube Co., Pittsburgh, to be held at Kennywood Park, July 30. The program includes a baseball game, novelty events, racing, various contests and dancing and music, in addition to the usual amusements at the park. The following executive committee is in charge: William B. Schiller, Taylor Alderdice, J. H. Nicholson, Edward Worcester, P. C. Patterson, S. M. Lynch, B. C. Moise, Peter Boyd, John Fritz, J. A. Beattie, E. C. Jaycox, W. A. Cornelius and Andrew Telfer.

HOPEFUL FEELING

Youngstown Sees Signs of Improvement, but Orders Are Not Numerous

YOUNGSTOWN, OHIO, July 26.—Improved steel buying commencing with September and continuing through the fall and early winter months is predicted by a leading independent executive. Crop movement will cause the farmers to do some buying, while the railroads will begin to make needed purchases, he believes. The period between the present and the middle of September will be marked by an irregular market, it is believed. While the general tendency is undoubtedly for more activity in the industry, indicated by a somewhat marked improvement in inquiry, actual buying still lags. Recent enlargement in active productive capacity in the Valleys has been disproportionate to the inflow of new business, and is largely attributable to the working off of a backlog of tonnage. Business now being negotiated will mean fairly sizable plate, bar, angle, bolt and nut orders.

A railroad car repair contract now in course of negotiation will involve upwards of 20,000 tons of plates, for instance, though the tonnage will probably be strung out over a considerable period. District makers recently figured on an inquiry for 1000 tons of rods, but when the business was placed it was for a much smaller tonnage. The Trumbull Steel Co. is working off a substantial order for strip steel placed by the Ford Motor Co. An inquiry for 500 tons of automobile seconds in sheets elicited varied quotations, one interest offering to supply the material at 3.50c.

Turn for Better Indicated

It is generally believed that such activity prefaces a turn for the better, though some time will probably elapse before the improved tone is shown in the actual placement of business. Consumers, it is stated, are less deterred by price uncertainties than for some time past, sensing the fact that quotations are reaching bottom. A definite market is gradually being shaped ranging from $3 to $5 per ton below nominal quotations on finished products.

The problem of operating losses, arising in part from recent reductions and from the low state of operations, is an important one before producers. Owing to the recent price reductions and the low state of operations, losses are now heavier than at any time this year.

Low Prices on Sheets

The sheet market is still spasmodic. An Eastern manufacturing consumer has purchased 1500 tons of copper bearing sheets from a Valley interest at a price under going quotations. Prevailing sheet prices are 3.25c. for No. 28 black; 4.25c. for No. 28 galvanized and 2.40c. for No. 10 blue annealed. These are all concessions from the recently announced levels. It is stated that 4c. for galvanized and 3c. for black are being quoted by Eastern competitors and could probably be done under pressure in the Valleys. An important producer expresses the opinion that the market will not stabilize until prices generally reach the lower levels.

There are signs of a let-up in the full finished market and the principal district maker is preparing to curtail production, which has been steadily maintained for several months. One sheet maker is turning out material largely for the Ford Motor Co., while another, the Brier Hill Steel Co., is working off tonnage for the Dodge Bros. Co. A non-integrated interest, the Falcon Steel Co., which has been idle for several weeks, is preparing for a complete suspension to continue for possibly two months.

While somewhat more activity has been in evidence in the plate market the past two weeks, it is not of a sustaining nature. Accordingly schedules are still gaged largely on day-to-day business. The range on prices is from 1.85c. to 2c.

SALE HALTED

Government Will Not Dispose of Surplus Steel Until Inventories Are Made

WASHINGTON, July 26.—In compliance with the recent order to stop all sales of surplus property, the Shipping Board to-day rejected without opening the only bid submitted for the purchase of 110,000 tons of structural steel at Hog Island. The single tender made was by the Bethlehem Steel Co. When it was received the announcement was made that it would not be opened and no additional bids on any surplus property will be considered until the inventory of surplus property, now under way, is completed. The physical work of making the inventory is almost completed, it was stated, but only a small part of the bookkeeping done. The steel at Hog Island consists of plain, fabricated and assembled material, the greater portion being fabricated plates. The policy as to disposition of the Government surplus is to sell, following inventory, after different branches of the Government have been given an opportunity to make requisition for needed supplies, in accordance with the recent order of Director Dawes. This was made clear to-day as the result of a conference between the budget director, Assistant Secretary of War Wainwright and Colonel Hartshorn, director of sales, War Department, after which it was announced the War Department will proceed with the sale of the surplus during August which has been scheduled for disposal, other branches having made requisitions for material from these lots. Included among the lots to be sold are miscellaneous iron and steel tonnages held in different sections of the country by the Quartermaster Corps. The biggest tonnage is to be sold Aug. 15, among which is about 3500 tons of shapes.

Along with the stopping of sales of surplus stocks, with the exception mentioned, the Government has held up proposed purchases. In line with this policy, the Bureau of Supplies and Accounts, Navy Department, has announced its withdrawal from market of approximately 8000 tons of plates, shapes, bars and sheets. Bids for furnishing these tonnages had been asked and were to be opened Aug. 5. The bureau also has withheld the award on approximately 900 tons of plates on which bids recently were received. These plates were to be delivered to Portsmouth Navy Yard, but it is understood the question of design of submarines is being given further study before the award is made and expected new bids will be asked later. Withdrawal of the request for bids for other steel, which was to furnish stock for six months, is attributed to the fact that stocks on hand first will be inventoried.

Freight Carried by U. S. Railroads

"Class One" railroads carried 2,249,567,625 tons of freight in the calendar year 1920. Coal and other products of the mines accounted for more than 1,200,000,000 tons, or 53.6 per cent. Grain and other agricultural products carried amounted to 220,000,000 tons, or 9.78 per cent. Lumber and other forest products carried weighed 197,000,000 tons, or 8.74 per cent. Meat and other animal products amounted to nearly 45,000,000 tons or 1.99 per cent. Manufactured and miscellaneous articles comprised 21.91 per cent, or about 493,000,000 tons. The balance—some 90,000,000 tons, or 3.98 per cent—was the total of the "less-than-carload" shipments, not classified as to character.

Federal Expenditures Drop

During the fiscal year ended June 30, United States Government ordinary expenditures amounted to $5,115,927,689, as compared with $6,403,343,841 last year. During the same period the disbursements on account of public debt fell from $17,038,039,723 to $9,182,027,170.

A Mahoning Valley fabricating interest has been figuring on 150 large boilers for the Navy Department, basing its estimate on price of plate stock considerably below the current market, at which it confidently maintains plates may be purchased.

PERSONAL

G. Grant Porter and W. Henry Twigg, managing director and director, respectively, of the Perfection Enamelling Painting Co., Ltd., London, have decided to embark in a business of representing American manufacturers in Europe. They have already made arrangements to represent some makers of machinery and equipment suitable for railroad use and shipyards, certain American devices and machines being regarded as having an attractive field of use in the railroads of Europe and in the metal-working industries. They left New York for France on Monday and have established headquarters at 11 rue de Edouard VII, Paris. They plan to cover Belgium, Germany, England and Italy. Mr. Porter has long been identified with English business activities, having first been engaged as an electrical engineer on the building of the Yerkes underground railroads of London. Mr. Twigg was for some time a consular representative of Great Britain in Venezuela.

Thomas B. Sweeney has become superintendent of the Dillon Boiler Works, Fitchburg, Mass., succeeding Joseph Scott.

W. Forster Browne, mining engineer, London, England, who has been in Canada for some time, examining properties of the British Empire Steel Corporation, also visited the United States and sailed from New York last week.

P. T. Irwin, Lincoln Twist Drill Co., Taunton, Mass., has been made sales manager, drill and reamer division, Greenfield Tap & Die Corporation, Greenfield, Mass., with headquarters in Greenfield. Galen Snow has been made advertising manager.

H. F. Randall, former manager of the New York office of the G. H. Williams Co., Erie, Pa., has succeeded E. F. Jones as general manager, Mr. Jones having resigned.

R. D. Love has been made manager of sales of the Warren Iron & Steel Co., Warren, Ohio, with headquarters at Warren, Ohio. He was formerly manager of sales and buyer for the Betz-Pierce Co., Cleveland, and later was connected with the sales department of the United Alloy Steel Corporation, Canton, Ohio.

A. C. Anderson, mechanical engineer Putnam Machine Works, of Manning, Maxwell & Moore, Fitchburg, Mass., is now engaged in engineering work for the William A. Hardy & Son Co., 133 Water Street, Fitchburg, brass founder.

David E. Roberts, consulting engineer, Cardiff, Wales, who has spent some months in China in connection with the proposed construction of additional iron blast furnaces, sailed from New York for England this week. Mr. Roberts has made a number of trips to the United States in recent years, visiting leading iron and steel plants.

Edgar L. Keithley, recently with the Seattle Plumbing Supply Co., has established an office at 1323 Alaska Building, Seattle, Wash., as a representative of the Central Foundry Co., maker of cast iron pipe, soil pipe and general castings. He will assist his father, E. A. Keithley, the company's representative at San Francisco, and will cover Oregon, Washington, neighboring States and British Columbia.

John D. Hurley, president Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, sailed from New York on the Olympic July 16 for an extended trip on business and pleasure throughout continental Europe. He was accompanied by Mrs. Hurley.

E. W. Crellin, former president Pittsburgh-Des Moines Co., has retired from active duty. The following officers have been elected: W. H. Jackson, president; O. E. Guibert, vice-president; George A. Smith, secretary and treasurer; W. W. Hendrix, vice-president. Mr. Smith has removed from Des Moines to Pittsburgh. A. C. Pearsall has been appointed general manager of the Des Moines branch.

J. C. Davies, managing director of Baldwins, Ltd., Swansea, Wales, who has spent some weeks in Canada at the plants of his company, sailed from New York on Tuesday.

Robert Wilson has resigned as superintendent of the Fabricated Steel Products Co., Leetonia, Ohio, to become identified in an official capacity with the Adams Mfg. Co., East Palestine, Ohio.

F. A. Hastings has been appointed assistant sales manager of the Pittsburgh Bridge & Iron Works, Pittsburgh. He has been with the American Bridge Co., and formerly of Wheeling, W. Va.

W. R. Hartline, for the last two years in the refinery construction department of the Texas Co., Houston and New York, has been added to the sale department of the Traffic Motor Truck Corporation, St. Louis, to assist in the promotion of sales to contractors and engineers. He was a flying engineer officer in the Army air service during the war. He is a junior member American Society of Civil Engineers.

President Lloyd Booth of the Falcon Steel Co., Niles, Ohio, announces that W. T. Brangham, assistant general sales manager, will have charge of the sales department during the next few months, under executive direction, due to the resignation of George E. Harris as general manager of sales. Mr. Harris has resigned to engage in business for himself in Detroit.

William J. Todhunter, for almost 35 years with the Illinois Steel Co. at South Chicago, Ill., has resigned as superintendent of the slab and plate mills at South Works to become manager of the American Forge Co., Chicago, a subsidiary of the Ajax Forge Co. Charles Horn, who has been assistant to Mr. Todhunter, succeeds him.

Paul C. Bandy, who formerly handled the sales work in the industrial heating department of the Cutler-Hammer Mfg. Co. in the Western district, is now manager of the industrial heating department of the Russell Electric Co., Chicago, who recently entered the industrial heating field in an extensive way.

George D. McDougall, general superintendent of the Nova Scotia Steel & Coal Co., New Glasgow, N. S., has been appointed chief engineer of the British Empire Steel Corporation, and Archie McColl, for many years secretary of the former company and assistant to the president, will be general manager of the Nova Scotia Steel & Coal Co., according to official announcement made by D. H. McDougall, vice-president of the British Empire Steel Corporation.

Clement C. Smith, Milwaukee, has succeeded Holden A. Evans as president of the Baltimore Dry Docks & Shipbuilding Co., Baltimore. He was chairman of the board and will continue to serve in that capacity. Mr. Evans also will serve on the board.

E. C. Welborn, 29 South La Salle Street, Chicago, has opened offices as business and engineering counsel in the solution of financial, business and engineering problems. Mr. Welborn graduated from Indiana University in 1897 and from the mechanical engineering course at Cornell University in 1903. He has been identified with the Illinois Steel Co., the Allis-Chalmers Mfg. Co., the Standard Separator Co., and for the past two years has been vice-president of the Hanna Engineering Works, Chicago, in charge of engineering, development, manufacturing and sales.

H. M. Salisbury, export manager Maxwell Motor Sales Corporation, Detroit, has gone to Europe to study conditions in England, France and Holland.

Charles S. Newmann, assistant secretary Union Mfg. Co., New Britain, Conn., will sail for home from Southampton, England, Aug. 3, following a three months trip.

Stewart C. Wilson has been appointed Pittsburgh district sales manager of the Whiting Corporation, Harvey, Ill., succeeding Robert S. Hammond, recently transferred to Chicago.

OBITUARY

James W. Porch

JAMES W. PORCH, for 23 years sales manager at New Orleans for the Lukens Steel Co., Coatesville, Pa., died July 21 after an operation. He was 63 years of age. Speaking of him, the New Orleans *Times-Picayune* of July 22 said: "Mr. Porch, from the day he came to New Orleans 23 years ago, was one of the city's outstanding personalities. Aggressive, a keen student of affairs, he took a leading part in virtually every movement launched in the last 20 years looking toward the development of New Orleans as a great port and a commercial center. He was a waterways enthusiast, one of the first of the little group of men who fought for revival of river traffic and who finally watched their following grow with the result the Government actually undertook that revival with its barge lines on the Mississippi and Warrior rivers. Another of his activities which was perhaps best known was his connection with the Public Belt. He was one of the first advocates of this city-owned facility and one of the most able campaigners in making it a reality."

Before going to New Orleans, Mr. Porch, under the Cleveland Administration, was the American consul general at Mexico City for a number of years. He is survived by his wife and two married daughters.

AUGUST C. KIECKHEFER, founder and former president Kieckhefer Elevator Co., Milwaukee, a manufacturer of freight and passenger elevators, died suddenly of heart disease in the Northwestern Station at Chicago on July 20 while waiting for a train to Milwaukee. He was 67 years of age and a native of Milwaukee.

BERNARD H. WENZEL, secretary Jaeschke Bros. Foundry Co., Milwaukee, died July 19 following a long illness. He was 29 years of age.

FRANK P. STANLEY, head of the Stanley Mfg. Co. and the Stanley Marine Engineering Co., died at his home on Puritan Lane, Swampscott, Mass., July 18, following an attack of heart disease, at the age of 71.

JONATHAN E. PORTER, founder of the Porter Machine Works, Hatfield, Mass., lathes, died of heart trouble at his summer home at Crescent Beach, Conn., July 21, at the age of 72. He was born at Hatfield, Nov. 22, 1849.

Federated Employment Bureau of the Engineering Societies

The Federated American Engineering Societies has taken over as part of its work the employment bureau for engineers which the national engineering societies had maintained for some time at 29 West Thirty-ninth Street, New York. Representing a combined membership of about 50,000, the Federated Engineering Societies plans to make this clearing house of engineering service increasingly valuable to employers and to engineers of every variety of training and experience. It is required that applicants be members and that they submit complete educational and professional records. The records are carefully classified and as the special requirements of any position are received the equipment and experience of men of suitable qualifications are submitted for consideration. The services of the bureau are free to employers and members alike. Since the arrangement was made for this joint conduct of the employment work of the various engineering societies the effectiveness of the service has been increased to a marked degree.

Cast Iron Pipe for Milwaukee

MILWAUKEE, WIS., July 26.—The city of Milwaukee closes bids Aug. 10 on 3510 tons of 54-in. cast-iron pipe and 343 tons of 54-in. special castings, f.o.b. Milwaukee, for delivery in 45 days.

DISSATISFIED WORKERS

Youngstown Employees Object to Wage Cuts—Many Preparing to Go Elsewhere

YOUNGSTOWN, OHIO, July 26.—While workers in the iron and steel industry are glad to secure employment, in the majority of cases, at almost any wage, the most recent wage reduction by independent producers, effective July 16, has caused considerable dissatisfaction. As a consequence of the moderate wage rate, many employees are preparing to seek work elsewhere or in other lines when business conditions are righted.

Wages earned by many men are a third or a half of their earning capacity during the war and they contend that living costs have not been proportionately reduced. Irregular employment, furthermore, has still further curtailed their income, with the result that socialistic and bolshevik tendencies are evident. Mill men state that radical sentiments are cordially received by many workers, owing to their dissatisfaction with current conditions.

Many men who were attracted to the mills by high wages during the war have either left the industry or are preparing to do so. In some departments of the industry, men have worked steadily less than a month during the past eight months. One sheet mill roller has worked 63 days this year, while there are many others who have worked less.

Generally the men feel that operating economies should not be compelled to bear the brunt of the readjustment, but that the executive and sales departments should be proportionately scaled. While salaried men have been cut an average of approximately 10 per cent and in some cases 15 per cent, workers in the mills claim such reductions have not equaled the cuts for operatives.

New Pittsburgh Scale

A break in the Pittsburgh building trades tie-up which has existed since June 1, because of the failure of the contractors and unions to agree on wage scales, is indicated by the action of the bricklayers' union recently in adopting a new scale reducing the rate from $12 per day of eight hours to $10.40, and cutting the overtime charge from double time to time and a half, except on Saturday afternoons, Sundays and holidays. There are no indications that this offer will be accepted by the contractors, who some time ago offered to sign an agreement with the unions calling for $1.12½ per hour or $9 a day of eight hours, and are not disposed to raise the offer. It is encouraging to those hoping for an early settlement of the building trades dispute that the bricklayers are showing signs of a desire to get to work. Meanwhile, union bricklayers on strike in Pittsburgh are said to be working in places just outside Pittsburgh as low as 80c. an hour and drawing strike benefits from the Pittsburgh union.

Unemployment Increasing

Unemployment still is increasing in most districts of Pennsylvania, according to the latest report of the State Bureau of Labor and Industry, covering the situation as of July 15. In the Altoona district there was a decrease from 22,050 on July 1, to 20,850 on July 15, the explanation being found in the resumption in the Pennsylvania railroad car shops in that district. Unemployed in the Pittsburgh district on July 15 numbered 50,850 as compared with 48,100 two weeks before. In the Erie district, 14,775 were idle against 14,635 on July 1. Harrisburg reports 20,850 out of work on July 15, against 14,245 on July 1; Johnstown 19,290, against 17,090; McKeesport 5890, against 5850; New Kensington 10,250, against 9820; Philadelphia 116,000 men and 11,550 women, against 105,000 and 11,150, respectively; Scranton 15,375, against 20,250, and Williamsport 6650, against 5950.

BOOK REVIEWS

Protection Our Proper Permanent Policy. By James T. McCleary. Pages 544. 5¾ x 9 in. Published by the National Tariff Institute, Inc., Washington and St. Paul.

Mr. McCleary is well known to the iron and steel trades for his successful administration of the affairs of the American Iron and Steel Institute for a number of years preceding 1920. He was representative in Congress from a Minnesota district for a series of terms and was assistant postmaster general under the Roosevelt administration. In all his public speaking, covering many campaigns, he brought to the discussion of national questions an unusual candor, clearness and teaching power. His method is the method of an honest instructor, who in arguing a proposition seeks, without any of the mere fencing of a contender, to lodge his thoughts in the minds of his readers or hearers, in just the way in which they were formed in his own mind. The art of doing this is rare.

Mr. McCleary is a protectionist, there is no doubt about that—a protectionist of the school of James M. Swank and "Pig Iron" Kelley. Not many of that type are to be found. Mr. McCleary's view is that protective tariff rates cannot be too high. In the chapter on "What Shall Be the Rates of Duty?" he writes:

"When we remember that under a protective tariff the duty is not a tax on our own consumers but a license fee on the foreign producers (and it is vital that every American citizen get this clearly established in his mind), all fear of getting the duties too high will disappear; and it will become the more evident the more clearly the subject is understood, that the only mistake possible is that of getting the rates of duty too low."

If that be the protectionist's confession of faith, it will have to be said that a good many among the present generation of American business men are apostate. The more one knows of the amount of practical politics entering into a tariff bill, the less reverence he has for protection as expressed in actual legislation, sound as he may consider himself to be in the faith as delivered to the fathers of a protective tariff. In connection with the Fordney bill that passed the House with so little consideration nothing has been plainer than that the sentiment of the business men of the country, without regard to party, favored moderate rates—more moderate than those decided on by the Ways and Means Committee. Foreign countries on whose products high duties are levied at American ports are led to discriminate against American products, and sentiment has grown among our exporting manufacturers in favor of a bargaining tariff.

Mr. McCleary has presented clearly and fairly, and withal most interestingly, the history of tariff legislation in the United States. He takes issue not only with the tariff reform and "revenue only" doctrines that now and then have carried a Congressional election, but combats what he considers heresy in some of the tariff views that have had a following in his own party, referring particularly to the declaration in its platform of 1892 that the duties levied should be "equal to the difference between wages abroad and at home." He objects to this on the grounds that the difference between foreign and domestic wages cannot be definitely learned, that rates so adjusted could not continue a proper measure of wage differences, because of changes, and in any event such an adjustment would not be properly protective. The book is a consistent preachment of Simon-pure protection, unmodified by any of the latter-day developments in our foreign trade. It illustrates how far apart men can be on this matter of the proper fiscal and impost policy of the American Government, yet with each side confident that its view will insure the largest prosperity to the largest number.

It can hardly be said that the liberal quotations from newspaper editorials and addresses of public men which intersperse the various chapters have added strength to the book. Mr. McCleary has done his work so well that these quotations are rather dilutions. But evidently the thought was to make these sidelights on American economics and business contribute to the author's purpose to prepare a complete handbook of protection. Enthusiasm in the cause is written on every chapter, and the reader will not miss the purpose to give protection as a national policy a standing with the present generation of American business men such as it had for 30 years following the Civil War. Mr. McCleary's long public service and his years of study of the tariff equip him in an unusual way to write a textbook of protection, and even the reader who may not agree with him will not withhold admiration of the stalwartism of his defense of the faith.

Armco in Picture and Fact, a book of 247 pages, traces the history of Armco ingot iron from the mines of the Lake Superior district through the blast furnace, the open-hearth furnace, the soaking pit and the blooming and bar mills to the sheet mill, where it takes its final shape. Then the processes of annealing, pickling, galvanizing and cold rolling are described, with the various auxiliary leveling, resquaring and inspection. Specialties are outlined, together with the methods of their manufacture. About 85 pages in the rear of the book are devoted to tables designed to aid the user of sheets. It is published by the American Rolling Mill Co., Middletown, Ohio.

Facts and Figures of the Automobile Industry, published by the National Automobile Chamber of Commerce, 366 Madison Avenue, New York, records in its 96 pages the volume of the automobile industry in production during 1920, with comparative figures for earlier years; the distribution of cars by states and by countries external to the United States; the exports and imports of cars, both pleasure and truck. It gives figures of the consumption of fuel, production of rubber, and number of dealers and service stations. It shows the steady increase of cars in the United States, from 2,445,664 in 1915 to 9,211,295 in 1920, and lists 8,369,605 of the latter as passenger cars. Of the world registration of 10,922,278 cars, 83 per cent are in the United States. Extracts from State laws show annual fees and general requirements.

Greenfield, Mass., manufacturing interests have established an attractive permanent exhibition of their products in a large room leading out of the sun parlor, Weldon Hotel, that city. Among those concerns having exhibits are: the Greenfield Tap & Die Corporation, taps, dies, drills and other small tools, as well as machine tools; Ruggs Mfg. Co., lawn, hand and hay rakes and wood and steel snow shovels; Velco Mfg. Co., broaching machines and broaches; Greenfield Machine Co. Division, Greenfield Tap & Die Corporation, a No. 1 external grinding machine; Russell Mfg. Co., screw plates with double reversible dies; Production Machine Co., a type R utility grinding and polishing machine, and Goodell-Pratt Co., small tool display. It was through the efforts of F. O. Wells that the exhibit was made possible.

According to a cablegram from Commercial Attache C. H. Cunningham, Madrid, a decree published July 19 makes the duties specified in the new Spanish customs on coal and coke effective at once. These duties had been suspended since 1915. The duties levied in the new tariff are as follows: Coal, 7.50 pesetas per 100 kilos, and coke and briquets, 9 pesetas per 100 kilos. (Peseta, normal value, 19.3c.; 100 kilos, 220.46 pounds.)

The conference between the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers reconvened July 25 at Chicago, to negotiate a new wage agreement. The conference was adjourned in June at Atlantic City following failure to agree after a week's negotiation. Manufacturers demand a practical return to the 1915-16 scale, which would amount to a reduction of $1.87 per ton for boilers on the base paid at present.

Explosion Hazard and Its Prevention

(*Continued from page* 206)

In coal mines the most used correctives are among others; (a) the use of water to moisten the dust and counteract its floatibility in the air, by the use of sprinklers or chemicals such as deliquescent salt (calcium chloride); (b) the localization of the danger by dividing the mine into safety zones separated by positive barriers to conflagrations. For that purpose stone dust has been used, as tests have proved that any flame could be stopped by a shower of fine mineral dust of a certain magnitude; (c) the prohibition of certain explosives, and the use of explosives that generate only low temperatures, and that fail to ignite existing coal dust mixtures (safe explosives); (d) the prescription of safety lamps that do not propagate their flames; (e) good aeration to assure only very lean mixtures. The question of coal mines is very complicated and somewhat outside of the industrial field. The writer has no pretension of being complete. This summary merely outlines what has been done, and is full of suggestions.

Pulverized Fuel Applications

Of all other applications of coal dust, the pulverized fuel plants are the most important, because they are built to produce on a large scale coal dust of impalpable fineness in dry form. That poses the questions: Are there any coal dust-air mixtures used in pulverized fuel plants? And how far is their operation safeguarded?

In the milling plants, before the fuel reaches the pulverizers, it is in such coarse form that really no explosion danger exists. After it has been pulverized there are three distinct operations creating coal dust-air mixtures: (1) the screening operation (2) the pneumatic distributors (3) the burners.

All pulverizers work in connection with a sifting device whose object it is to maintain a certain degree of fineness of the product delivered. These contrivances may be based on mechanical principles and use sieves, or may use air currents of various velocities and changing directions. Both devices create fuel-dust-air mixtures that are practically safe. Air separation mills use a cloud density of 1 lb. of coal powder to 30 to 60 cu. ft. of air. Their circuit is short, always below 100 yd., including return lines, which correspond to a great localization. They never handle more than 5 lb. of coal per sec. in one unit. Their pipe lines are usually very much inclined and never should be less than 60 deg. from horizontal to avoid deposits of any dust in the lines in case of unforeseen shutdown of the fan. The velocities of the air currents in the pipe lines are above 4000 ft. per min.

The only weak point is the cyclone separator, where possibility for unfavorable safety conditions exists because of the low velocities that have to prevail there for functional reasons. Thus the danger, if any, is localized in one particular point that should be placed outside of the buildings and be provided with suitable safety valves to relieve possible pressures. In that manner all trouble inside the building is avoided. Furthermore, as hardly any chances for ignition exist, reasonably safe conditions are assured, which is proved practically by the high reputation and the increasing popularity of this method of separation in all industries.

Pneumatic distributing devices also create, purposely, fuel-powder mixtures with air. They are divided into two classes, according to their principle of operation. The emulsion type uses a mixture less than 3 cu. ft. of air per lb. of coal, according to the various features of the systems developed. They are practically explosion-proof, as their dust concentration is extremely high, and in their complete circuit no contact with any fire or outside source of ignition exists.

Suspension methods of distributing fuel powder use cloud densities varying from 40 to 120 cu. ft. per lb. of coal transported, according to the distance of distribution and the varying conditions in the operation of the system. These cloud densities approach often, and sometimes are beyond, the high limit of inflammability. To counteract this shortcoming, and also to reduce pipe diameters and avoid deposits, great current velocities are used. Speeds varying from 3000 to 6000 ft. per minute are common.

This corrective should exist in the complete circuit; whenever cyclones are used they should be placed under all circumstances outside of all buildings, without unnecessary connections to any other part of the equipment, in order to isolate the danger point as much as possible. Explosion relief valves are absolutely necessary to prevent the building up of any pressures, as well as safety back pressure devices segregating part of the lines. The suspension system of distribution can be made reasonably safe for short distances, where densities of 40 to 70 cu. ft. per lb. of coal might suffice to maintain the flotation of the dust; beyond those limits its safety becomes precarious, especially because, in their actual commercial forms, direct connection to furnaces exists.

The third point in using mixtures of fuel dust and air concerns the burners of the furnaces or boilers. The mixtures may be the primary air-fuel dust in the ratio of 1 lb. of coal to 20 cu. ft. or less of air, for distances up to 100 ft., or secondary (volume) air and fuel in the ratios of 1 lb. of coal to 150 or 200 cu. ft. of air, depending on the nature of the flame wanted. The first mixture is only a means to transport the coal powder from the bins to the furnaces, and the second mixture is produced in those very dangerous proportions for immediate combustion purposes. The ignition is wanted continuously, and the temperature in the combustion chamber is raised very high with that aim in view. To be safe, burners must first confine the combustion to the combustion chamber, which is easily done by maintaining the flow velocities in the burner pipes higher than the flame velocities of fuel-air mixture at the high temperatures, and by having their air and fuel dust supply interlocked and under instant control of the operators.

In designing various machines and devices along the lines developed above, or in incorporating minor changes suggested, there is no doubt that, with proper engineering skill, the various pieces of apparatus making up powdered coal installations can be made safe to a point of practical exclusion of any explosion hazard.

Ignition and Self-Ignition

The one problem that remains to be discussed is the cause of ignition. Just as an explosive is relatively harmless without a detonator, a dust-air mixture is not absolutely dangerous by its mere existence. An ignition source is necessary to produce an explosion. These sources, which may be external or internal, must be carefully avoided, to assure safe conditions.

All outside fires, like Bunsen burners, open flames, torches, connections to furnaces, should be prohibited in the close neighborhood of any inflammable mixture. The use of electricity should be preferred anywhere, with the obvious precaution that sparks should be prevented by the choice of proper motors and current characteristics, a.c. versus d.c., by the use of correct wiring to avoid all chance of short circuits, by the installation of properly protected lights (no arc lamps allowed) and by the use of properly grounded neutral connections that counteract stray-currents, as well as electro static or electro dynamic tensions. Electricity, besides being the most convenient prime mover, permits with the simplest means compliance with these logical prescriptions, and presents the added advantage of permitting easy interlocking of all drives for greater mechanical safety.

The internal source of combustion with fuels is usually called self-ignition. This phenomenon, known to all interested, exists with storage of coal independent from its physical form, be it run of mine or crushed or pulverized. As coals are heterogeneous materials, soiled with all kinds of impurities, there should be nothing mysterious about self-ignition in the light of the above technical reasoning. It is merely a slow oxidation effect, starting perhaps with a pyrite impurity, and causing a local rise in temperature. The phenomenon may die out or propagate, according to circumstances. If the coal is rich in hydrocarbons, this

increase in temperature may distillate some low volatile gases liable to create dangerous mixtures with air. With finely pulverized fuels, the chances for these reactions are increased by reason of the large surfaces of contact and the ease of distillation of some hydrocarbons out of small particles of coal. This slow burning of stored coal is accompanied by a penetrating odor, and often by the formation of smoke, that make it easily noticeable.

Remedies against self-ignition are:

1. Store the coal preferably in the raw or crushed form, and dry and pulverize it only according to the needs of operation of the plant.

2. The storage capacity of dried and pulverized coal should be such as to avoid all danger from self-ignition.

3. Pulverized fuel should be stored preferably in close proximity to its place of combustion.

The first rule, besides being a safety recommendation, is the expression of the sound manufacturing principle: Ample storage of raw material and progressive transformation. The size of bins for storage of dried and pulverized coal is essentially dependent upon the coal quality and the time involved. No general rule will apply, and to prescribe maximum time and maximum storage capacity would be unfair to certain coals. The best suggestion is a time test of each coal quality. By duplicating practical operating conditions, this question can be settled without guess and interference of side issues. The coal bins located next to furnaces can easily be emptied by burning up their content without danger.

For raw coal, aeration has proved a reliable antidote against self-ignition, because air currents cool down the coal and retard the oxidation effect, and accumulations of gases in quantities are avoided.

Besides the pulverized coal itself, existing only inside of the various machines, bins and handling devices, it is necessary to consider also the so-called mill-dust which, in the course of time, accumulates everywhere in any industrial building—on roof trusses, in corners, on top of flat surfaces. This mill dust is often of inflammable nature and its accumulations are a constant source of danger. The removal of mill dust is an absolute operating necessity from the safety standpoint, and cleanliness is not only a hygienic virtue but a preventive, whose importance cannot be emphasized enough. The most economical method of dust removal is the well-known vacuum dust-collecting system, that incidentally permit a complete recovery of the dust, often of commercial value.

These vacuum devices should be in every factory, and no pulverized fuel plant should be without them. Of the various systems offered by the trade, those are to be preferred where the exhaust fan is located beyond the point of collection, on account of their superior efficiency and safety.

Understanding Essential to Progress

Prejudice and ignorance are some of the greatest enemies of progress. Only by frank, unbiased study and diligent research will antiquated opinions be shattered and real knowledge diffused. As industrial safety is a corner stone of prosperity, a better understanding of the nature of explosions, their hazards and their remedies will be essential to further industrial welfare. The writer hopes that this analysis will contribute to that end.

Causes and Occurrence of Dust Explosions*

Static Electricity an Important Contributory Cause but Dust Proportion the Vital Element

RECENTLY the engineers of the Department of Agriculture were asked to investigate an explosion of rubber dust occurring in the recovery of hard rubber. That was a new form of explosion. It cost the lives of nine men and indicated that certain by-products in certain industries are now being utilized, in which very fine dust is produced. That may account or some of the explosions that have taken place in some industries that we have not hitherto regarded as dangerous.

We might cite an example of that in the cereal industry, where in recent years the oat hull has been utilized and is now being ground for the manufacture of cattle feed. That by-product some years ago was more or less waste; and in other industries we may explain the frequency of explosions by the utilization of by-products that were, not many years ago, considered as waste. In the grinding or manufacturing process very fine dust is, therefore, created and the explosion follows.

The theory of dust explosions should not be difficult to understand because, upon analysis, it is very simple. It has been found in tests that the finer and the drier the dust, the more explosive its condition. This is quite natural, because the finer the dust, the nearer its molecules approach the size of gas molecules, and what occurs in a gas explosion is very similar in form to what occurs in the dust explosion, in fact, almost identical.

Dust "Explosions" Simply Rapid Combustion

Dust does not explode, of course, like dynamite. It is simply a rapid propagation of flame. Just what occurs when the explosion takes place is somewhat debated at present. Some physical chemists claim that the dust, upon being heated, distills explosive gases; others state that that is not the case, but that the combustion is so rapid that the rapid rate of flame travel creates a tremendous pressure and the explosion follows.

In the industrial plant one explosion, only, rarely takes place—there are usually two and in some instances three. That has been explained in this way: the original dust explosion might be just the ignition of small quantities of dust and air, which produces sufficient concussion to jar or shake into the air any dust lodged on girders, beams or ledges in any part of the plant. This dust feeds and propagates the flame from the primary explosion, resulting in the secondary or vital explosion, which is the one that usually causes the extensive damage.

Static Electricity Causes Explosions

The Department has been asked in recent years to look into many interesting cases of explosions, not only in industrial plants, but in the operation of farm machinery. One particular problem between the Cascades and the Rockies, in the Pacific Northwest, has shown that in some seasons as many as 600 explosions have occurred in five weeks' time in the threshing of wheat in the vicinity of Spokane, Wash. Although at first the operations of the I.W.W. were assigned as the cause of the explosions, investigation showed scientific developments. The wheat in the territory was diseased with smut dust that was very explosive, and the remarkable part of the investigation was that the machines operating in the field generated a large static electric voltage.

Engineers have tried to measure that discharge, and in some cases it runs as high as 52,000 volts, although it is, of course, at very low amperage. But it made a very hot spark, and the passing of the spark from the cylinder teeth to the concaves in the threshing machine ignited the dust. Of course, the thresher operator laughed at the idea at first that he was generating enough electricity with his machine to burn

*Abstract of paper read before Cleveland section of Associcharge grain dust explosion investigations, United States Department of Agriculture, Bureau of Chemistry, before the Western Society of Engineers.

him up or blow him up, but nevertheless the scientific investigations disclosed that to be the fact, and the wiring of those machines has controlled the frequency of the explosions.

A year or two later the Department was asked to look into a series of frequent fires in cotton gins in the South. This happened during the war, in 1917, and of course they were all "pro-German cases," in which matches were being introduced with the cotton, supposedly. But an investigation disclosed that the fires were very similar to the cases in the Pacific Northwest. The friction of the cotton on the galvanized pipe, in passing from the wagon to the gin, built up the charge which ignited the cotton. This led to a grounding arrangement which materially reduced the fires.

Explosion Lessons Result in Reforms

All the way down the line we find that explosions are occurring in representative lines of industry, and in the operation of certain machines or equipment where these conditions exist or the dust is present. The explosion that occurred in Minneapolis, May 2, 1878, when the Washburn-Crosby Mills blew up, led to the introduction of improved types of dust collecting equipment.

Professors Peck and Peckham, then called upon by the coroner to investigate the cause of this explosion, constructed a box containing about 2 cu. ft. of air space and by blowing 2 oz. of flour dust onto a Bunsen burner inside the box they were able to lift two men standing on the box lid. That 2 oz. of flour dust, when ignited, would raise the weight of 300 lb. A physical chemist, with the chemical composition of flour known, has taken that calculation and found that, if it were possible to release a sack of flour, and diffuse it at that ratio, on the basis of that experiment, that one sack of flour would lift 2500 tons 100 ft. high.

Coal Dust Highly Explosive

In another investigation the Bureau of Mines finds that 0.02 ounce of coal dust per cu. ft. of air space is sufficient to produce an explosive mixture. The explosive range of methane gas is from 5½ to 14 per cent. That means that with methane having less than 5½ per cent there is no explosion; with over 14 per cent there is too much gas present, but the range is between those two extremes. With 0.02 ounce of coal dust per cu. ft. of air space there is a mixture that could produce an explosion. That is taken as a standard, because we have made coal dust the standard in the tests, but grain dusts are more explosive, so it would probably take less grain dust than it would coal dust.

Figures are usually monotonous and uninteresting, but they will give some idea of the tremendous pressures created when explosions of this kind occur. On the basis of 0.02 ounce per cu. ft., only 80 ounces would be needed in a room 20x20x10 ft.; 5 lb. of dust diffused in proper proportions through the air in a room of that size would be sufficient to blow it apart.

In the laboratory experiments, by using 75 milligrams (1/380 ounce) of dust, just a small quantity, in a little vessel of 1400 cu. cm. capacity (88 cu. in., equivalent to 4x4x5½ in.) we have produced as high as 20 lb. pressure per sq. in. These figures show the terrific explosive force contained in dusts when mixed with the right proportions of air and subject to conditions that are favorable to explosion.

Summarized in Three Conclusions

First there are certain engineering problems that must be solved before we can expect to control or prevent these dust explosions. Recent cases that have occurred have taken place in the most modern, well-constructed and well-equipped plants. It has been demonstrated that a so-called "fire-proof" plant, a plant built of fire resistive materials, by no means is explosion-proof. If it is well constructed, it must be well maintained. Construction engineers must recognize the hazard and danger of dust explosions, and not permit any opportunity for the accumulation of dust in any manner whatsoever, because an accumulation of dust, when forced into supervision, will naturally permit the propagation of the flame from the primary explosion.

Second is the progress recently made in determining that electrical sources are largely responsible in many cases for disastrous explosions. A recent case in the Southwest indicated that the breaking of an incandescent lamp bulb by a workman carrying something on his shoulder ignited the dust and caused an explosion. That point was not accepted by the electrical engineers at the time, on the basis that breaking the bulb destroys the filament and thereby removes the possible source of ignition.

But the Bureau of Chemistry took up the matter with the manufacturers of electric lamps and conducted a series of co-operative experiments at the Nela Park laboratory of the National Lamp Works, Cleveland. These tests established definitely that there is not a type of electric lamp made but that, when the bulb is broken, will produce dust explosions immediately, if there is the proper proportion of dust in the air. That introduced a new element of danger, in that the use of electric bulbs in dusty atmospheres is unsafe. They must have vapor-proof coverings; a mere wire guard is not sufficient. Upon introduction of a lamp into a bin or a dusty part of the plant, if the bulb is broken, the explosion follows immediately.

It also developed in that investigation that the dust settling on the lamp globe may result in fires. Certain kinds of dust reach the point of incandescence and fire follows. If the dust particles that have been set afire drop onto the floor fire ensues, or if they drop through the air in which the dust is suspended in proper proportion the explosion will follow.

That simply means that we have got to recognize what we consider the advanced lighting methods in our industrial plants as affording a possible cause of dust explosions. We must take the necessary steps to control the static electric conditions that produce sparks in certain types of milling machines, and which will ignite dust, beyond question.

The third important matter is a subject for very grave discussion which will have to be decided in this country and Canada very soon, before we can attempt to make progress on control of dust explosions. The flour milling industry has made progress in explosion prevention by introducing improved types of dust collecting systems. It is rather difficult now to do that in a grain elevator, but I do not believe we are ever going to prevent explosions in grain elevators until we come in some way to a system for collecting the dust.

The possibility of suction or aspiration on the grain from the time it enters the elevator until it leaves should be looked into—in other words, we might put an application of suction at every point where the grain is thrown or handled. That cannot be done in any large terminal elevator now, because the possible difference of weights between the shipper and the receiver prevents. But if they were handling a material that had gasoline or dynamite or something else like that in it, they would take it out, probably very quickly.

Pulverized Coal Dangerous

Investigations of the United States Bureau of Mines have given rise to the following notes:

A small stream of pulverized coal leaking down from a defective joint in a coal transport line does not attract much attention, whereas a leak in a natural gas line under similar circumstances receives immediate attention. As a matter of fact, if by any means the dust cloud should come in contact with an open flame or hot metal, the effects would be as disastrous as if it had been gas.

One of the most serious troubles with which users of pulverized coal have had to contend has been the number of fires in the storage bins for pulverized coal. It has been somewhat difficult to determine the exact cause of these fires, but undoubtedly spontaneous combustion has played an important part in the origin of some of them.

Care should be taken that pulverized coal is not

delivered to storage bins at a high temperature; and to avoid this, the gases of combustion from the drier furnace should not be allowed to become hot enough to overheat the coal. Storage bins for pulverized coal should not be placed in any position where they may become heated from furnaces, steam pipes, or hot flues.

If a plant has been shut down for several days, delivery of coal from the storage bin through transport lines to the place of consumption should not be permitted before an examination is made to ascertain whether the coal has become heated to such a point that it will ignite when brought in contact with a current or blast of air.

The Drying of Pulverized Coal*

One of the biggest and most expensive pieces of machinery in the preparation plant is the drier. In the past it has been considered necessary to dry the coal down to 1 or 2 per cent of moisture in order properly to pulverize, feed and burn it. Latest practice indicates that it is not necessary to have the coal anywhere near this low percentage of moisture, and in some cases it is possible to operate without using driers, and to design and install the plant without them. The Allegheny Steel Co. has operated for three years without driers, and the new Ford Motor Co. installation has been built without them.

There is no doubt, also that progress will be made in perfecting the driers, where they are used, so as to reduce the cost of installation and operation. There is, in addition, a strong possibility of development so as to dry the coal either in steam driers or by the utilization of waste gases, where drying is deemed necessary.

The net over-all efficiency is about the same, whether the moisture is taken out of the coal by predrying or evaporated from the coal in the boiler furnace. There is, if anything, a slight advantage in favor of the latter.

*Abstracted from a paper by Loren L. Hebberd before the Technical Association of the Pulp and Paper Industry.

Bids on Surplus Material

WASHINGTON, July 26.—A price of $9.37 per gross ton for cast iron pipe and 8 1/3c. per lb. for copper was received by the Ordnance Salvage Board, War Department, for approximately 2527 gross tons of surplus pipe and 127,075 lb. of surplus copper rotating bands in the form of cast iron proof projectiles, with copper rotating bands assembled on them, the Bridgeport Iron & Metal Co., Bridgeport, Conn., being the purchaser. Aside from this company, the bidders were: E. J. Ellis, Washington; National Metals Co., New York; Boston Iron & Metal Co., Baltimore; Hyman-Michaels, Chicago; Max Solomon, Pittsburgh, and Briggs & Turivas, Chicago. The sale was announced last Wednesday.

Elevator Company to Have New Plant

The Graves Elevator Co., Inc., 426 Exchange Street, Rochester, N. Y., has increased its capital stock from $30,000 to $250,000 to raise funds to purchase a site and erect a new building. The site chosen is in Lincoln Park, across from the General Railway Signal Co.'s works and adjacent to the new plant of the Rochester Casting Co. Loren O. Graves, president Graves Elevator Co., is secretary of the Rochester Casting Co., which will furnish the elevator company with castings. Plans for the new building call for a one-story structure, 100 x 400 ft. Work will be started within six months. The location permits sidings from the Buffalo, Rochester & Pittsburgh and the New York Central.

A bulletin of the phono-electric wire made by the Bridgeport Brass Co., Bridgeport, Conn., has been issued printed in French. It covers the physical and electrical characteristics of the wire and contains tables necessary for the intelligent selection of the sizes of wire needed.

To Make Factory Truck Hardware

Hardware for making up a factory truck is a feature of business on which the Oliver Machinery Co., manufacturer of woodworking machinery and machine tools, Grand Rapids, Mich., has embarked. It is in a position to manufacture the complete truck, but on the basis that it will serve furniture factories, pattern shops, wood shops of various kinds and foundries, which are likely to have carpenters or woodworkers in their employ, it expects to find a wide field for the sale of the hardware needed in connection with the woodwork for building factory trucks.

The plan is to sell the hardware on a foundry basis, that is, at a net price that will be low enough to make the purchases attractive and obtain a lower freight classification than would apply to the manufactured truck. With each order will be sent a blueprint showing how to cut each piece of lumber to make it fit. The hardware includes wheels and their supports, various brackets, bolts and screws and the castings into which stanchions are fitted.

British Turning to Oil Fuel

One outstanding result of the big strike in the coal mines of Great Britain has been an increasing use of oil as fuel, in place of the coal almost universally used heretofore. Fuel oil imported into the United Kingdom in the first five months of 1921 aggregated 198,000,000 gal., as compared with 319,000,000 gal., in the entire twelve months of 1920 and 185,000,000 gal. in the whole of 1913. Monthly averages show 39,600,000 gal. in 1921, 26,500,000 gal. in 1920 and 15,400,000 gal. in 1913.

Announcement early in June of the conversion of three locomotives of the North Staffordshire Railway from coal burners to oil burners indicates a movement which is already well under way, in the changing over of railroad fuel to oil. The system adopted is reported to be the same as that in use on the Midland Railway, which is said to have been chosen because of its extreme simplicity and ease and cheapness of fitting. No structural alteration was required in the firebox or ash pan, and it is said that either oil or coal, or both combined, can be burned in the engines as now fitted up.

The burner, placed in the firebox, is supplied with oil from a 450-gal. tank fitted on top of the coal bunker. Steam is supplied to it from a stop valve on the boiler, and the oil is regulated by a simple plug cock. It is said that, with a very little practice, the engineer can regulate the supply of oil and steam in such a manner as to produce satisfactory results. The capacity of the tank is sufficient for more than a full day's work, and engines so fitted are reported to have done exceedingly well in both passenger and freight service.

Motion Pictures Obtainable from Bureau of Mines

Two educational motion pictures illustrative of the mineral industry have recently been completed, the United States Bureau of Mines announces. The first of these, the story of abrasives, shows the generation of power at Niagara Falls, its utilization for the production of carborundum (silicide of carbon), and aloxite (aluminum sesquioxide), and finally the numerous interesting and important industrial operations that are performed with the aid of the abrasives thus manufactured.

The story of rock drilling shows the use of modern types of rock drill, not only for shaft-sinking and underground operations, but also for quarrying and the cutting of the new hydro-electric power canal to connect Lake Erie with Lake Ontario. Requests for the loan of these films for showing at public gatherings where no admission fee is charged should be addressed to the Bureau of Mines, 4800 Forbes Street, Pittsburgh, Pa.

Machinery Markets and News of the Works

AWAITING REDUCTIONS

Rock Island Railroad Will Not Buy Until Prices Are Lowered 40 Per Cent

Vocational Schools Furnishing Business—July Better Than June in Chicago

Only in one center is it definitely reported that July is a better month than June. This is Chicago, where railroad business has given a little life. The Illinois Central has ordered some of the smaller equipment asked for and was expected to close on the remainder early this week, the total purchases not exceeding $100,000. The Rock Island has added two lathes to its list and has informed dealers that it will not buy until there is a 40 per cent price reduction. Action on the H. W. Johns-Manville Co. list will not be taken for a month.

Vocational schools are among the chief current buyers. The public schools of Philadelphia have purchased about 40 machines, principally speed lathes and drill presses. The McKinley school, Canton, Ohio, will receive bids July 29 on a list amounting to nearly $50,000. In several centers the used tool business is more lively than that of new equipment.

Fifteen tools have been purchased by Dwight P. Robinson & Co., New York, for a project in Brazil, additional purchases to be made in the near future. The American Sugar Refining Co. has sent out a revised list of 16 machines for its Baltimore refinery.

Recent price reductions include the following: Ten per cent on motors of the General Electric and Westinghouse companies; 20 per cent reduction in high speed drills; a reduction of 15 per cent from 1919 prices by a Paterson, N. J., maker of upright drills; 10 per cent reduction on grinding and buffing machinery and disk grinders by a Grand Rapids, Mich., maker. Some makers of taps and dies in New England contemplate further reductions.

New York

NEW YORK, July 26.

The largest machine-tool purchases of the past week were made by Dwight P. Robinson & Co., 125 East Forty-sixth Street, New York, and for a project in Brazil. About 15 tools were bought and other purchases will be made within the near future. The American Sugar Refining Co., New York, has issued a revised list of about 16 tools for its new Baltimore refinery. A few months ago this company issued an inquiry for about 50 machines, a few of which, including punching and shearing machines and pipe machines, were purchased. The remainder of the list has been issued in revised form with a part of the tools formerly inquired for eliminated. Otherwise the market is extremely dull, purchases being confined to single tools and few of these.

The crane market is quiet, little activity either in inquiries or orders being reported. On the few inquiries that are active competition is keen. The Lehigh Valley Railroad, 143 Liberty Street, New York, has asked for bids on two coal-handling units for erection in New Jersey. There are a few export inquiries in the market and some transactions in hand-power cranes. The New Jersey Foundry & Machine Co. was recently awarded the two 10-ton, 20-ft. span hand-power cranes purchased by the United States Engineer's office, Norfolk, Va. The Chesapeake Iron Works has sold to the American Sugar Refining Co. four overhead traveling cranes of about 3-tons capacity, 25-ft. 2-in. span, equipped with three trolleys, each with a lifting capacity of 2275 lb. for installation at the Baltimore plant of the company.

The Kingsbridge Iron Works, Inc., 405 East Ninety-ninth Street, New York, has acquired the old Morris Park race track, near Fowler Avenue, comprising 14 lots, for $50,000. The property will be improved for the establishment of a new plant for the manufacture of ornamental iron products.

The G. E. Fixture Co., New York, has been incorporated with a capital of $25,000 by H. Firman, J. Moscoff and J. N. Chamkin, to manufacture gas and electric fixtures. The company is represented by H. Solomon, 332 Broadway.

The Electro Thermo Co., New York, has been incorporated with a capital of $100,000 by C. C. Trautmann, W. L. Strauss and P. Becker, to manufacture electrically operated washing machines. It is represented by C. A. Oberwager, 233 Broadway.

L. Robaczynski, 96 Meserole Street, Brooklyn, manufacturer of knitting machines and parts, has had plans prepared for a new one-story machine shop, 41 x 96 ft., on Grand Avenue, to cost about $12,000. Louis Allmendinger, 20 Palmetto Street, is architect.

The McFarland-Clum Corporation, Brooklyn, has been incorporated with a capital of $75,000 by G. T. McFarland, R. V. Clum and J. G. Snyder, 256 Broadway, New York, to manufacture electric devices for automobiles and similar products.

The National Metal Box Co., Brooklyn, has been chartered under State laws to manufacture metal boxes and containers. The incorporators are M. B. Gulbin, M. Feld, and R. Barko, 51 Chambers Street, New York.

The Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, L. I., manufacturer of storage batteries, has arranged a list of equipment for installation in its one-story addition, 50 x 120 ft., estimated to cost about $55,000.

Charles L. Cadle, Superintendent of Public Works, Capitol Building, Albany, N. Y., will receive bids until 12 o'clock noon, Aug. 17, for furnishing and installing two 3-ton, semi-portal, revolving jib cranes at the Barge Canal terminal, Gowanus Bay, Brooklyn.

The Neth Wire Tying Machine Corporation, New York, has been incorporated under Delaware laws with capital of $500,000 by E. A. Perry, Jr., J. L. Ward and G. Dixon Raine, Jr., New York, to manufacture wire baling machinery and parts. It is represented by the Corporation Service Co., Wilmington, Del.

The Super Clarion Corporation, New York, has been chartered under State laws to manufacture special machinery and parts. The incorporators are G. Fleck, J. J. Platzman, and L. W. Dinkelspiel, 5 Beekman Street.

The Roman Bronze Works, 275 Greene Street, Brooklyn, has leased a one-story building, 50 x 60 ft., to be erected by M. T. Kelly at Provost and Greene streets, at a cost of $20,000, for a new foundry. The construction contract has been let to C. C. Woodruff, 213 Tenth Street, Long Island City.

The New York Central Railroad Co., Grand Central Terminal, New York, will receive bids until 12 o'clock noon, Aug. 3, for shop material, covering requirements up to Sept. 1, as follows: Black, galvanized and blue annealed sheets; driving and truck tires for freight and passenger service; seamless steel tubing; car and tender axles; car axles for axlelight system; driving and trailer truck axles; front engine truck axles; standard wire nails; galvanized and polished fence staples; steel bars; steel shapes; steel plates; galvanized tie dating nails; and woven wire fence. Bids will also be received until 12 o'clock noon, Aug. 1, for the following: Track bolts, track spikes, angle bars, tie plates, frogs, switch points, switches, switch plates, crossing frogs, terminal stud track bonds, guard rails, knuckle rails, and movable points for crossings, all in accord with standard plans and specifications of the company on file at the

office of W. C. Bower, general purchasing agent, Grand Central Terminal.

The Henry, Millard & Henry Co., New York, has been incorporated under Delaware laws with capital of $150,000 to manufacture iron and steel products. The incorporators are H. H. Walker and J. F. O'Connor, Brooklyn. The company is represented by the Capital Trust Co., Dover, Del.

The Netherlands Aircraft Mfg. Co., Amsterdam, Holland, represented in the United States by R. B. C. Noorduyn, Hazelhurst Field, Mineola, L. I., is planning for the establishment of works in the vicinity of New York for the manufacture of airplanes, airplane motors, etc. Anthony G. H. Fokker is head of the company.

Fire, July 20, destroyed a portion of the plant of I. Block & Son, 393 Pearl Street, New York, manufacturer of oil and gas stoves, with loss estimated at about $150,000.

The Westinghouse Electric & Mfg. Co., 165 Broadway, New York, with main plant at East Pittsburgh, Pa., has taken a contract for furnishing electric machinery and equipment for the electrification of the Chile State Railroad, operating from Santiago to Valparaiso, at a cost of approximately $3,000,000.

The Thatcher Propeller Co., Albany, N. Y., care of Pember & Campaigne, architects, 24 James Street, manufacturer of airplane and boat propellers, has plans under way for new works. It is understood that bids will be asked in August.

The Steelcraft Corporation of America, 2341 East Sixty-ninth Street, Cleveland, manufacturer of safes, locks, etc., is planning for additions to the plant of Howell, Field & Goddard, Inc., Review Avenue, Long Island City, following the purchase of a controlling interest in this organization. The Long Island city works are devoted to the metal-clad doors and other metal fireproof products, with present output totaling about 200 doors per day. This capacity will be increased. The Steelcraft company also operates the Stiefel & Freeman Works, Lititz, Pa. B. H. Sinks is president.

The Giant Drill Extracting Machine Co., Jersey City, N. J., has been incorporated with a capital of $100,000 by Henry L. Berstleman, Gilbert C. Cadwaller and James F. McCormack, 76 Montgomery Street, to manufacture special machinery and parts.

The Florence Pipe Foundry & Machine Co., Florence, N. J., has awarded a contract to the Austin Co., Bulletin Building, Philadelphia, for a one-story addition on Front Street, 40 x 100 ft., to cost about $25,000.

The Davis Equipment Co., Bayonne, N. J., has been incorporated in Delaware with a capital of $250,000 to manufacture machinery and parts. The incorporators are Julian Rice and John V. Corcoran, Bayonne. The company is represented by the United States Corporation Co., Dover, Del.

Fire, July 15, at the oil refinery of the Tide Water Oil Co., Constable Hook, Bayonne, N. J., caused a damage estimated at about $200,000.

The loss, caused by fire at the plant of the Warner Quinlan Asphalt Co., 79 Wall Street, New York, at Linden, N. J., July 18, estimated at $3,500,000, included the tool and machine shops, power plant, laboratory and other buildings, as well as 18 asphalt tanks, 33 oil tanks, 12 gasoline tanks and 16 oil stills. The insurance is now being adjusted, and the company plans for the early rebuilding of the works. Charles Almquist is superintendent.

The Ward Electric Shop, Inc., Boonton, N. J., recently organized with a capital of $25,000 to manufacture electrical specialties, has acquired a plant at 813 Main Street. It is headed by Nelson C. Doland, Joseph A. and William E. Ward.

The Essex Fells Water Co., Essex Fells, N. J., will install a new electrically operated pump at its plant at Verona. A new 350,000-gal. water reservoir will also be constructed.

Thomas A. Edison, Inc., West Orange, N. J., manufacturer of electrical products, is planning for the erection of an addition to the power house.

Swift & Co., 154 Ninth Street, Jersey City, N. J., will build an addition to the power house at their local packing plant to cost about $25,000.

The Cook New Method Engine Co., Irvington, N. J., has been incorporated with a capital of $125,000 by J. Thomas Cook, Alfred T. Goullet and Fred H. Hill, 180 Laurel Place, Irvington, to manufacture engine equipment for automotive service.

The Eastern Metal Stamping Corporation, Newark, has been incorporated with a capital of $250,000 by William G. Viall, Thomas W. Paterson and Frederick A. Slater, Newark, to manufacture metal goods. It is represented by Karl Z. Kiefer, 810 Broad Street.

Property of the Accurate Screw Machine Co., comprising a machine works and equipment at Fifth and Cross streets, Harrison, N. J., will be sold by Mortimer Lowy, receiver for the company.

The International Water Heater Co., Newark, has been incorporated with a capital of $500,000 by James B. Adams, Frank Williams and Charles H. Giese, 142 Market Street, to manufacture water heaters and similar products.

The Behrens Crane Co., Merchantville, N. J., has been incorporated with a capital of $125,000 by Albert Burling and J. N. Wilkins, Merchantville, to manufacture cranes, parts, etc.

New England

BOSTON, July 25.

The machine tool market the past week has been devoid of features. Inquiries, classified as active prospects, apparently are no nearer the closing stage and new prospects are lacking. Based on New England industrial conditions the outlook for improved business within the next month, at least, is not particularly encouraging. Sales the past week were confined to about a half-dozen individual tools, which went at prices considerably below list quotations. A. Paterson, N. J., manufacturer of upright drills has issued a new price list showing an average reduction of 15 per cent from 1919 quotations. July will close as one of the leanest months on record for a majority of local machine tool houses.

Some New England manufacturers of taps and dies contemplate a further reduction in prices in the hope of moving large stocks on hand. During the period from Jan. 1 to June 30, one of the largest makers is understood to have made $136 worth of stock for every $100 sold, notwithstanding a steady reduction in operations until 40 per cent of normal was established.

Contract has been let for the erection of a power plant addition, 60 x 64 ft., by the United Illuminating Co., New Haven, Conn.

The Collins Co., Collinsville, Conn., agricultural tools, hammers, axes, etc., will expend considerable money in repairs and in renovating its small press grinding department.

Nathan D. Cass, president N. D. Cass Co., Athol, Mass., toys, with others, proposes to open a plant in Manchester, Vt., under the firm name of the N. D. Cass Toy Co. of Vermont. A saw mill will be erected.

The Bakers Standard Equipment, Inc., Boston, with a capital of $100,000, has taken a Massachusetts charter. Leo R. Zusman, 50 Russell Street, Brookline, is president, and S. Mitchell, 106 Lucerne Street, Dorchester, treasurer.

A Massachusetts charter has been granted the Oxford Steel Products Co., Boston, capitalized for $300,000, of which Clarence E. Dodge, 2 Myers Street, Boston, is president, and Maurice T. Viall, 155 Armington Street, Cranston, R. I., treasurer.

Marx C. Kristek, 17 Court Street, is president, and Harry A. Katz, 7 Jones Street, treasurer, Kristek Mfg. Co., Worcester, Mass., capitalized for $50,000, recently granted a charter to manufacture taper pins, firearm pins, clock studs, etc.

Plans are being figured for a two-story plant, 75 x 125 ft., for the Chandler Machine Co., Ayer, Mass. Part of the building will be used as a garage.

The Sterling Roofing Co., New Bedford, Mass., will erect a one-story manufacturing plant, 75 x 150 ft.

Contract has been let for the erection of a one-story and basement repair shop, 102 x 218 ft., at Greenfield Junction, Me., for the Great Northern Paper Co., to cost $100,000.

Additions to the machine and finishing departments to cost about $30,000 will be made at the paper manufacturing plant of Tileston & Hollingsworth, Hyde Park, Boston. Plans have been completed.

The Marcy Tool Works, Inc., Putnam, Conn., has been incorporated with a capital of $100,000 by H. Devine and A. W. Marcy, Hillcrest Grandview Avenue, Putnam, to manufacture tools, hardware specialties, etc.

The Lindquist Engineering Works, Inc., Marlborough Street, Portland, Conn., recently incorporated to manufacture mechanical products, has been organized with C. O. Hedstrom, Main Street, as president, and E. A. Lindquist, Middletown, Conn., secretary and treasurer.

The Central Maine Power Co., Augusta, Me., has arranged for a bond issue of $3,000,000 for extensions, improvements, general operations, etc. Harvey D. Eaton is president.

The American Tube & Stamping Co., 471 Hancock Avenue, Bridgeport, Conn., is planning the erection of a one-story addition on Wordin Avenue for the manufacture of rolled steel specialties.

The Capitol Auto Top Co., 28 Goodman Place, Hartford, Conn., has filed notice of organization to manufacture automobile tops and kindred equipment. D. N. Renken, 55 Shultas Place, heads the company.

The J. M. Craig Brass Foundry, Arch Street, Hartford, Conn., has awarded a contract to Charles P. Waterman,

Inc., 75 Pratt Street, for extensions and improvements in its plant.

O. P. Thompson, 145 State Street, Springfield, Mass., and associates, are having plans prepared by R. B. Warner, architect, 168 Bridge Street, for the erection of an eight-story automobile service and repair works on Dwight Street, 100 x 190 ft., estimated to cost about $600,000 with equipment.

Philadelphia

PHILADELPHIA, July 25.

Business in second-hand machinery is better than that in new tools. One used machinery company contemplates furnishing part, or all, equipment toward a $40,000 outlay for tools; it also expects to get some or all of the business of a $90,000 expenditure. Inquiries have been received in this district by second-hand machinery dealers for sizable lists, both from Chicago and Milwaukee dealers. The chief second-hand demand is for fabricating machinery, such as bending rolls and punches and shears.

Principal purchases are by vocational schools. Twenty-four speed lathes, eight drill presses, four 14 in. x 5 ft. engine lathes, one arbor press and three double-end emery wheel stands were sold July 18 to three new schools in Philadelphia, the Tilden Junior High School, the Mitchell Junior High School and the Thomas Junior High School. A vocational school at Scranton also purchased some tools.

There has been a fair number of inquiries, but many are for appraisal purposes and buying on others is deferred in the hope of further recessions in prices. Recent reductions include one of 10 per cent on motors by the General Electric and Westinghouse companies, effective July 11, and a 20 per cent reduction on high speed drills. Steam hammers have now been reduced to less than half the price prevailing during the war.

Several Philadelphia dealers received business from the Government which used up some of its surplus money, held over at the end of the fiscal period on June 30, for the purchase of tools. Export business is reported about one-tenth of that in 1913 and 1914.

Business is so slack that some houses are reducing their selling and office forces. Most dealers are making expenses and consider themselves fortunate in so doing.

The O'Brien Machinery Co., 119 North Third Street, Philadelphia, has rejected bids for its proposed four-story and basement building at 113 North Third Street, and will call for new bids at a later date. H. F. Schultze, 11 South Sixteenth Street, is architect.

The Automatic Clutch & Transmission Co., Philadelphia, has been incorporated under Delaware laws with a capital of $1,200,000 to manufacture power transmission and controlling equipment. F. R. Hansell, Land Title Building, represents the company.

The Danda Co., Philadelphia, has been chartered under State laws to manufacture valves and similar products. Kern Dodge, 5135 Pulaski Avenue, is treasurer.

The Bridgman Brothers Co., 120 South Thirtieth Street, Philadelphia, manufacturer of pipe, steam fitters' supplies, etc., is completing plans for a new one-story building at Thirty-first and Walnut streets. Clarence E. Wunder, 1415 Locust Street, is architect.

The Pneumatic Street Cleaner Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Robert L. Holliday and Mirabeau Sims, Philadelphia, to manufacture street-cleaning machinery and parts. A general iron foundry will also be conducted. The company is represented by James Saulsbury, Equitable Building, Wilmington, Del.

The Victor Talking Machine Co., Camden, N. J., closed its plant, July 25, for two weeks, during which time repairs and improvements will be made to machinery. It is now giving employment to about 12,000 operatives.

The F. M. Hall Refrigerating Co., Camden, N. J., has been chartered under State laws with 20,000 shares of stock, no par value, to manufacture refrigerators and refrigerating equipment. The incorporators are E. and Frank M. Hall, and John A. Penn, 428 Market Street.

Milton Mirkens, Trenton, N. J., has acquired the former Ewing Rubber Mill on Hilton Avenue, for the establishment of a new plant to manufacture rubber goods. The building, on a site 206 x 235 ft., will be remodeled and machinery installed at an early date.

Plans have been filed for the erection of a new one-story power house and engine plant by the Enterprise Furniture Co., Glen Rock, Pa. W. E. S. Dyer, Land Title Building, Philadelphia, is engineer.

The Reading Knob Works, Inc., Reading Pa., has been incorporated with a capital of $175,000 to manufacture door knobs and kindred products. James A. Yuill, Wyomissing, is treasurer.

The Lehigh Coal & Navigation Co., Lansford, Pa., will commence the immediate erection of a new coal breaker at Coaldale, Pa., estimated to cost about $1,000,000, including machinery, to replace the structure recently destroyed by fire.

The Myers Machine Tool Co., Columbia, Pa., has preliminary plans under way for a one-story building, estimated to cost about $10,000. Granville E. Paules, Bucher Building, is architect.

The Enamel Products Corporation, East Stroudsburg, Pa., has been incorporated with a capital of $50,000 to manufacture enamelware specialties. Louis Rupprecht, East Stroudsburg, is treasurer.

The International Mfg. Co., Weatherly, Pa., recently acquired by new interests, will begin production early in August on window screens, ventilators and other metal products. Howard A. Koch, Fleetwood, Berks County, is treasurer.

The Pennsylvania Edison Co., Reading, Pa., has disposed of a bond issue of $125,000 for improvements and extensions in electric plant and system, general operations, etc.

The Bee Automobile Co., 620 Linden Avenue, Allentown, Pa., has acquired the property now occupied, and adjoining land, extending to Court Street. It is operating a complete repair department with machine and forge shops, and a portion of the site will be used for the erection of a new building. Frank H. Bachman is president, and R. H. Bachman, secretary and treasurer.

The Capitano Steel Squares Co., Pittston, Pa., has been incorporated with a capital of $30,000 to manufacture steel specialties. Alexander Capitano, Pittston, is treasurer.

Chicago

CHICAGO, July 25.

The Illinois Central has placed orders for some of the smaller equipment on its list and will probably close for the remainder early this week. The total purchase by this road will probably not exceed $100,000. The Rock Island has added a 36-in. x 14-ft. and an 18-in. x 6-ft. lathe to its list and at the same time has informed dealers that no buying will be done until prices have been reduced 40 per cent below present levels. The prospects of an early purchase by this road are therefore not considered bright. Although business is still dull, the purchase by the Illinois Central and orders received from industrial concerns will bring sales totals for July above the unusually low record for June. The Stephenson-Adamson Mfg. Co., Aurora, Ill., has bought the tools for which it was reported as inquiring last week. Action on the H. W. Johns-Manville Co. list, published last week, will not be taken for about a month, and there is some doubt as to whether orders will be placed by the Milwaukee or the New York purchasing offices of the company.

No action has been taken on the lists for the Federal vocational schools at Jacksonville, Ill., or Valparaiso, Ind. Purchases for the latter school are to be made at Cincinnati. As noted in this column some weeks ago, second-hand equipment was bought for a Federal vocational school at Karlov and Polk streets, Chicago. It is now reported that further purchases are to be made.

The Valley City Machine Works, Grand Rapids, Mich., has reduced prices 10 per cent on its grinding and buffing machinery and disk grinders.

The Sewell Clapp Envelope Co., 23 North Des Plaines Street, Chicago, has let a contract for a factory, 209 x 300 ft., at 4201-4219 Belmont Avenue, to cost $250,000.

The Illinois Central Railroad Co. is having plans prepared for a one-story repair shop and four-stall roundhouse at Herrin, Ill., to cost $60,000.

The American Tar Products Co., 208 South La Salle Street, Chicago, has purchased 40 acres at the southwest corner of Pershing Road and Fifty-second Avenue as a site for a new plant to cost $1,500,000. It now has works at St. Louis, Milwaukee, Youngstown, Birmingham, and Steubenville, Ohio.

The Automatic Control & Signal Corporation, 202 South Clark Street, Chicago, has been incorporated with $500,000 capital stock to manufacture safety devices and accessories. The incorporators include H. E. Bourdette, A. J. Brookins, R. L. Laird, W. H. Potter, et al. Correspondent: Laird, Scheyer & Sullivan, 127 North Dearborn Street, Chicago.

The Potter Specialties Co., 140 North Dearborn Street, Chicago, has been incorporated with $100,000 capital stock to manufacture automobile devices and accessories. Prominent among its products will be a signalling device for automobiles. Incorporators include M. E. Koch, Leo W. Gardner, and Carle F. Potter. For the present the company

will contract for the manufacture of its products, but later a factory will be secured. Correspondent: Ela, Grover & March, 140 North Dearborn Street.

The Waukegan Foundry Co., Waukegan, Ill., has the construction of its foundry well under way. The building will be 276 ft. in length and will have 15,300 sq. ft. of floor space. A 35-ft. Whiting cupola has been installed and operation is expected to start about Aug. 1.

The Sapihl Electric Tool Co., manufacturer of electric grinders and drills, has taken quarters in the Willis Mfg. Co. building, Galesburg, Ill., and will begin at once to equip it for manufacturing purposes. The company will employ about 15 skilled men to start with.

The Metal-Craft Mfg. Co., 64 West Randolph Street, Chicago, recently incorporated, will manufacture metal office furniture, sheet metal fixtures and factory and shop equipment, such as bins, shelving, cabinets, tool stands, lathe pans and jigs. N. M. Cottrell is president.

Fire, July 13, destroyed the plant of the Lewis Roofing Co., Moline, Ill., with loss estimated at about $200,000, including equipment.

The North American Car Co., 328 South La Salle Street, Chicago, has preliminary plans under way for a new one-story shop, 80 x 120 ft., at 135th Street and California Avenue, Blue Island, Ill., to cost about $40,000. It is expected to call for bids early in August.

The Russell Grader Mfg. Co., 2037 University Avenue, Minneapolis, Minn., has preliminary plans under way for its new one-story plant in the new Industrial District for the manufacture of agricultural machinery. It will comprise several one-story buildings and is estimated to cost about $450,000 with machinery. Sund, Dunham & Ludwig, 514 Essex Building, Minneapolis, are architects.

The Hercules Powder Co., du Pont Building, Wilmington, Del., is planning for extensions and betterments in its plant at Rayville, Ill. The works have been closed for some time past and it is proposed to resume production early in the fall.

Fire, July 17, destroyed a portion of the plant of the Midwest Refining Co., Casper, Wyo., with loss estimated at about $50,000.

The City Council, Corning, Iowa, has commissioned C. K. Munns, engineer, Corning, to prepare plans for the proposed municipal electric light and power plant, estimated to cost about $60,000.

The Bettendorf Co., Davenport, Iowa, manufacturer of steel cars, machinery, etc., has acquired the plant and business of the B. L. Schmidt Co., Davenport, manufacturer of cylinder grinding machines. It will be continued in operation and no immediate changes, it is said, are planned.

Pittsburgh

PITTSBURGH, July 25.

Never before in the memory of those now active in the machine tool trade has business been so nearly at a standstill as at present. Dealers report a dearth of inquiries the past week and very few sales. In cranes and the heavier lines practically nothing has been closed since last accounts and there seems to be no life to inquiries that have been before manufacturers for several weeks. It does not seem to be so much a matter of price but more a question of whether this is the time to buy. General business, however, is not reviving as rapidly as could be expected.

The Troop Mfg. Co., 218 First Avenue, Pittsburgh, manufacturer of stoves, heaters, ranges, etc., has acquired property on Jane Street, heretofore held by the Enterprise Machine Co., 120 x 120 ft., improved with a two-story building, to be used in connection with its works.

The Reliance Boiler Works, Inc., Pittsburgh, has been incorporated with a capital of $40,000 to manufacture boilers, tanks, etc. H. C. Feldstein, 1608 Center Avenue, is treasurer.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has preliminary plans under way for a new plant on Sixteenth Street. The W. G. Wilkins Co., Westinghouse Building, is architect and engineer. The company is also said to be arranging details for its new plant at Kings Highway and Slevin Avenue, St. Louis, estimated to cost about $1,000,000 with machinery. Joseph W. Marsh is president.

The Builders' Steel Works Co., Pittsburgh, has been incorporated with a capital of $50,000 to manufacture steel and iron specialties. W. H. Miller, 44 South Howard Street, Bellevue, Pa., is treasurer.

The Robinson Ventilating Co., Harmony, Pa., has completed plans for a new one-story machine shop, 60 x 120 ft., estimated to cost about $25,000. Two electric traveling cranes will be installed.

The Board of Directors, Uniontown Hospital, Uniontown, Pa., has filed plans for the erection of a new power house at the institution.

The Hawkins Traction Flange Co., Pittsburgh, has been chartered under State laws to manufacture railroad flanges and kindred equipment. A. C. Pauley, 352 Fingal Street, is treasurer.

The Euclid Auto Construction Co., Pittsburgh, is arranging plans for extensions in its truck and automobile body manufacturing department for increased production.

The South Penn Oil Co., Morgantown, W. Va., is planning for extensions and improvements at its local plant to cost about $300,000.

The Romisch Mfg. Co., Morgantown, W. Va., will break ground early in August for a new two-story foundry and machine shop, 50 x 50 ft., on Beechurst Avenue, to replace its building recently destroyed by fire. Anthony Romish is head.

The Tri-State Equipment & Repair Co., Kenova, W. Va., has been incorporated with a capital of $50,000 for the operation of a local plant to manufacture automobile parts and equipment, with general repair department. The company is headed by J. W. Havner, Huntington, W. Va., and W. D. Sutton and A. S. Glenn, both of Ashland, Ky.

The Logan Machine Shops, Logan, W. Va., has awarded a contract to the McClintic-Marshall Co., Pittsburgh, for its new two-story machine shop, 60 x 100 ft., to replace the structure recently destroyed by fire.

The Marion Motor Co., 304 Jacobs Building, Fairmont, W. Va., recently organized with a capital of $40,000, will soon commence the erection of a new plant, 42 x 70 ft., to manufacture automobile parts and equipment. L. Glenn Roop is president and J. R. Cole, secretary and treasurer.

The former plant of the Williams Rubber Co., Buena Vista, near McKeesport, Pa., has been acquired by new interests, with company now forming. The works will be remodeled and machinery installed for the manufacture of mechanical rubber specialties.

The W. W. Martin Co., 5847 Center Avenue, Pittsburgh, has filed plans for a new three-story automobile service and repair works, 100 x 140 ft., at Ravenna Street and North Highland Avenue, to cost about $150,000.

The West Virginia Foundry & Stove Works, Huntington, W. Va., has plans under way for a one-story foundry, 50 x 120 ft., and works building, 30 x 130 ft. The present plant will be removed to the new location, and additional equipment installed to double, approximately, the present capacity. Frank C. Boggess is manager.

The Century Mfg. Co., Charlestown, W. Va., recently organized with a capital of $250,000, is planning for the establishment of a new plant to manufacture talking machines and parts, including spring motors, attachments, etc. The company is headed by William Lehmeyer, L. A. Tinder and E. A. Reid, Charlestown.

The Buckhannon Light & Power Co., Buckhannon, W. Va., is planning for the immediate erection of its proposed new power plant.

Detroit

DETROIT, July 25.

The Whitehead & Kales Co., Detroit, has begun construction on the structural steel work for the new plant of the Durant Motors, Inc., Lansing, Mich., to be finished in six weeks. More than 500 men are employed on the site.

The National Alloys Co., Detroit, has been organized with an authorized capitalization of $200,000 to manufacture brass, bronze and aluminum castings and is seeking a plant. The incorporators are W. J. Reardon, John G. Collins, and Horace H. Lane, 2320 Dime Bank Building.

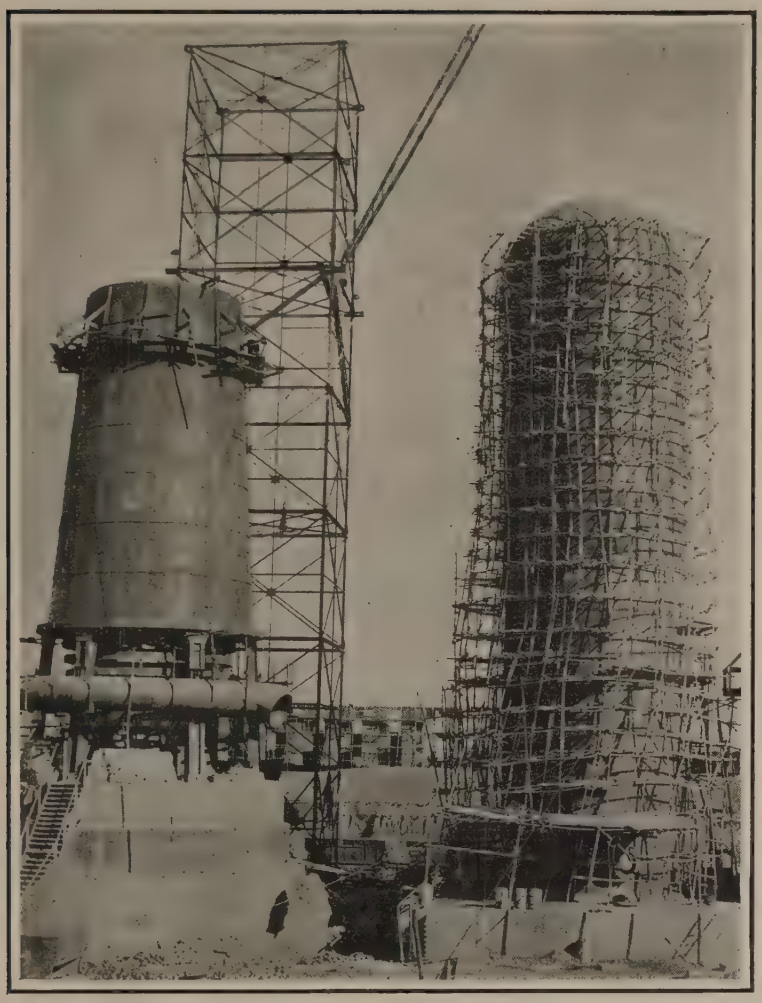
The Benton Tool Co., Benton Harbor, Mich., has been incorporated by Frank L. Sharer, S. W. Trick and A. S. Lindenfeld to manufacture hardware specialties and other metal products. It is expected to begin production in a few weeks in an established plant. The capitalization is $100,000.

The Continental Motors Corporation is tooling up its Detroit and Muskegon plants to handle an order from Durant Motors, Inc., for 2500 motors. Several fair-sized orders for equipment have been placed.

The City Council, Detroit, has placed with the Kuhlman Car Co., Cleveland, an order for 50 one-man trolley cars at a cost of $351,250.

The W. J. Baird Machinery Co., Detroit, has purchased a six-story building, 63 x 100 ft., at Jefferson Avenue and Brush Street, which will for the present be leased to companies wishing space for light manufacturing.

The Detroit Street Railway System, Detroit, Ross Schram, secretary, Murphy Building, Detroit, is taking bids for the erection of the new municipal car shops at St. Jean and Shoe-



Erection of Blast Furnace in India

At the left there will be found a construction view of the new blast furnace plant being erected by Arthur G. McKee & Co., Cleveland, for the Indian Iron & Steel Co., at Asansol, India, near Calcutta. The work is being done by native labor, which is not breaking any records for speed in construction. As shown in the picture, a bamboo scaffold was built around the stove. The McKee company has not been informed whether this scaffold was used in building the stove, or was erected only for use in putting on the dome. The photograph shows that a traveler of rather familiar design is being used in erection work, and the picture of the furnace stack indicates that usual construction methods are being followed in building the stack.

All the steel for the furnace was fabricated in the United States and marked for erection purposes. Part of the plate work was shipped ready for erection and part shipped straight, being curved in rolls after reaching its destination. The construction of the No. 1 furnace shown on the photograph is now well along and the McKee company has started the erection of the second stack.

maker streets, one-story, 260 x 370 ft. William C. Markha, 312 Marquette Building, is engineer.

The Algonac Machine & Boat Works, Inc., Algonac, Mich., has been incorporated with a capital of $25,000 by J. M. and C. C. Smits and J. DeBruyn, Algonac, to operate a general machine and repair works.

The Britton Axle Co., Alma, Mich., has been incorporated with a capital of $3,500,000 by William M. Britton, Alma; W. J. Wickes and Frank H. Payne, Saginaw, Mich., to manufacture automobile axles and kindred equipment.

The Renulife Electric Co., 614 Marquette Building, Detroit, manufacturer of electrical specialties, has rejected all bids for the erection of its new three-story plant, 42 x 90 ft., at 1234 Abbot Street, and the project will be held in abeyance. The plant was estimated to cost about $75,000. A. Frank Herman and H. T. Simmons, 411 Owen Building, are architects.

The Muskegon Piston Ring Co., Muskegon, Mich., has been incorporated with a capital of $20,000 by George W. Olson and Joseph Kitzinger, Muskegon; and John R. Nix, Muskegon Heights, to manufacture piston rings and other automotive products.

The Acme Etched Products Co., Detroit, has been incorporated with a capital of $28,000 by Fred S. Osborn, Howard Atoshian and Paul C. Renaud, 99 Willis Avenue, to manufacture metal name plates.

The Hinkley Motors Corporation, 3420 West Fort Street, Detroit, has awarded contract to the H. G. Christman Co., Stevens Building, for its new plant at Ecorse, Mich., for the manufacture of gasoline engines. The initial works will comprise a main one-story plant, brick and reinforced-concrete, 250 x 340 ft., and one-story power house, 50 x 62 ft. Albert Kahn, 1000 Marquette Building, is architect. H. M. Butzel is secretary.

The Utility Compressor Co., 1161 East Harper Avenue, Detroit, manufacturer of air compressors, has commenced foundation work for its new plant at Adrian, Mich., estimated to cost about $40,000.

The Common Council, Reed City, Mich., is arranging for a bond issue of $70,000 for the erection of a municipal electric light and power plant.

Baltimore

BALTIMORE, July 25.

The American Locomotive Co., 30 Church Street, New York, is planning for the erection of a new one-story forge shop at Richmond, Va., 85 x 160 ft.

The Roanoke-Vinton Ice Co., Roanoke, Va., is planning for the erection of a new ice manufacturing and cold storage plant to cost about $100,000. T. B. Witt is manager.

The Bureau of Yards and Docks, Navy Department, Washington, will break ground at once for a new one-story machine shop and wood-working plant at the Navy Yard, Hampton Roads, Va., to cost about $108,500.

The Clary-Cumming Battery Co., 1218 Hampton Street, Columbia, S. C., is planning for the operation of a local factory for the manufacture of storage batteries and similar equipment. E. M. Cumming is secretary.

Fire, July 16, destroyed the plant of the Roanoke Fiber Board Co., Roanoke Rapids, N. C., with loss estimated at about $300,000, including machinery.

The City Council, Wilmington, Del., has approved an ordinance providing for a bond issue of $600,000, to be used by the Board of Harbor Commissioners in connection with the marine terminal project. A total appropriation of $2,500,000 is available, to be utilized as the work proceeds. The project will include a number of piers and docks, equipped with freight-handling machinery, conveying and hoisting equipment, etc., Contracts for certain features of the work will be awarded at an early date.

Clarence E. Bright and Lawrence J. Mangan, Washington, care of James E. Cooper, architect, 1421 F Street, have plans in preparation for the erection of a new three-story and

basement automobile service and repair building, 145 x 160 ft., on K Street, estimated to cost about $250,000.

The Ray-Shield Mfg. Co., Wilmington, Del., has been incorporated with a capital of $200,000 by Thomas F. and John W. Hogan and Harry E. Algard, to manufacture automobile bodies and parts. P. Warren Green, du Pont Building, represents the company.

The Victor Piston Ring Co., 608 American Building, Baltimore, recently incorporated, contemplates establishing a plant in the near future, but in the meantime will have the rings made by contract.

Clendenin Brothers, Inc., Keyser and Regester streets, Baltimore, has been incorporated with $250,000 capital stock to manufacture metal products. The incorporators are James G. Corckran, James R. Adams and Harold Tschudi.

The Waycross Packing Co., Waycross, Ga., has been purchased by W. H. Baxley, president and manager. The plant is being enlarged and additional machinery will be installed.

The Baltimore Power Plant Co., 743 Calvert Building, Baltimore, has been incorporated to manufacture engines, automobiles, automobile bodies, etc. The incorporators are J. Frank Biddinger, Charles D. Sener and James G. Christhilf, Jr.

The Maryland Metal Building Co., Inc., 801 Munsey Building, Baltimore, has been incorporated with $100,000 capital stock to manufacture portable structures. The incorporators are Frederick J. Maisenholder, William L. Henderson and Aubrey Pearre, Jr.

Buffalo

BUFFALO, July 25.

The Board of Supervisors of Erie County, Buffalo, Maintenance Department, has completed plans for the erection of a one-story automobile service building and machine repair works for county trucks and cars, 62 x 120 ft., at Hamburg, N. Y. Charles Spelch, 583 Ellicott Square, Buffalo, is architect.

City Commissioner Graves, Buffalo, has been directed by the City Council to secure estimates of cost relative to the establishment of a municipal electric power plant, as now being projected.

The Kominz New Chain Mfg. Co., Rochester, N. Y., has been incorporated with a capital of $50,000 by M., A., and J. S. Kominz, to manufacture chains. It is represented by Wile, Oviatt & Gilman, Granite Building.

The Jamestown Carving Works, West Fifth Street, Jamestown, N. Y., has awarded contract to Shellberg & Lindquist, 35 Bush Street, for a two-story addition, 48 x 63 ft., to cost about $20,000.

The Triangle Tool & Die Co., Rochester, has been incorporated with a capital of $25,000 by J. A. and G. E. Ryan and S. J. Emerick, Rochester, to manufacture tools, dies and kindred products. It is represented by Webster, Meade & Straus, attorneys, Rochester.

The Syracuse Cold Storage Co., 101 North West Street, Syracuse, N. Y., is planning to rebuild the portion of its plant destroyed by fire, July 14, with loss estimated at about $25,000, including equipment.

Cleveland

CLEVELAND, July 25.

The improvement noted in the machinery market last week continues, but is more in inquiries than orders. A few buyers are looking around and trying to line up machinery they expect to purchase, but are advising the trade that they will not place orders until business revives. The only inquiry of any size pending is that for equipment for the McKinley School, Canton, previously noted, on which bids will be received July 29. This list amounts to from $40,000 to $50,000.

Some business in single machines was placed at Cleveland and one order from a local manufacturer of automobile parts was for four machines. Reports from Detroit indicate that while automobile manufacturers are operating their plants at probably a better capacity than at any previous time this year, there will be little demand from that source for machinery for some time. Some Detroit manufacturers of automobile parts have a great deal of equipment that is either not being operated at all or only part of the time. With the market for additional equipment so limited some sales organizations are devoting their efforts to attempts to induce manufacturers to supplant present machinery with more modern and more productive equipment.

The Bryan Pattern & Machine Co., Bryan, Ohio, is reported to have taken a large order for pistons for the Ford Motor Co. and may install some additional equipment.

In Cincinnati the machine tool market continues dull, inquiries and sales being confined for the most part to single machines. The inquiry of the Bethlehem Steel Co., Bethlehem, Pa., which includes a 42-in. lathe, is still pending and no action is yet reported on the tools for the American Sugar Refining Co.'s Baltimore plant. The list issued by the Canton, Ohio, Board of Education calling for 25 tools, has been received by manufacturers in this district. There is some activity in used machinery.

The American Tool Works Co., Cincinnati, will close its plant Aug. 1. When in full operation a force of 1200 is employed, although for several months it has only numbered 400.

The London Motor Plow Co., London, Ohio, was recently incorporated for $50,000 for the purpose of building tractors. The company's present model will be changed to include an enclosed rear axle and transmission unit in place of the bull gears and pinions of the present design. The officers include E. H. Daniel, president; P. J. Kirwin and H. Emerick, first and second vice-presidents, respectively; Ray Dunham, secretary, and H. Plimell, treasurer.

The Stewart Phonograph Corporation has moved from Canada to Cleveland and has opened a plant in the Tool & Auto Products Building, St. Clair Avenue and East Forty-ninth Street, and will shortly begin the manufacture of phonographs. L. S. Greenbaum is president and general manager.

The Telestyle Umbrella Co., Findlay, Ohio, has been organized with a capital stock of $150,000 to manufacture telescoping umbrellas. It will acquire the plant formerly used for the manufacture of a similar line of products. Karl L. Schwartz and others are interested.

The General Machine & Tool Co., Akron, Ohio, has been formed to do general machine shop work and will open a plant at 941 Yale Street Extension.

Indiana

INDIANAPOLIS, July 25.

Elwood Haynes, president Haynes Automobile Co., Kokomo, Ind., with other Kokomo capitalists and George J. Marott, Indianapolis, have taken over the holdings of the Holton Tractor Co., Indianapolis. The reorganized concern will be known as the Haynes Tractor Co. and will have $2,000,000 capital. The new tractor, combining the features of the Holton and Powell tractors, will be manufactured at Kokomo, to which city the equipment of the Holton company will be moved. Some of the buildings of the Haynes company will be used until a separate factory is erected.

The Marquette Electric Engineering Co., Chicago, which recently bought the Hotpoint Electric Co., is erecting a plant at Wanatah, Ind., at a cost of $50,000.

The LaBelle Mfg. Co., Indianapolis, has been incorporated with $250,000 capital stock and is seeking a plant with about 75,000 sq. ft. of floor space for the manufacture of washing machines. The officers are J. F. Scott, president; C. S. Walker, secretary-treasurer; H. R. Victor, vice-president.

The Generator Corporation, Poseyville, Ind., has been incorporated with $100,000 capital stock to manufacture galvanized tanks, lighting plants, troughs and other farm equipment. The directors are Otto E. Caudell, Valentine Bender and U. M. Caudell, Evansville; E. D. Fletchell, P. H. Anyle, George Nix and Joseph L. Schafer, Poseyville.

The Johnson Motor Wheel Co., South Bend, Ind., has been sold to G. A. Farabaugh, representing a group of creditors, for $60,000. The formation of a new company is contemplated to manufacture a motor, the invention of Mr. Johnson.

The Marion Foundry Corporation, Marion, Ind., has been moved to Auburn, Ind., where it has established offices with the Auburn Foundry. Castings will be made for a moving grate, the product of the Marion company, and for the Auburn stoker for power plant engines. B. O. Fink is president of the Marion Foundry Corporation, which has a capital stock of $100,000.

The Corcoran Pressed Metal Co. has taken a three-year lease on the Starr Building, Meridian Street and the Belt Railroad, Indianapolis, where it will manufacture sanitary milk cans. It has $100,000 capital stock. L. A. Corcoran is president; L. A. Painter, Pittsburg, Ill., vice-president, and Wilson C. Atkinson, Pittsburg, secretary-treasurer.

The Triangle Steel Products Co., Chicago, care of T. C. Casse, 163 Washington Street, Chicago, architect, has plans under way for a new plant at Michigan City, Ind., one-story and basement, 250 x 500 ft. It is estimated to cost about $75,000.

The Newcastle Casting Co., Newcastle, Ind., has been incorporated with a capital of $100,000 by William T. Applegate and Homer Steinbrink, Newcastle, to manufacture metal castings.

The Advance Rumely Co., La Porte, Ind., manufacturer of agricultural implements, dairy equipment, etc., has preliminary plans under way for a one-story brick and concrete addition. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

Fire, July 13, destroyed the plant of the Consolidated Stone Co., Bloomington, Ind., with loss estimated at about $250,000, including crushing machinery, stone handling and other equipment. A. E. Dickinson, Bedford, Ind., heads the company.

The Union Steel Mfg. Co., 2955 West Grand Street, Chicago, manufacturer of high-speed steel tools, dies, die castings, etc., with branch works at Brazil, Ind., is arranging for the erection of a new plant at Washington, Ind., where the two present plants will be consolidated and additional equipment provided for increased production. Negotiations with the local Merchants' Association for a site are practically completed. The new plant is estimated to cost close to $100,000.

The Central South

ST. LOUIS, July 25.

The Terrill Tire & Rubber Co., 1512 McGee Street, Kansas City, Mo., has awarded a contract to Frank Woodruff, Clinton, Mo., for the erection of a new two-story and basement tire manufacturing plant at Clinton, 90 x 150 ft. A. C. Terrill is president.

The Automatic Self-Leveling Clock Co., Kirksville, Mo., has tentative plans under way for a new two-story, brick and steel plant, estimated to cost about $100,000. J. T. Dodd is head.

The City Council, Weleetka, Okla., is arranging for a bond issue of $82,500 for the construction of a municipal electric light and power plant. L. T. Newton is city clerk.

The Constantin Refining Co., Tulsa, Okla., operating local oil refineries, has arranged for a bond issue of $4,000,000 for extensions, betterments and general operations. E. Constantin, Sr., is president.

The Common Council, Pawhuska, Okla., is considering the construction of a new municipal electric light and power plant. Estimates of cost and details will be arranged at an early date.

The Southern Brick Co., Bristol, Tenn., is being organized by Charles T. Kilgore, Bristol, and associates, with capital of $90,000, to manufacture brick, tile and kindred products.

The Louisville & Nashville Railroad Co., Louisville, will break ground at once for the erection of its proposed new electric power plant at Paris, Tenn. W. H. Courtenay is chief engineer.

The Hugo Hydroelectric Power Co., Hugo, Okla., is being organized by officials of the local Chamber of Commerce to construct a series of hydroelectric generating plants in this section. Application has been made to the Federal Water Power Commission, Washington, for permission to utilize waters from the Mountain Fork River, Little River and Kiamichi River, the plants to have capacities of 150,000 hp., 100,000 hp. and 50,000 hp., respectively. The project is estimated to cost in excess of $2,500,000, including equipment and systems.

The Ford Tire Machinery Co., Akron, Ohio, is considering plans for the establishment of a new branch plant at Joplin, Mo.

Swift & Co., Union Stock Yards, Chicago, are planning to rebuild the portion of their packing plant at Sedalia, Mo., recently destroyed by fire with loss estimated at about $125,000.

The Board of Education, Wichita, Kan., is arranging a list of equipment to be installed in the manual training department at the proposed new high school.

The Duncan Lubricant Oil Works, Inc., Duncan, Okla., has been incorporated with a capital of $50,000 to operate a local plant for refining lubricating oils. The company is headed by Roy K. Wilson and J. R. Frensley.

The Gulf States

BIRMINGHAM, July 25.

The Turning Basing Compress Co., 302½ Main Street, Houston, Tex., recently organized, has plans under way for a new cotton compress plant, 100 x 100 ft., with machinery estimated to cost about $100,000. Robert E. Goree is president, and G. M. Edel, secretary.

The Southern Brass & Plating Co., Houston, Tex., is planning to rebuild the portion of its plant recently destroyed by fire.

Fire, July 19, destroyed a portion of the sugar refinery of the Morsihan Sugar Co., New Iberia, La., with loss estimated at about $300,000, including machinery.

The Gibstown Electric Light & Power Co., Gibstown, La., recently organized, is planning for the immediate erection of a new local electric generating plant. E. W. Merritt is president, and J. H. Houck, secretary and treasurer.

The Co-operative Ice Co., Clearwater, Fla., recently organized, is planning for the erection of a new ice-manufacturing plant with initial daily capacity of about 25 tons, estimated to cost about $35,000. F. L. Hendrix is secretary and treasurer.

The Henderson Cotton Oil Co., Shreveport, La., is completing plans and will soon take bids for the rebuilding of its local cottonseed oil manufacturing plant, recently destroyed by fire with loss estimated at about $300,000, including machinery.

The Common Council, Moore Haven, Fla., is planning for the installation of a municipal electric light and power plant. A bond issue will be arranged.

E. G. Edwards, Wetumpka, Ala., and associates are organizing a company to construct a local cold storage and ice-manufacturing plant. Plans will be arranged at an early date.

The Gulf Coast Oil Refining Co., Gulfport, Miss., recently organized, has acquired about 20 acres for the construction of a new plant. George L. Dodds is president and Charles T. Madison, vice-president and general manager.

The State Bond Improvement Co., Jackson, Miss., will break ground at once for a new one- and two-story power plant at the Mississippi Agricultural College, Starkville, Miss., estimated to cost about $50,000.

The Union Sawmill Co., Stamps, Ark., is planning to rebuild its local plant, recently destroyed by fire with loss estimated at close to $1,000,000 with machinery. J. W. Adkins, construction engineer, is in charge; F. W. Scott is general manager.

Motors, oil engines, pumping machinery and other mechanical equipment will be installed by the Board of Aldermen, Amite, La., in connection with extensions and improvements at the local waterworks. Massena L. Culley, Jackson, Miss., is consulting engineer. M. R. Williams is clerk of the Board of Aldermen.

Milwaukee

MILWAUKEE, July 25.

Probably the most encouraging prospect before machine tool builders is the settlement of the Government obligation to railroads in part at least within the coming 30 to 60 days. The release of approximately $500,000,000 into railroad channels is expected to make possible a fairly heavy aggregate of machine tool and general equipment purchases which have been held in abeyance awaiting proper financing. Current inquiry, coming principally from the automotive, textile and shoe machinery industries, is relatively good, but orders are slow in development. July sales of tools so far are at least equal to those of the entire month of June and most makers and dealers expect to show a small gain by the close of the period.

The Tomahawk Steel & Iron Works, Tomahawk, Wis., expects to start work about Aug. 10 or 15 on the erection of a new foundry and machine shop in place of the plant destroyed by fire two months ago. It will be of brick and steel, 100 x 160 ft., with a basement 50 x 60 ft., and is estimated to cost $75,000 with equipment, most of which will require replacement. The new plant will occupy a site on the Chicago, Milwaukee & St. Paul main line. W. P. Ireland, Tomahawk, and L. A. DeGuere, Wisconsin Rapids, Wis., are associated architects and engineers on the project. The Tomahawk company operates as a commercial foundry and machine shop but manufactures special logging and woodworking machinery and specializes in repair work for saw and planing mills and wood-working plants in the lumber region of Northern Wisconsin.

The Meigs-Powell Co., 582-584 Sixteenth Avenue, Milwaukee, manufacturer of gages, micrometers and other precision instruments, sustained a heavy loss by fire which destroyed the adjoining building, occupied by the Max Schuelke Pipe Organ Co., on July 20. It is intended to reconstruct the building at once. Some retooling will be necessary. John D. Powell is secretary and treasurer of the Meigs-Powell Co.

The Biggam Trailer Co., Milwaukee, has been incorporated to manufacture trailers, trailer trucks and similar specialties for the automotive industries, and to license motor truck manufacturers for the production of such units. The capital stock consists of $250,000 preferred stock and 15,000 shares of common stock without par value. The incorporators are H. F. Biggam, Leo G. Smith and Waldemar C. Wehe, attorney, 425 East Water Street, Milwaukee.

The Riverview Foundry Co., Silver Lake, Wis., a new corporation with $10,000 capital, is erecting a one-story building, 50 x 120 ft., which will specialize in jobbing work for agricultural implement and automotive shops and also manufacture stoves. Operations will begin about Sept. 1. The principals are Charles R. Bohrn, R. C. Dixon and E. I. Dixon, all of Silver Lake.

The Cook & Gardiner Sanitary Rake Co., Beloit, Wis., has been organized by W. R. Cook and E. M. Gardiner to manufacture an automatic cleaning lawn rake and other garden tools. The factory of the former Weber Fanning Mill Co., at Rockton, Ill., suburb of Beloit, has been leased and is being equipped. It is two stories, 30 x 80 and 30 x 60 ft., and will be in operation about Aug. 10.

William J. Cary, county clerk, Milwaukee, is taking bids for furnishing the Milwaukee County Courthouse power plant department with one medium duty thread cutting engine lathe and one horizontal piston pattern, simplex design, Burnham high duty boiler feed pumping unit.

The Acme Valve Grinding Machine Co., Milwaukee, has been organized with a capital stock of $25,000 to manufacture special machinery and tools for automotive shops, etc. The incorporators are George W. Leitsch, V. A. Roberts and George A. Fullips, 3507 Chambers Street, formerly superintendent Badger-Packard Machinery Co., Milwaukee.

The Wisconsin State Board of Control, M. J. Tappins, Madison, Wis., secretary, expects soon to call for bids for the construction and equipment of a $60,000 cold storage plant and warehouse in connection with the State prison at Waupun, Wis. The architect is Arthur Peabody, Capitol Building, Madison.

The Brunett Heating System Co., Rice Lake, Wis., recently incorporated with a capital stock of $100,000, has acquired an 80-acre site on the Chicago & Northwestern and Soo Line tracks, for its proposed foundry and machine shop. It will manufacture heating units designed by M. R. Brunett of Minneapolis and adapted especially for farm and rural communities. Construction work will start Aug. 1.

The Valley Paper Mill Co., Neenah, Wis., a new $300,000 corporation, has engaged E. A. Wettengel, architect, Appleton, Wis., to design a one- and two-story brick and concrete mill and power plant, 100 x 300 ft., estimated to cost about $150,000 with equipment. Albert C. Ehlman, 114 Grand Avenue, Milwaukee, is president. George W. Burnside, Neenah, is general manager.

The Oliver Mfg. Co., Milwaukee, which was organized several months ago and is now manufacturing lifting packs and other automotive specialties, has changed its corporate style to the Oliver-Barth Jack Co., to better express the nature of its business.

The J. M. Royal Engineering Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture machinery, specialties, etc. The principals are James M. Royal and Howard A. Schroeder. Emmett J. McLeod, 128 Grand Avenue, is attorney.

The Seamweld Equipment Co., 814 Winnebago Street, Milwaukee, has been organized to manufacture welding equipment, transformers and electrodes under the Fay patent. The officers are Fred Pabst, president; Harry W. Marsh, vice-president and treasurer; P. C. McNulty, Jr., vice-president and general manager, and Joseph W. Fay, vice-president and chief engineer.

California

SAN FRANCISCO, July 19.

The Schartzer Illuminated License Plate Co., West Nineteenth Avenue, Oakland, Cal., manufacturer of metal license plates, has awarded contract to Edward DeMar, 3080 Claremont Avenue, Berkeley, Cal., for its new one-story plant on West Nineteenth Avenue, estimated to cost about $75,000 with machinery.

Weldon & Glasson, Thirty-first Street and Woolman Avenue, San Diego, Cal., operating a wood-working plant, are planning to rebuild their works, destroyed by fire, July 7, with loss estimated at about $75,000, including machinery.

The Hoff Magnesite Co., Monadnock Building, San Francisco, has acquired about one acre of land at San Pablo, Cal., for the erection of a new plant. Preliminary plans are under way.

The Severin Motor Car Co., Kansas City, Mo., manufacturer of automobiles and equipment, is considering the purchase of land at Oakland, Cal., for the erection of a Pacific Coast plant.

The Moore Shipbuilding Co., foot of Adeline Street, Oakland, Cal., has filed plans for a new one-story foundry for the manufacture of brass castings.

The Albany Engineering Works, Berkeley, Cal., is planning for the erection of a new one-story machine shop and foundry.

The Bastian Combination Water Heater Co., Los Angeles, manufacturer of water heaters, etc., has filed notice of change of name to the General Water Heater Corporation.

The Board of Education, Sacramento, Cal., is planning for the purchase of machinery and equipment for manual training work at the local high school to cost about $18,000. A list is being prepared.

The Board of Supervisors, Oroville, Cal., has directed Frank Boyle, County Purchasing Agent, Oroville, to purchase a rock crushing machine with screens, asphalt heating plant, road grader and other equipment for the Highway Department.

Canada

TORONTO, July 25.

Although dealers have been receiving more inquiries than usual the past two or three weeks for machinery and tools only a very few have turned into actual sales and the market continues quiet. Some dealers, however, have been doing a fair business in second-hand tools, but the demand is usually for replacement purposes. Small tools are moving quietly.

The Bell Thread Co., Ltd., Hamilton, Ont., is in the market for a 25-hp., three-phase, 25-cycle, 220 volt motor; also one of 5-hp., three-phase, 25-cycle, 220 volt.

The lumber mill of the Richards Mfg. Co., Ltd., Campbellton, N. B., was destroyed by fire July 19 with a loss of $60,000.

The National Slag Production Co., Hamilton, Ont., has secured a site on the Canadian National Railway and the beach line of the Grand Trunk Railway and will establish a plant. The new concern is capitalized at $300,000 and is headed by Edwin J. Robertson.

The Dominion Oxygen Co., Ltd., is about to start work on the erection of a plant in Montreal to cost $250,000, which will be a duplicate of its Toronto works and double the capacity of the organization.

Republic Company Suffers Deficit for Quarter

Additional evidence bearing on the condition of the steel industry earlier in the year is found in the report of the Republic Iron & Steel Co. for the three months ended June 30 last. This report shows a net operating loss for that period of $508,447, contrasted with a profit of $2,793,687 for the corresponding period last year. Subsequent figures show, after taxes and charges, a deficit of $883,673, as against a surplus of $104,611 for the preceding quarter, or 42c. a share on the company's $25,000,000 preferred stock, and a surplus of $2,305,500, equivalent to $6.22 a share on the $30,000,000 common stock, after preferred dividends, for the like period last year.

This showing, in part, at least, is due to a broad policy in providing for depreciation and renewal charges, amounting to $175,675 for the period just ended, as against $177,797 for the quarter ended March 31 last, as well as increased bond interest charges. The total deficit for the June quarter amounted to $1,321,173; for the corresponding period last year there was a profit of $418,000.

Unfilled orders on the books of the company, as of June 30, were 97,265 tons, as against 121,498 tons for the corresponding period last year.

Based on earnings for the first six months of 1921, the company's surplus, which on Dec. 31, 1920, stood at $37,441,571, has been reduced to $35,337,509.

Great Northern Ore Properties

The total receipts from all sources by the trustees of the Great Northern Iron Ore properties in 1920 were $5,952,816, comparing with $5,844,000 in 1919. A total of $6,000,000 was paid out to holders of certificates of beneficial interest, which represented two semi-annual dividend payments of $2 per share each. The small deficit was charged against the undistributed receipts fund, and at the end of 1920 there was $208,000 left in this fund.

The total number of tons of ore shipped under the old leases in 1920 was 2,423,445, and the average royalty was 15.52c. This compares with a total tonnage shipped in 1919 of 1,824,510, and average royalties of 17.52c. per ton. The 1919 receipts were the lowest in the history of the property since 1911, and the 1920 receipts show only small improvement.

Steel Corporation Taxes

The following statement was made July 22 by Elbert H. Gary, chairman United States Steel Corporation, in response to questions by newspaper men:

In making our income tax returns to the Government for 1917 and 1918, we raised questions concerning items involving approximately $60,000,000 of taxes. Believing these were not taxable, we claimed credit for them in our returns. Recently the Government representatives have been discussing with us the questions relating to these items. They have not been decided nor has any of them been decided. We have no way of determining when a decision will be reached.

IRON AND INDUSTRIAL STOCKS

Low Prices Beginning to Attract More Investment Buying

While the market for securities is by no means active, low prices are beginning to attract more investment buying. For a long period the rank and file have paid more attention to minorities than to majorities; to pessimism than to optimism. That the country is financially sounder and industrially more active than it was a month ago cannot be disputed, and unmistakable signs are developing that strongly suggest greater activity in fundamental trades heretofore suffering from an apathy of the buying public. The increased buying of steel products by the railroads, which are nearer to receiving claim money from the Government than they have been before, is of importance notwithstanding mills are inclined to cut prices for their goods. Such purchasing should form a backlog for the steel mills and it seems logical to assume will encourage industry as a whole to go forward, providing the buying public loosens its purse-strings.

As to the latter, we have increasing savings deposits and a strengthening in cash reserves of National and Federal banks, which mean a huge buying power sooner or later and an ability of industry to borrow funds with which to conduct business. Our indicated and present grain supplies are enormous, the carriers already cracking under the strain of moving them. Packing house interests are selling larger amounts of foodstuffs. Leather, cotton and woolen industries give further evidences of having passed beyond the depression point. Other straws indicate reviving general business the country over.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30¾ - 32	Gulf States Steel.	30 - 31
Allis-Chalm. pf...	69½ - 72	Int. Har. com.....	72¾ - 75⅝
Am. Can com.....	26 - 27½	Lackawanna Steel.	— - 37½
Am. Can pf.....	— - 81	Midvale Steel.....	22¾ - 23½
Am. C. & F. com.	122 -126	Nat.-Acme	14¾ - 15¼
Am. C. & F. pf...	109½-110	N. Y. Air Brake..	— - 54
Am. Loco. com....	80½ - 84	Press. Steel com..	— - 73
Am. Radiator com.	— - 68½	Ry. Stl. Spg. com.	81 - 82½
Am. Steel F. com.	25⅝ - 26⅜	Ry. Stl. Spg. pf...	— -100
Bald. Loco. com..	73 - 78¼	Replogle Steel....	19 - 19½
Bald. Loco. pf....	— - 97	Republic com.....	44½ - 47
Beth. Steel com..	42 - 43	Republic pf.....	— - 83
Beth. St., Cl. B..	45¼ - 48¾	Superior Steel....	30 - 34¼
Beth. Stl., 8% pf..	98 - 98¼	Un. Alloy Steel...	23⅞ - 25¾
Chic. Pneu. Tool..	— - 50	U. S. Pipe com...	14 - 14⅞
Colorado Fuel.....	26 - 26⅜	U. S. Steel com...	71¾ - 73¼
Cruc. Steel com...	52¾ - 55¾	U. S. Steel pf.....	108⅞-109⅜
Cruc. Steel pf.....	— - 82	Vanadium Steel...	27⅞ - 29¼
General Electric..	117¾-122¼	Va. I. C. & Coke..	— - 70
Gt. No. Ore Cert..	27 - 27½	Westingh'se Elec.	41⅝ - 44⅝

Industrial Finances

The Peck, Stow & Wilcox Co., Southington, Conn., small tools, has called a stockholders' meeting for July 27 for the purpose of electing directors and to vote on accepting an amendment to the company's charter, sanctioned by the Connecticut General Assembly last March, authorizing an increase in the capitalization from $1,500,000 to $4,000,000.

The General Electric Co. offers its employees the privilege of subscribing to new $10 bonds and subscription stamps under a perfected savings plan. The 5 per cent supplementary compensation for continuous service for five years or more, for the first half of 1921, will be paid early in August in employees' 7 per cent investment bonds, issued in denominations of $10. Balances above multiples and amounts less than $10 will be paid as nearly as possible in non-interest bearing employees' subscription stamps in denominations of 50c.

The Westinghouse Electric & Mfg. Co. has filed with the Massachusetts commissioner of corporations a statement of its financial condition dated March 31 last, which shows total assets and liabilities of $196,748,534, contrasted with $146,283,560 at the close of the previous year. During the year there was no increase in the share capitalization of the company, but $30,000,000 bonded indebtedness was created, and a mortgage of $6,275,000 was assumed. The surplus account shows a shrinkage of approximately $1,500,000, standing as it does at $37,000,682.

Directors of the Lincoln Motor Co. are making arrangements for a $2,500,000 bond issue, half of which will be placed within the near future and the remaining half held as a backlog. There will be no public offering of the bonds inasmuch as directors and large stockholders have subscribed for the entire issue to be floated for the present.

The Gulf States Steel Co. operated at a profit of $34,396 during the quarter ended June 30, last. After making deductions for taxes, depreciation and other charges, there was a deficit of $53,353, contrasted with one of $102,917 for the preceding three months period.

The regular quarterly dividend of 1¾ per cent on the outstanding preferred stock of the Taylor-Wharton Iron & Steel Co. for the three months ended June 30, 1922, has been declared payable Aug. 1.

Trade and Office Changes

The Curran Motor Products Co., Detroit, has changed its name to Western Motor Products Co., Inc. It is capitalized at $100,000.

Lasker & Minck have been appointed the Eastern sales agents for the Evans & Howard Fire Brick Co., St. Louis; they have also been appointed sole distributors for Koppax paint in Mexico.

The Economy Baler Co., Ann Arbor, Mich., has sent W. H. Fogelsong, scrap metal press expert, to Cleveland to take charge of the Cleveland office, opened recently at 508 Schofield Building.

W. H. J. Fitzgerald & Co., 165 High Street, Boston, have been made sales representatives in Maine, New Hampshire, Vermont and Massachusetts for the John Steptoe Co., Cincinnati, line of standard lathes.

The W. H. Anderson Tool & Supply Co., Detroit, has leased the property at 303 Bridge Street, N. W., in Grand Rapids, Mich., and will open an office and warehouse there. George D Bresch has been appointed district manager. The building has been altered and will be ready for occupancy about Aug. 1.

The Oxweld Acetylene Co., Newark, N. J., manufacturer of welding and cutting equipment, has removed the offices of its foreign sales department from Newark to 30 East Forty-second Street, New York. Separate departments for sales, engineering, advertising, shipping and accounting have been established, each in charge of a competent man of long experience in the export field.

The M. J. Dougherty Co., piping fabricator and engineer, Philadelphia, has secured the Tomlinson Steam Specialty Co., Cleveland, Detroit and Akron, to represent it in the upper half of the State of Ohio and all of Michigan.

The Positive Lock-Bolt Co. has purchased the entire assets of the Safety Nut & Bolt Co., Cleveland. The new organization is a $250,000 Ohio corporation with the following personnel: C. C. Murphy, president; J. N. Leatherman, vice-president; M. D. Neff, secretary; Edna B. Craft, treasurer; W. H. Burke, general manager; H. L. Jollay and William F. Koehn, directors. The purchaser will complete equipping the factory, work of which was well under way when the old company met with difficulties, and will proceed within a period of 90 days to manufacture on a quantity basis, not only the lock-bolt, but several other specialties to which the locking device is applied and patents of which we have also purchased.

The Cleveland office of the Sullivan Machinery Co. was moved on July 1 from 810 Park Building to room 824, Kirby Building. Ralph T. Stone is manager at Cleveland. The company has established a supply depot and service station for coal mining machinery supplies and repair parts at Seventh Avenue and Thirteenth Street, Terre Haute, Ind., with H. T. Wiley, formerly of the engineering department at the Claremont, N. H., Works, in immediate charge. This service station will be under general charge of M. C. Mitchell, manager for Illinois and Indiana, at the Railway Exchange Building, St. Louis.

Peter A. Frasse & Co., Inc., machinery, tools, supplies, New York, has been appointed the sole agent for the metropolitan district for the drilling machines made by the Sibley Machine Co., South Bend, Ind.

The partnership heretofore conducted by W. Nelson Mayhew and Samuel Frank, trading under the firm name of Steward & Stevens Iron Works, and the partnership heretofore existing between Joseph N. Dalsen, Samuel Frank and W. Nelson Mayhew, trading as Montgomery Iron & Steel Co., have been merged, and the business heretofore conducted by the Steward & Stevens Iron Works and the Montgomery Iron & Steel Co. will hereafter be conducted by W. Nelson Mayhew, Samuel Frank and Joseph N. Dalsen, co-partners trading as Montgomery Iron & Steel Co.

The first issue of *The Dart*, a house organ published by the Medart Patent Pulley Co., St. Louis, appeared June 1. The articles include a discussion of business conditions and an outline of the development of Philip Medart's process of shafting manufacture. Size 4 x 9 in.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.93c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.93c.
Hoops, base price	4.03c.
Bands, base price	3.63c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	3.03c.
Channels, angles and tees under 3 in. x ¼ in., base	2.93c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.63c.
Squares, flats and hex	4.98c. to 5.13c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	3.03c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.68c.
No. 12	3.73c.
No. 14	3.78c.
No. 16	3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.30c.	.....
Nos. 22 and 24	4.35c.	4.70c.
No. 26	4.40c.	4.75c.
No. 28	4.50c.	4.85c.
No. 30	4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	4.25c. to 4.50c.
No. 16	4.50c. to 4.75c.
Nos. 18 and 20	4.65c. to 4.90c.
Nos. 22 and 24	4.80c. to 5.05c.
No. 26	4.95c. to 5.20c.
No. 27	5.10c. to 5.35c.
No. 28	5.25c. to 5.50c.
No. 30	5.75c. to 6.00c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	31c.
Bar	38c. to 40c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....30c. to 32c.

Old Metals

The market is still very discouraging and buying values are slightly lower. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.25
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	8.25
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

THE IRON AGE

New York, August 4, 1921

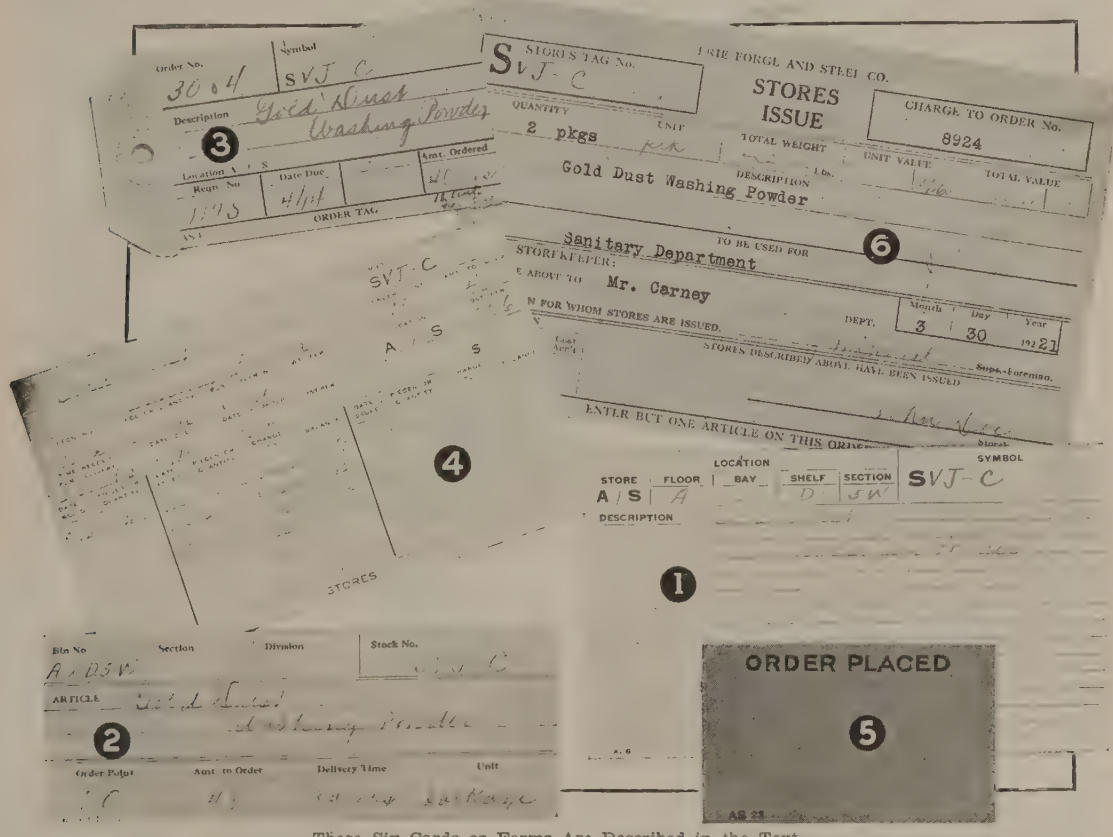
ESTABLISHED 1855 VOL. 108: No. 5

Continuous Stores Keeping Cuts Investment

System of Checks and Almost Automatic Control of Ordering Materials Economizes in Space Required and in Amount Carried

IN an effort to minimize the amount of stores and repair parts carried in the storehouse, the Erie Forge & Steel Co., Erie, Pa., has developed a system of keeping track of stores under which the amount of any item carried in stock is the smallest amount which could be purchased advantageously at one time, unless a larger amount is required because of rapid use. The fully marked, so that new as well as old employees may readily find the material wanted, with the least possible delay.

Each bin has a board within it, which effectually and physically separates one portion of its contents from another. This board gives a warning that, when it is reached in the gradual issuing of stores, it is time



These Six Cards or Forms Are Described in the Text

whole thing has been worked down to a basis which might be described as almost scientific, with a definite allotment of each size and kind of material as the amount to be carried on hand, and a rigid determination of the point in the consumption of that material where a new order should be put in, so that delivery may be made before the remaining balance of the old stock is consumed.

In the stores building, which, despite this arrangement, carries some $150,000 worth of material at all times, the bins for different materials are all carefully marked, so that new as well as old employees may readily find the material wanted, with the least possible delay.

Each bin has a board within it, which effectually and physically separates one portion of its contents from another. This board gives a warning that, when it is reached in the gradual issuing of stores, it is time to order a new stock if they are to be on hand when needed. As soon as this point is reached, the storeroom clerk makes out a requisition upon the office to order as promptly as possible a certain specific amount of the material.

Taking the example shown by the cards herewith illustrated, it will be noted that the so-called "order point" of Gold Dust washing powder is fixed at 20 packages, it having been found by experience that 20 packages will last, in the ordinary run of events, just about the length of time required to get the order

through and the new supply into the bin. This time is shown also, on the card, to be about three weeks. The amount ordered each time is 48 packages, or four cases of 12 packages each. The yellow card, Fig. 2, containing this information, is tacked on the bin where this particular material is kept.

To the new material, when received, a manila tag, Fig. 3, is attached. As the material is unpacked and placed in its proper bin, this tag is hung on a hook on the side of the bin, until all of the material covered by the shipment has been issued, when it is stamped to that effect, and sent to the balance clerk in the stores office.

In order that stores may be used up in the order in which they are received, it is customary to remove the small balance of the old material and place this on top of the new, when the new is placed in its bin. Thus no material is allowed to lie in the bin, month after month, without being put into service in its regular rotation. This is important in connection with certain materials which might spoil if left too long.

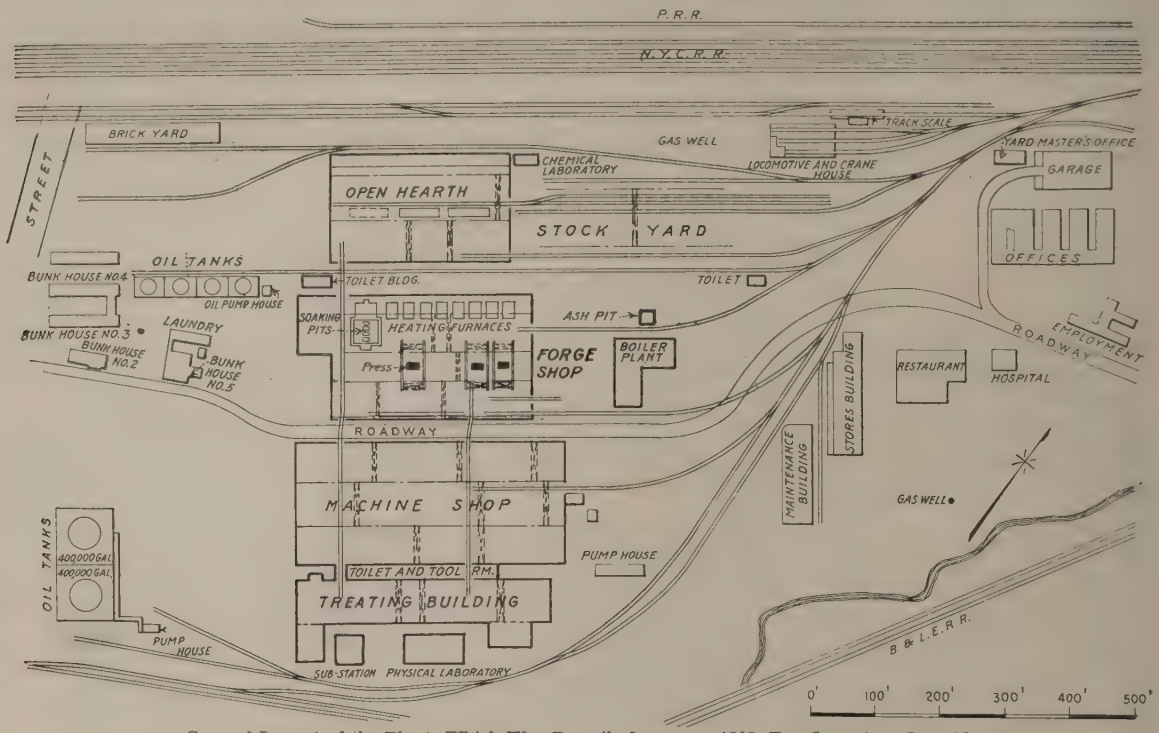
The white card, Fig. 4, kept by the balance clerk in the stores office, is used as a perpetual inventory of material on hand. All deliveries of materials are entered on one of these cards, and all withdrawals of material also are entered, so that the difference between the two will always represent, barring error, the amount actually on hand. This is subject to check at necessary intervals, but is found so generally reliable in service that it is considered correct at all times.

A red card, Fig. 5, is attached to the label on the bin as soon as a requisition is made out for the placing of a new order. This is done primarily as a guide to the clerk in the stores building, so that the order will not be duplicated through lack of his remembering that it has already been placed.

The yellow slip, Fig. 6, and its pink duplicate, serve as requisitions for drawing out materials from stores. This is posted on the balance card when used, and also on the cost records. Extensions of the amount are made by the cost department, and the proper amount charged to the department receiving the material.

By means of this system, both the balance clerk and the storeroom clerk have a ready check upon the condition of the stores in each particular. If the balance clerk finds that an order should come through for certain items, and does not receive it, he immediately goes to the storeroom to learn why. In this way the storeroom clerk is not permitted to overlook sending in his requisition for materials as the several bins become depleted.

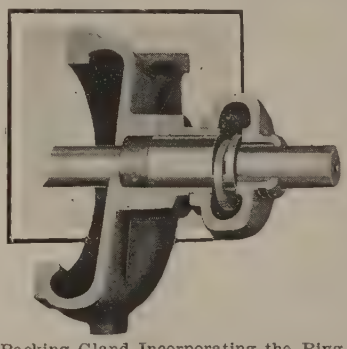
Perhaps the best thing that can be said about the system as a whole is that it works, and that the company is much pleased with the way it works.



General Layout of the Plant, Which Was Described on page 1595, THE IRON AGE, June 16

Pump with Ring-Oiled Packing Gland

Centrifugal and other rotary types of pumps which will incorporate a packing gland designed with the ring oiling feature will be manufactured by the Arrow Pump Co., Buhl Building, Detroit. It is claimed that the ring oiling feature eliminates leaky glands and scored shafts, increasing the life of the pump by efficient lubrication at the glands.



Packing Gland Incorporating the Ring Oiling Principle. The gland is also used as a bearing to eliminate long overhang

The illustra- shows one example of this construction. The packing gland is arranged in combination with an adjustment nut and oil reservoir to permit the use of the ring oiling principle of lubrication. A constant flow of oil is supplied to the gland making it practical to use it also as a bearing, the shaft being supported close up to the load, eliminating overhang and the necessity of outboard bearing. Deflection of the shaft is said to be prevented and the seal of the packing undisturbed. With deflections and vibration of the shaft prevented the metallic packing affords all the resiliency necessary to seal without scoring the shaft.

This method of lubrication is designed to keep a film of oil between the packing and the rotating shaft, and in the bearing. The packing is not subject to the wear it would otherwise have, and is calculated to hold its seal for long periods without adjustment.

British Steel Exports Very Low in June—Imports Relatively Larger

British steel exports in June, this year, excluding iron ore and including scrap, were only 66,301 gross tons as compared with 101,202 tons in May, 161,508 tons in April and 183,373 tons per month for the first quarter. The June exports last year were 287,655 tons. The average per month in 1920 was 274,881 tons per month, while in 1913 it was 420,757 tons per month. The 1919 rate was 188,519 tons per month. The June outgo is therefore much less than even the 1919 monthly average and smaller than any month in the war years. Imports in June were 88,083 tons, which contrast with 89,348 tons in May, 111,536 tons in April, and with 186,040 tons per month in the first quarter. The 1913 imports were 195,264 tons per month and in 1920 they were 128,685 tons per month.

Gross Tons	Exports	Imports
Aver. per mo., first quarter, 1921	183,373	186,040
April, 1921	161,508	111,536
May, 1921	101,202	89 348
June, 1921	66,301	88,083
Aver. per mo., second quarter, 1921	109,670	96 320
Aver. per mo., 1919	188,519	50,801
Aver. per mo., 1920	274,881	128,685
Aver. per mo., 1913	420,757	195,264

The trend of some of the prncipal exports is shown by the following data in gross tons:

	Average per Month 1913	1920	June 1920	June 1921
Pig iron	78 771	38,505	43,358	10,269
Steel rails	41,676	11,213	8,948	1,173
Steel plates	11,162	16,571	14,882	1,336
Galvanized sheets	63,506	34,244	45,826	4,471
Steel bars	20,921	30,322	34,292	2,115
Tin plates	41,208	29,418	32 756	8,801
Black plates	5,679	3,026	3,167	419
Steel sheets	....	....	11,014	684

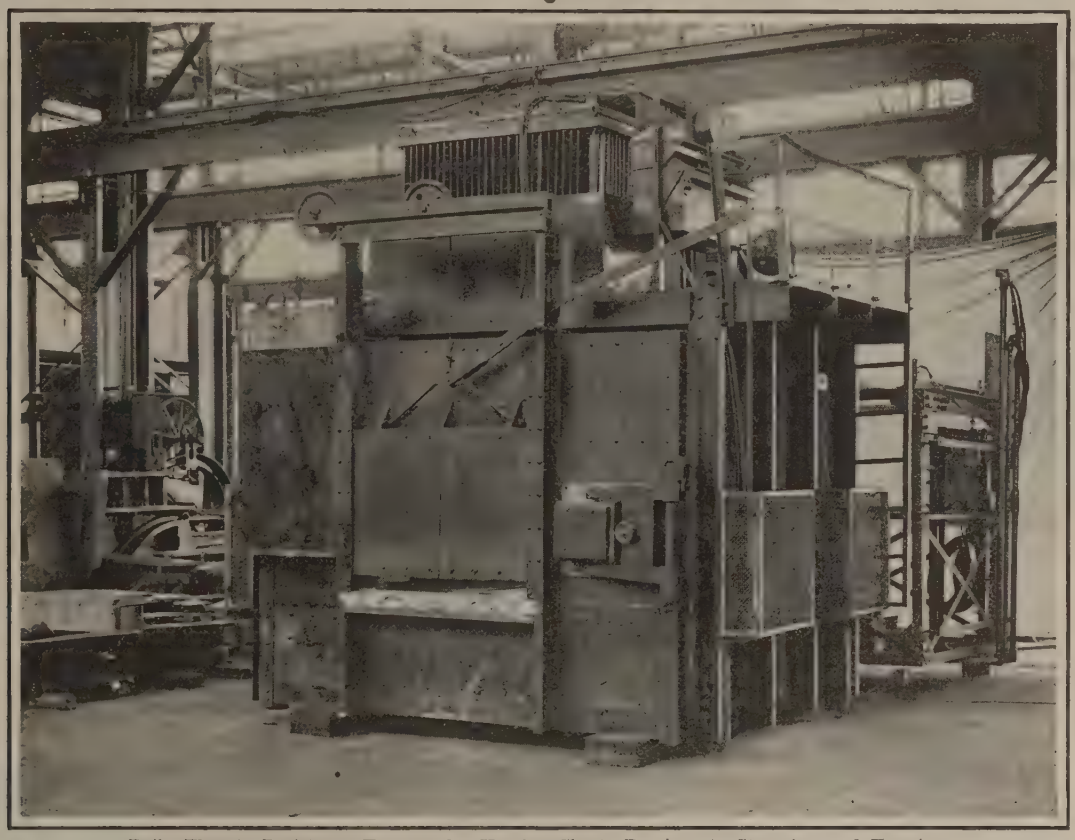
Iron ore imports in May were only 34,209 tons, as compared with 541,742 tons per month in 1920. In June, 1920, they were 675,179 tons. The total for the first six months was 1,284,166 tons, as compared with 3,459,508 tons in the first six months in 1920.

Manganese ore imports were 8334 tons in June against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to July 1 this year was 142,038 tons against 179,066 tons for the same six months last year.

Resistance Type of Electric Furnace Installed for Heating Sheets

In the manufacture of automobile body and fender stampings it is of the highest importance that the heating operations be conducted with as little scaling as possible, for any pitting due to this action requires considerable additional labor in getting the defects sand-blasted to sufficient extent to get a good finish.

The Mullins Body Corporation, Salem, Ohio, with this in mind, recently installed in its new plant a Baily electric furnace specially designed for this work. Since a large part of the pressing or drawing to shape is performed cold and only one or two hot runs are required for perhaps six or seven cold operations on the press, it was desirable to build a furnace of the portable type which could be handled by a crane and taken from place to place so that there would be no idle furnaces while the material was receiving its cold runs. This necessitated a furnace with four eye bar connections at the top, one at each corner, for hooking on the crane chains; and also that the transformer and control equipment be located on the top of the furnace, as shown.



Baily Electric Resistance Furnace for Heating Sheets Previous to Stamping and Forming

The furnace is rated at 100 k.w. in electrical capacity, and has a hearth 3 ft. 4 in. wide by 6 ft. 5 in. long with a door opening 3 ft. 4 in. wide by 2 ft. 2 in. high. It has a capacity for heating 750 lb. of material to 1800 deg. Fahr. per hr. In plants where a crane is not available for moving the furnace, the equipment is designed for mounting on a car which may be moved at will on a truck running parallel to the presses.

One of the features of this equipment is the remarkable uniformity of temperature obtained on the sheets, a condition which it is claimed is not possible to attain in fuel-fired equipment where the doors must be opened frequently. Scaling is also reduced to an almost negligible item, making very much smoother sheets than is possible in fuel-fired practice.

Features of German Machine Tool Plant

Color of Buildings Considered—Prevailing Winds Aid in Reducing Dust and Noise—Welfare of Apprentices and Workmen Emphasized

A MACHINE tool plant in which important consideration was given to the color of the outside as well as the inside of the buildings, to the prevailing winds as a factor affecting the reduction of dust and noise, and to the welfare of apprentices and workmen, was built for the Fritz Werner Co., Marienfelde near Berlin, Germany. The plant was constructed under war time exigency, but appears to have been able to meet fully post-war economic conditions. At the time the war department called for greater production the plant was located within the city limits of Berlin and expansion was impossible. Accordingly it was decided to use previously acquired property in the suburbs.

Pattern Storage Building, Connected with Engineering Department by an Archway to Permit Study of Patterns on Hand

The plant occupies about 265,000 sq. ft. The main building, which houses the executive offices and the shops, is located at the southwest corner of the grounds, as this is the shortest route to the nearby railroad station. Advantage was taken of the prevailing west winds in locating the foundry as far as possible from the other buildings, in order to reduce the noise and dust so far as they were concerned.

Traffic is maintained by means of paved streets, standard gage railroad sidings connected with the nearby main line and a system of industrial tracks. The works are divided by a paved main street into a large western area, where the main building is located and a smaller eastern section. In the eastern section are located the pattern storage house, the pattern shop, heat treating shop, boiler house, foundry, foundry material storage shed and garage.

The standard gage tracks consists of two switching and receiving tracks, also a classification track at the northern extremity, which in turn serves four distribution tracks by means of turntables. The outer of the eastern tracks serves to bring materials for the foundry, boiler house and pattern shop; the inner one for raw materials for the machine shops. The two western tracks are used for shipping. Switching within the grounds is carried on by a locomotive using benzol as fuel, which is small enough to use the turntable at the same time with the cars.

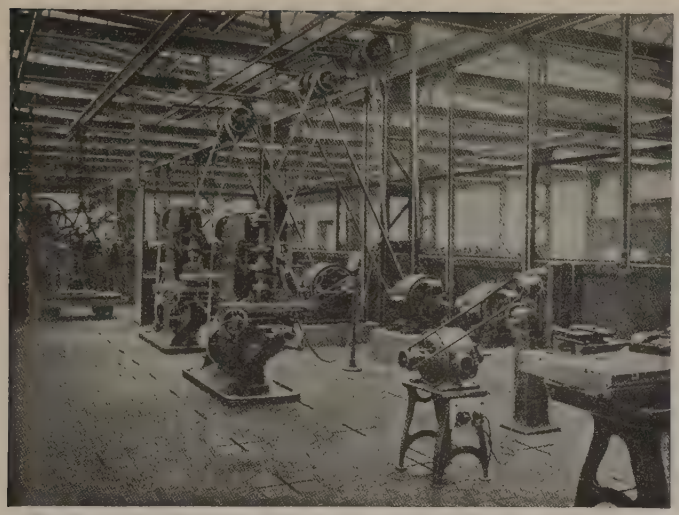
Allowance was made for ample clear space between the buildings, partly to secure yard storage and partly to enhance the lighting of the buildings. The main building is U shaped. The wings are about 328 ft. long, connected by the office building 308 ft. long. Between the wings there is a 230 x 492 ft. one story building, where the heavy machinery is placed. The wings are used as shops for work for which heavy machinery is not required.

In the basement of the executive building are located the wash and locker rooms for the workmen. Above this are the shop offices, the floors of which are elevated 5 ft. above the shop floor for supervision. A hallway 10 ft. in width, outside of the offices, serves as a connecting link between the offices and shops. The sales department is located on the upper floor and on the floor beneath the engineering department. The school for apprentices is located on the third floor.

The main one-story shop consists of a 46-ft. center bay, equipped with 10-ton electric cranes, four 23-ft. bays on the east side, equipped with special devices for handling the transmission parts of the machine tools, and four 23-ft. bays in the west side, equipped with 3-ton electric cranes for assembling. The testing department is also located in this building. Machine tools are tested for production and operating speed according to rated capacity with direct-current motors. Tests are also made for foundations for new type machines.

Connected to the main shop and located on the ground floor of the wings is part of the steel storage, the tool room, cutting-off machines, general storage, storage for semi-finished products and transformer station. Electric power is derived from public service lines at 6000 volts alternating current and transformed to 220 volts. The transformer station is located at the center of distribution of electric power consumption of the whole works in the interest of economy of electrical losses. The foundry is the only other unit having a

Interior of Pattern Storage Building, Showing Arrangement of Fireproof Rooms, Each of Which Serves to Store Patterns and Cores Belonging to One Type of Machine



A Section of the Workshop Showing Good Light Treatment, Also Group Drive. No special foundations are used for machines with rotary motion

transformer station, as it was shown that this reduced installation and operating cost. The works require from 1000 to 1200 kw., distribution to individual motors being effected partly by means of underground cable and partly through pipe conduit. The motors average 20 hp. used for group drive by means of shafting 65 to 72 ft. long.

The roof is of concrete tile construction. All skylights face the north to keep direct sunlight away from the machinery and the workmen. The heating pipes are located just under the skylights and appear to be part of the construction members of the building.

The Workshop of the Apprentice School. The management is very solicitous about this department and devotes particular attention to it

The floor of the main workshop is of wood block on a concrete base and has proved serviceable. Only the heaviest of the machine tools, especially those with reciprocating motion, have special concrete foundations; all other machines are mounted on skids. The shops located in the wings are notable for their light treatment which is accented by good fenestration, comparatively narrow working floor space of 40 ft., and the light color of the ceiling and floor. The floors of these shops are of jack-arch construction supported on I-beams for taking heavy floor loads.

Elevators 6½ x 10 x 13 ft. in size establish communication between the various floors. The elevator shaft, the stairs and toilets form a separate group in the building.

The storage and distribution of the lubricating oils is one of the features of the works. The oil is stored in the basement in iron reservoirs of 500, 1000, 2500 gal. capacity, from which pipe connections lead to the railroad siding. The oil is forced out of barrels, or tank cars into the reservoirs by carbonic acid gas. Accurate measuring devices are installed to keep account of all oil used. Oil used in automatic screw and other machines is centrifugally cleansed and then filtered for further use.

The outside walls of the large buildings are carried out in slag of a brown violet color. This material possesses the advantage of not showing the accumulation of grime and smoke, unavoidable in works of this character. The inner walls of the U are of glazed tile in order to help the lighting of the one-story shop building.

The pattern storage building is one of the economic features of the works. It is an absolutely fireproof structure of eight stories including the basement, each 8¼ ft. high, divided into a number of small fireproof rooms. Each room serves as a storage place for the patterns belonging to one type of machine, together with the cores. This allows of very easy inspection and is a safeguard against damage by fire. A 3000-lb. capacity elevator is used for the transfer of the patterns to and from the various floors.

The pattern storage building is connected to the engineering department in the executive building by means of an arch gallery. This is to allow the designers to check up old patterns, so as to avoid as much as possible making of new ones. The space above the arched gallery is used for blueprinting apparatus using natural light. Next to the pattern storage building is the pattern shop which is a two-story slag structure. A special compartment is provided for machines causing dust and making noise.

The laboratory for testing materials is located in the heat treating shop. This includes a metallographic, a chemical and physical laboratory. The foundry has its own laboratory for testing pig and cast iron.

The boiler house is used for heating the entire plant.

The Wash and Locker Rooms Are of White Tile Wall Construction, with Hot and Cold Running Water

The Workmen's Dining Room Is Light and Airy. Meals are served here at noon

It is equipped with two fire-tube boilers with automatic grate stokers. The heat in the flue gas is utilized for heating the feedwater by means of a heat exchanger. Outside the boiler house is a 1500-ton coal storage yard. A crane equipped with a grab bucket takes the coal to the bunkers in the boiler house from which the automatic stokers are fed. Two or three workmen only are required for all of this work. The boiler house is so planned that in case of necessity a power house can be added, equipped with steam turbines, in which case the exhaust steam would be used for heating. Adjourning the boiler house is a building containing fire apparatus, also a building for the compressors, which serves the entire plant with compressed air.

The foundry has a casting floor 71 x 325 ft., constituting the center bay, with lean-tos on either side. In the eastern section are located the cupolas, dryers, sand and core makers and in the western the raw materials, patterns, wash, locker rooms and shop offices. The foundry is equipped with a number of stripping plate molding machines and jarring machines. Sand blast apparatus and pneumatic chipping tools are used for cleaning castings. The foundry is connected to the coke shed by a tunnel, the top of which is equipped with hoppers. The hopper valves serve coke cars, which are taken by elevator direct to the cupolas. The cupolas are equipped with sprinkler systems to prevent fire damage from flying sparks.

Hot air is used for heating the foundry in winter. During the summer months the same system is used for admitting fresh air from the outside, which has proved a great comfort during casting operations. The crane runways extend in the open at both ends in order to facilitate the handling of flasks and finished castings. Provision is made so that the upper part of the end walls can be pushed out in the crane runway and replaced when the crane enters the building.

The firm is particularly solicitous for its apprentices. Practical education is given in a special workshop equipped with all types of machine tools. In addition there are two class rooms, a large drafting room, a lecture hall, library and research department. A large sodded playground with a covered turn hall are used for the physical development of the apprentices.

Installations pertaining to the welfare of the workmen, such as dining room, washrooms, bathrooms, locker rooms and toilets are systematically arranged and well equipped to conform to modern hygienic practice. These rooms are readily cleansed and are easily accessible. The fundamental observed in their location was that all unnecessary steps must be avoided.

The main wash and locker room is located in the basement and is lined with white glazed tile to a height of 6½ ft. It is equipped with rows of wash basins with hot and cold water bibs. The lockers, one assigned to each man, are also located in this room. The place is lighted electrically and heated. The workmen on the upper floors have similar provisions. The toilets are equally divided on a ratio basis of one cell to 12 workmen. In addition to the wash room there is a special bath house equipped with 10 showers and 10 tubs.

The dining room and kitchen are located in the mansard with a capacity for the preparation of 1200 quarts of food. The kitchen has a white tile floor and is equipped with four steam cooking kettles. In adjoining rooms are electrically driven potato pealers, meat choppers, dish washing machines, knife cleaners, etc. The food is passed from the kitchen to the dining hall through large window openings, which is efficient and allows the workmen to survey the kitchen. Special smaller dining rooms are assigned to the officials and foremen.

In addition to the ground occupied by the plant, the company owns 40 acres of land, which is rented to the workmen for gardening at a nominal price. There are about 200 vegetable gardens. Water for sprinkling is provided by the company.

The plant which is planned to employ from 1000 to 1500 workmen is so laid out that 50 to 100 per cent additions can be made without disturbing the present arrangement.

Less Cast Iron Pipe Made

Figures of the Census Bureau show a heavy reduction in the production of cast iron pipe in 1919, compared with 1914, the figures being 702,550 tons in 1919 and 1,120,720 tons in 1914. This reduction is wholly under the heading of gas and water pipe and fittings, which fell from 909,070 tons in 1914 to 447,880 tons in 1919. There was a healthy increase in production of soil and plumbers' pipe and fittings, from 211,650 tons in 1914 to 254,670 tons in 1919.

Values of various kinds of pipe and cast iron fittings, however, showed a large increase under all headings. The total value of the products of the industry advanced from $28,102,600 to $51,902,800. Unit values of cast iron pipe and fittings, per ton of 2000 lbs., in 1914, were $23.18, as compared with $69.05 in 1919.

Under the two large tonnage items, the unit value for gas and water pipe and fittings in 1914 was $21.87 as compared with $62.79 in 1919. Similarly, the unit value of soil and plumbers' pipe and fittings has advanced from $29.17 in 1914 to $80.07 in 1919.

Cast Iron Pipe—Census Bureau's Summary Concerning the Industry—1919

Kind	1919 Tons 2000 Lb.	1919 Value	1914 Tons 2000 Lb.	1914 Value
*Total value of products	....	$51,902,800	....	$28,102,600
Cast iron pipe and fittings	702,550	48,514,600	1,120,720	25,979,200
Gas and water pipe and fittings	447,880	28,124,100	909,070	19,805,500
Bell and spigot pipe	375,200	19,257,700	828,900	16,669,600
Flanged pipe	23,790	1,714,200	27,290	706,500
Culvert pipe	5,660	344,000	11,010	246,500
Fittings	43,230	6,808,200	41,870	2,182,900
Soil and plumbers' pipe and fittings	254,670	20,390,500	211,650	6,173,370
All other castings	16,400	1,614,500	13,580	681,700
All other products	....	1,773,700	....	1,441,700

*Includes 59 establishments primarily engaged in the manufacture of cast iron pipe with products valued at $50,235,100 in 1919 and $26,659,360 in 1914; and seven establishments in 1919 and nine in 1914 in other lines of manufacture, reporting cast iron pipe to the value of $1,667,700 and $1,443,240 respectively.

Hare's Motors, a corporation formed a year or so ago to take over the management and operation of the companies manufacturing the Mercer, Simplex and Locomobile automobiles, is to be dissolved. The companies making those cars will operate once more as separate units. No definite plan has been made for a reorganization of the Locomobile concern, but have been for the Mercer Motors Co., which owns the Simplex Automobile Co.

Chemical Reactions in Foundry Cupolas

Actions and Reactions — Combustion, Cupola Gases, Carbon Ratio, Melting Efficiency, Metal Losses and Gains — Cupola Balance Sheet

BY Y. A. DYER*

IN a strict sense, combustion is rapid oxidation accompanied by flame—the product of combustion being a gas or vapor. It may be stated, in the case of cupola combustion, that the carbon in coke and oxygen in air have such strong chemical affinity for each other in the presence of heat that they unite with violence. By the force of their chemical union, combustion is instantly produced and intense heat evolved. The higher the temperature, the more rapidly will combustion proceed. As air is the vehicle which carries oxygen into the cupola and coke the medium of carbon supply, a general acquaintanceship with air, oxygen, nitrogen, carbon and their behavior in the presence of heat becomes necessary to a full understanding of cupola actions and reactions and the products of combustion.

Air and Its Constituents

One cu. ft. of dry air under standard conditions (32 deg. Fahr. and 29.93 in. of mercury) weighs 1.293 ounces, or 0.0808 lb.† The volumes of all permanent gases under uniform pressure increase uniformly with uniform increase of temperature. Expressed in the Fahrenheit scale, a gas expands $\frac{1}{491}$ for each degree increase above 32 deg. Fahr. The volume is proportional to the absolute temperature; that is, to $T - 32 + 490$ $(= T + 458)$, where T is the temperature in deg. Fahr.

But the volume of a gas is inversely as the pressure upon it, therefore doubling the pressure halves the volume. The density of a gas varies inversely as its absolute temperature. For practical metallurgical purposes the composition of air may be stated in the following ratios and percentages:

	Ratios		Percentages	
	By Volume	By Weight	By Volume	By Weight
Oxygen	21	3	20.8	23.1
Nitrogen	80	10	79.2	76.9

Oxygen (O_2) has molecular weight of 32, density of 16; and one cu. ft. under standard conditions weighs 1.44 ounces or 0.09 lb. Nitrogen (N_2) has molecular weight of 28, density of 14; and one cu. ft. weighs 1.26 ounces or 0.0787 lb. The nitrogen gas of the air is practically inert; remains unchanged in the cupola, and merely dilutes the air and gases, thereby very materially lowering temperatures.

Carbon in the Coke

Coke is a solid fuel containing a high percentage of carbon, and is generally used in the cupola melting process. By the union of its carbon with oxygen an intense heat is produced. The products of this union are carbon dioxide (CO_2) and carbon monoxide (CO) gases or vapors. The quantity of heat generated by a fuel burned in oxygen, its heat of combustion or heat value, is expressed in terms of calories or heat units. The British thermal unit (B.t.u.) is the quantity of heat required to raise the temperature of 1 lb. of pure water 1 deg. Fahr., at or near its maximum density (39.1 deg. Fahr.).

Carbon has a molecular weight of 12; its specific heat above 1832 deg. Fahr. is 0.50; therefore it has atomic specific heat (0.50 x 12) = 6. The boiling point of carbon, under atmospheric pressure, is reported as 6692 deg. Fahr. Diamond is assumed as relative standard for carbon in the calculation of thermic results, and its heat of combustion is approximately 14,580 B.t.u. Thus the heat of combustion from one pound of solid carbon, exclusive of heat of vaporization, is 14,580, or in round numbers 14,500, B.t.u. when burned to carbon dioxide.

The heat of vaporization of carbon may be obtained by subtracting the heat of combustion of solid carbon from that of the carbon in the gas. The heat of combustion of solid carbon to carbon monoxide is 4370 B.t.u., effected by 1 lb. of carbon uniting with 1.333 lb. of oxygen to form 2.333 lb. of carbon monoxide. The 2.333 lb. of monoxide gas, in burning to carbon dioxide, generates $(2.333 \times 4370) = 10{,}195$ B.t.u., or in round numbers 10,200; therefore, $(10{,}195 - 4370) = 5825$ B.t.u. represents the heat of vaporization of carbon. Then, the total heat of combustion becomes $(14{,}580 + 5825) = 20{,}405$ B.t.u., of which 14,580 are sensible or available heat units for melting and superheating, and 5825 are latent heat units, or heat necessary to vaporize carbon.

Carbon Vapors or Gases

As the gases of the cupola are the products of combustion, or union of carbon and oxygen, and are the heat producing agencies for the melting and superheating of iron, their relative values will be discussed.

Carbon dioxide (CO_2) gas has molecular weight of 44, density of 22; one cu. ft. weighs 1.98 ounces or 0.1236 lb. under standard conditions; and one pound requires for its complete combustion $(\frac{32}{12}) = 2.667$ lb. or 29.6 cu. ft. of oxygen, or 11.517 lb. or 142.44 cu. ft. of air. Carbon dioxide contains 12 parts of carbon and 32 parts of oxygen in 44 parts of gas.

It may be stated that the gas is formed in the cupola by one atom of carbon taking up or uniting with two atoms of oxygen, forming one molecule of carbon dioxide; or 1 lb. of carbon uniting with (12:32::1:2.667) 2.667 lb. of oxygen, forming $(1 + 2.667) = 3.667$ lb. of carbon dioxide, creating perfect combustion and generating approximately 14,500 B.t.u. The flame temperature of carbon burned to carbon dioxide in air is reported by LeChatelier as being 3700 deg. Fahr.

Carbon monoxide (CO) gas has molecular weight of 28, density of 14; weighs 1.26 ounces or 0.07875 lb. per cu. ft.; and 1 lb. requires for its complete combustion 1.333 lb. or 14.8 cu. ft. of oxygen; or 5.759 lb. or 71.22 cu. ft. of air. Carbon monoxide contains 12 parts of carbon and 16 parts of oxygen in 28 parts of gas.

It may be stated that the gas is formed in the cupola by the molecule of carbon dioxide (3.667 lb.) taking up, or uniting with, one atom of carbon (1 lb.), forming 2 molecules of carbon monoxide gas (4.667 lb.); or 1 lb. of carbon, by this transfer, is united with only $(12:16::1:1.333) = 1.333$ lb. of oxygen, forming $(1 + 1.333) = 2.333$ lb. of monoxide gas, creating imperfect combustion.

The absorption of heat by carbon monoxide gas is at the rate of approximately 10,200 B.t.u. per pound of carbon charged in the cupola, and the net amount of heat given out when one pound of carbon forms monoxide gas is approximately only $(14{,}500 - 10{,}200)$ 4300 B.t.u., or less than one-third of the heat generated in the formation of carbon dioxide gas. Hence, in the matter of melting and superheating metal, the advantages to be derived from the carbon dioxide flame become very apparent. The flame temperature of carbon burned to carbon monoxide in air is reported by LeChatelier as 2335 deg. Fahr.

Should the CO gas pick up another atom of oxygen in its ascent through incandescent carbon in the cupola, combustion may be completed. Therefore, if 2.333 lb. of CO takes up 1.333 lb. of oxygen, 3.667 lb. of CO_2

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†All ounces, pounds and tons in this article are Avoirdupois; tons are of 2000 lb.

will be formed, and the heat produced per lb. of carbon will be 10,206 B.t.u. The heat produced in oxidizing 1 lb. of CO to CO_2 amounts to approximately $\left(\frac{10206}{2.333}\right) = 4375$ B.t.u. Carbon monoxide burned to carbon dioxide in air has a flame temperature of 3810 deg. Fahr., according to LeChatelier.

Nitrogen Present in the Air

Since 1 lb. of oxygen is contained in 4.32 lb. of air, the amount of air required to burn 1 lb. of carbon to CO_2 is $(2.667 \times 4.32) = 11.52$ lb.; and since each lb. of air contains 0.769 lb. nitrogen, the total nitrogen is $(0.769 \times 11.52) = 8.85$ lb. In the matter of formation of CO gas, the amount of air necessary is $(1.333 \times 4.32) = 5.76$ lb.; therefore, the amount of nitrogen is $(0.769 \times 5.76) = 4.43$ lb.

If more air be supplied to the cupola than is necessary to satisfy each atom of carbon with oxygen, the excess weight of air will absorb additional heat from the fuel and the oxygen present will be left free or uncombined; therefore it will suffer no interference in its attack on the metal.

Carbon Ratio and Flame Temperature

Because of its nonvolatility, no flame is produced in burning solid carbon. But when the temperature in the cupola becomes sufficiently high to raise a portion of the carbon to incandescence, flame is produced by the burning gases. While in the solid state, in the presence of heat, carbon remains incandescent; as it decomposes a gas or vapor is produced in the form of finely dissociated carbon particles that are seen to burn in the cupola and produce flame. The following formula for carbon burned to carbon monoxide illustrates the principle of calculating approximate flame temperature of carbon burned in air:

Parts by weight of oxygen and carbon	2.333
Specific heat of carbon monoxide at 3200 deg. Fahr.	0.278
Parts of nitrogen introduced	4.430
Specific heat of nitrogen at 3200 deg. Fahr.	0.278
B.t.u. generated	4,385

$$\frac{4385}{2.333 \times 0.278 + 4.43 \times 0.278} = 2{,}332 \text{ deg. Fahr.}$$

If carbon be burned to monoxide in oxygen, the flame temperature would be approximately:

$$\frac{4385}{2.333 \times 0.278} = 6{,}746 \text{ deg. Fahr.}$$

Therefore, some idea may be formed of the devitalization or drop in temperature caused by the presence of nitrogen in air mixture supplying oxygen for combustion; also of the possible thermal effects of combustion by oxygen.

It will have been noted that the actions and reactions which produce the dioxide and monoxide gases create the flame and heated volume of gases which rise in the cupola and mingle with the descending charges. However, it should be paramount in the mind of the melter that the gas which supplies the intense flame is carbon dioxide, therefore any condition which tends to minimize its formation or lower its flame temperature—such as insufficient air, excessive coke bed and intermediate charges, or excessive air delivery, creating dilution by excess nitrogen and uncombined oxygen—should be eliminated as far as possible.

Sundry tests by many successful melters have proved that the height of fuel bed should be such at all times during the process of operation that at its upper level practically all the oxygen of the air blown into the cupola will have been combined with the carbon in the coke. Such condition will result in the utilization of the maximum flame temperature at the critical point. Ordinarily the greatest constant heat occurs in the cupola between 18 and 36 in. above the tuyeres (depending on size, construction and operation of cupola), where the zone of fusion exists. At this point the theoretical maximum flame temperature created by carbon burning to dioxide would be approximately $\frac{14{,}580}{3.666 \times 0.382 + 8.85 \times 0.278} = 3{,}777$ deg. Fahr.

In well regulated cupolas the gases usually approximate, by volume, the following range of analyses at the critical point in the melting zone area:

CO_2	15.00 to	16.00	per cent
CO	10.00 to	8.00	per cent
N_2	74.50 to	75.50	per cent
O_2	0.50 to	0.50	per cent

thus creating a carbon ratio $\left(\frac{CO_2}{CO}\right)$ of 1.5 or 2 to 1. Under the conditions met in ordinary practice, an ideal cupola working carbon ratio may be stated as 2 to 1, and with such existing conditions a melting ratio of 10 to 1 will obtain, provided first-class coke is used.

At the zone of fusion the temperature may actually range from 3150 to 3250 deg. Fahr. under approximate gas conditions as stated above—that is: 60 to 67 per cent carbon dioxide and 40 to 33 per cent carbon monoxide; temperatures of the two gases being based on LeChatelier's figures. The temperatures at which the gases leave the cupola vary with rate of driving and height of charging area—ranging from 600 to 700 deg. Fahr. in high cupolas to 1000 to 1100 deg. Fahr. in very low cupolas.

It should be the aim of the melter to select suitable coke, ascertain definite melting zone and so arrange charging conditions, air volume and pressure that as small a portion as possible of the carbon in the coke of upper charges will be transferred to carbon monoxide or consumed as such before reaching melting zone. This feature has an important bearing on the equilibrium of the carbon ratio. Water spraying of intermediate coke charges is often resorted to in extreme cases of too free burning coke. However, the author contends that this method is an expedient—a temporary remedy, not a cure. There is a basic cause, and if coke above the melting zone burns away too readily the character of the coke should be closely examined, cupola construction checked closely, or charging and operating conditions remedied.

Actions and Reactions Simple

Cupola chemical actions and reactions are comparatively simple and stable, compared with blast furnace reactions and chemical equilibrium. In facilitating these actions and reactions the important members of the cupola charge to be dealt with are coke and air. The air blown through the tuyeres supplies oxygen, which immediately sets up a chemical action by combining with the carbon in the coke.

While there is no way of definitely determining which action takes place first, it is reasonable to assume that the carbon of the coke is burned to dioxide instantly, then becomes carbon monoxide by burning solid carbon, which in turn is burned back to carbon dioxide—therefore the actions and reactions become reversible or interchangeable. However, in the cupola the re-burning of monoxide to dioxide occurs too high above the melting zone to be of service for melting. Chemical actions and reactions in the cupola are equated below in substantially the form and order in which they occur:

1 Carbon burns to dioxide gas $= C + O_2 = CO_2$
2 Carbon dioxide is reduced by carbon $= 2C + O_2 = 2CO$
3 Water and moisture are decomposed $= C + H_2O = CO + H_2$

Under average working conditions, temperature about 62 deg. Fahr., barometer 29.6 in., humidity 65 per cent, 1 cu. ft. of air weighs $\left(0.0808 \times \frac{490}{520} \times \frac{29.60}{29.93}\right) = 0.0754$ lb. and contains by weight $(0.0754 \times 0.231) = 0.0174$ lb. of oxygen. To supply 1 lb. of oxygen under these conditions requires $\left(\frac{1}{0.0174}\right) = 57$ cu. ft. of air. But 2.666 lb. of oxygen are required for complete combustion of 1 lb. of carbon to carbon dioxide gas; therefore, $(2.666 \times 57) = 152$ cu. ft., or 11.46 lb. of air will be required to supply the necessary oxygen to burn 1 lb. of carbon.

If coke has a fixed carbon content of 88 per cent, then each pound of coke will contain 0.88 lb. of carbon. Maintaining intermediate coke ratio to iron charged of 1 to 10 means that the actual melting ratio will be nearer 8 to 1, or about 250 lb. of coke for each 2000

lb. of metal, when account is taken of the portion of coke bed which burns away during the melting process; therefore it will be safe to compute the burning of an average of 250 lb. of coke in melting 2000 lb. of iron; and that coke will contain $(0.88 \times 250) = 220$ lb. of carbon.

Inasmuch as only 60 to 65 per cent of the carbon is finally present at the melting zone as CO_2, and 40 to 35 per cent as CO gas (an average of 2.16 lb. oxygen to pound of carbon), there will be actually needed for combining weights $(220 \times 0.62 \times 2.67) = 364$ lb. of oxygen for CO_2 and $(220 \times 0.38 \times 1.33) = 111$ lb. oxygen for CO—a total of 475 lb. of oxygen, carrying $(475 \times \frac{10}{3}) = 1583$ lb. of nitrogen, or $(1583 + 475) \div 0.0754 = 27{,}295$ cu. ft. of air. However, on account of blower slippage, bends in pipe, pipe friction, leakage and obstructions, approximately 10 per cent more air must be blown in order to insure the free delivery of this quantity, or $(27295 + 2729) = 30{,}024$ cu. ft., which practically tallies with the generally accepted blowing unit of 30,000 cu. ft. for each ton of metal charged.

BALANCE SHEET
(Per 2000 Lb. Charge)

Materials Charged	Per Cent	Lb.	Unit Weight	Casting Weight		Slag Weight		Gas Weight	
Iron:		1950							
Fe	93.11		1815.64	Fe	1808.39	FeO	9.32		
C	3.60		70.20	C	70.20				
Si	1.95		38.02	Si	36.07	SiO_2	4.17		
S	0.06		1.17	S	1.17				
P	0.63		12.29	P	12.29				
Mn	0.65		12.68	Mn	9.75	MnO	3.78		
Sand and dirt:		50							
SiO_2	75.00		37.50			SiO_2	37.50		
Al_2O_3	22.00		11.00			Al_2O_3	11.00		
Alkalies	3.00		1.50			Alkalies	1.50		
Coke:		244							
Free carbon	88.00		214.72					C	214.72
Volatile hydrocarbons	1.30		3.17					CO	3.17
Moisture	0.70		1.71					H_2O	1.71
Ash	9.35		22.82			SiO_2 Al_2O_3 FeO CaO	10.95 5.71 4.45 0.49		
Sulphur	0.65		1.58	S	0.60	CaS	2.20		
Limestone:		50							
$CaCO_3$	98.00		49.00			CaO	27.44	CO_2	21.56
$MgCO_3$	0.38		0.19			MgO	0.09	CO_2	0.10
SiO_2	0.97		0.48			SiO_2	0.48		
Al_2O_3	0.65		0.33			Al_2O_3	0.33		
Air:		2010							
O_2	23.1		464.00					O	458.86
N_2	76.9		1546.00					N	1546.00
		4304	4304.00		1938.47		119.41		2246.12

Heat Balance and Melting Efficiency

The heat balance of a cupola, or distribution of heating value of coke—heat utilized for melting and superheating iron, melting and heating slag, expelling water vapor from air and gas (CO_2) from limestone, etc.—may be fairly accurately computed by the aid of certain practical and theoretical factors. Thus—a cupola burning 244 lb. of coke (containing 88 per cent fixed carbon) to melt and superheat 1950 lb. of iron, supply heat for slag and other purposes—with escaping gas containing by volume 14 per cent CO, 10 per cent CO_2 and 76 per cent nitrogen—will yield the following results:

Carbon in coke passing to gases:

$$244 \times 0.88 = 214.72 \text{ lb.}$$

Carbon in cu. ft. gas:

CO	$0.14 \times 0.03375 =$	0.00473 lb.
CO_2	$0.10 \times 0.03375 =$	0.00337 lb.
		0.00810 lb.

Gases produced: $\frac{214.72}{0.0081} = 26{,}508$ cu. ft.

Heat power in cu. ft. CO gas: $7654 \div 22.22 = 344$ B.t.u.
Heat of CO in gases: $0.14 \times 344 = 48$ B.t.u.
Heat absorbed by CO gas: $26{,}508 \times 48 = 1{,}272{,}384$ B.t.u.
Heat power of coke:

$$244 \times 0.88 \times 14{,}500 = 3{,}113{,}440 \text{ B.t.u.}$$

The gases escaping at 800 deg. Fahr. will carry out the following sensible heat:

Volume CO and CO_2: $\frac{214.72}{0.03375} = 6{,}362$ cu. ft.

Volume nitrogen introduced: $\left(\frac{6362}{0.14 + 0.10}\right) - 6362 = 20{,}146$ cu. ft.

Volume of gases:

CO_2	2,672	
CO	3,690	
N	20,146	26,508 cu. ft.

Heat losses from escaping gases:

$$\left.\begin{array}{ll} \text{N and CO} & 23{,}836 \times 0.0196 \\ CO_2 & 2{,}672 \times 0.029 \end{array}\right\} \times 800 \text{ deg.} = 435{,}728 \text{ B.t.u.}$$

According to Ledebur, the total heat in 1 lb. of cast iron melted at 2192 deg. Fahr. is 441 B.t.u. These figures represent the heat units in such cast iron just melted at 2192 deg. Fahr. The mean specific heat for cast iron, from 32 deg. to t deg. Fahr. as reported by Richards, is $0.12 + 0.000046t$. Therefore, to superheat 1 lb. of such metal to (say) 2357 deg. Fahr. would require $2357 \times 0.224 = 528$ B.t.u., or 87 additional B.t.u. for superheating. A gray iron which melts at approximately 2260 deg. Fahr. requires $2260 \times 0.22 = 497$ B.t.u. for melting, and to superheat to (say) 2460 deg. Fahr. would require $2460 \times 0.23 = 565$ B.t.u.

By reason of the lower melting point of white or mottled iron, relatively less heat will be required—thus: assuming a white iron to melt at about 2075 deg. Fahr., it will require $2075 \times 0.21 = 435$ B.t.u. to melt; and to superheat to say 2275 deg. Fahr. will require $2275 \times 0.22 = 500$ B.t.u., or 65 additional B.t.u. for superheating. Because it is more easily oxidized, white iron will not admit of the same degree of superheat as gray iron. It is safe to assume 545 B.t.u. for melting and superheating ordinary gray iron.

It requires approximately 900 B.t.u. to melt and heat a pound of calcium-aluminum-silicate slag. It requires 1846 B.t.u. to expel 1 lb. of gas (CO_2) from limestone. At about 62 deg. Fahr. the air, if saturated, would contain 4.92 grains of water vapor per cu. ft. With humidity of 65 per cent, the air would contain $4.92 \times 0.65 = 3.20$ grains, or $\left(\frac{26{,}650 \times 3.20}{7000}\right) = 12.18$ lb. of water vapor per ton of iron melted. It requires 5780 B.t.u. to decompose 1 lb. of water vapor. Coke exposed to the weather absorbs moisture rapidly—as much as 4 to 17 lb. of water per 100 lb. of coke when exposed to drenching for a period of 2 to 72 hr.

Therefore, if wet coke be used there will be a substantial drawing on the heat balance of the cupola to expel moisture from that source. It requires 1091.7 B.t.u. to vaporize 1 lb. of water.

In summing up the heat losses, and considering the heat necessary to melt the iron and slag, the following theoretical cupola heat balance sheet will fairly represent the useful energy expended for work and energy escaped per 244 lb. of coke consumed in melting and superheating 1950 lb. of metal:

Heat power of coke:

		B.t.u.
$244 \times 0.88 \times 14{,}500$		3,113,440
To melt and superheat iron:		
1950×545	1,062,750	
To melt and heat slag:		
120×900	108,000	
To expel water vapor:		
12.18×5780	70,400	
To expel gas from stone:		
21.66×1846	39,985	
Improper combustion:	1,272,384	
Escaping gases:	435,728	
Radiation and conduction:		
By difference	124,393	3,113,440

Melting efficiency: $\frac{1{,}062{,}750}{3{,}113{,}440} = 34.13$ per cent.

Improper combustion: $\frac{1{,}272{,}384}{3{,}113{,}440} = 40.86$ per cent.

Cupola Charge Balance Sheet

The following theoretical balance sheet graphically illustrates the final form in which all the materials entering the cupola are disposed of by the melting process. Figures used are taken from a test heat made by the author, using 39-in. cupola at the Alamo Iron Works, San Antonio, Texas. Total metal charged was 18,500 lb., composed of 58 per cent machinery scrap, 30 per cent pig iron and 12 per cent soft steel scrap; 2250 lb. Solvay coke and 426 lb. Texas limestone. Total metal, by actual weight, received from the heat was 17,761 lb.; total slag produced 1150 lb.

Reduced to ton basis—iron produced, 1920.1 lb.; coke consumed, 244 lb.; stone burned, 50 lb.; slag produced, 124 lb. Difference in weight between total metal charged and metal received, 739 lb., or 79.8 lb. per ton of iron melted, as shown by cleaning room record—total loss from all sources, 3.99 per cent. Coke ash analysis, exclusive of sulphur, was 48 per cent silica, 25 per cent alumina, 19.5 per cent iron oxide, lime 5 per cent and magnesia 2.50 per cent. Following are metal mixture and casting analyses:

Slag Analysis:	Per Cent
$Si\,O_2$	44.46
$Al_2\,O_3$	14.27
$Fe\,O$	11.53
$Ca\,O$ / $Mg\,O$	23.48
$Mn\,O$	3.16
Alkalies	1.26
CaS	1.84
	100.00

	Metal Mix	Metal Analysis
Total carbon	3.60 per cent	3.60 per cent
Silicon	1.95 per cent	1.855 per cent
Sulphur	0.06 per cent	0.089 per cent
Phosphorus	0.63 per cent	0.640 per cent
Manganese	0.65 per cent	0.546 per cent

A New Rail Specification Proposed

Provides for Rolling Tie Plates from Top of Each Ingot—Treatment in Soaking Pits—Lenient as to Cold Straightening

CAPT. ROBERT W. HUNT, head of the firm of Robert W. Hunt & Co., Chicago, inspection, testing and consulting engineers, addressed a letter on Aug. 1 to railroad officials interested and to the principal officers of steel rail manufacturing companies in respect to rail specifications. His connection with the manufacture of steel rails over the entire period of their production lends special weight to any consideration by him of the subject, which in the present case is a specification which he believes will help in rail manufacturers and rail consumers uniting.

A copy of the specification is given below. The principal points of difference between it and other specifications are printed in italics, thus to be easily distinguished.

Captain Hunt admits to claiming for years that each ingot cast on a heat is a unit unto itself and deserving of being tested and treated as such. On Jan. 22, 1912, he recommended the nick and break test on every ingot, and that the method is practicable he now mentions that practically all rails made in Canada for the last six years have been so tested. "But, because of the loathness of American manufacturers to permit it, the system has not been given a thorough trial in the States; and I am now proposing that in lieu of this plan of testing, if the manufacturer desires, the top rails of each ingot can be rolled into tie plates to be hot punched, sheared and annealed, and which the purchaser agrees to accept in place of the tonnage of "A" or top rails that he would ordinarily obtain under his contract. Tie plates made from such steel have given good satisfaction for several years and, no doubt, those manufacturers whose works are not now properly equipped will be glad to install the necessary machinery for producing them in order to aid the railroads in obtaining better rails."

For a number of years he has been convinced, and actual experiences have proved "that the cold straightening of rails can be very much minimized and in some cases eliminated without detriment to the track conditions, and with such obvious saving to the manufacturers as would more than cover the cost of milling the ends of the rails square and free from burrs. Better attention to the soaking pit practice and restricting the cold straightening, I believe, will ultimatelly afford relief from the development of internal fissures."

The specifications follow:

Specifications for Open-Hearth Steel Rails

80 lb. to 110 lb., Inclusive, Per Yd.

Inspection

ACCESS TO WORKS

1. Inspectors representing the purchaser shall have free entry to the works of the manufacturer at all times while the contract is being executed, and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the rails have been made and loaded in accordance with the terms of the specifications.

PLACE FOR TESTS

2. All tests and inspections shall be made at the place of manufacture, prior to shipment, and shall be so conducted as not to interfere unnecessarily with the operation of the mill.

Material

MATERIAL

3. The steel shall be made by the open-hearth process.

Chemical Requirements

CHEMICAL COMPOSITION AND ANALYSES

4. (a) The chemical composition of each heat of steel from which the rails are rolled shall comply with the following:

Carbon, not less than	0.60 per cent
Manganese, not less than	0.60 per cent
Phosphorus, not more than	0.04 per cent
Silicon, not less than	0.10 per cent

(b) Rails rolled from heats containing more than 0.75 per cent of carbon shall have the flanges near the ends painted yellow and be shipped separately, provided, however, that such heats do not have either the manganese content over 0.90 per cent or the phosphorus content over 0.03 per cent.

(c) A chemical analysis for each element above mentioned, including sulphur, shall be made on each heat of steel cast for rails. The analysis shall be made on approximately equal portions of carefully mixed drillings taken from two ladle test ingots, one representing the steel going into the second regular ingot cast, and the other that going into the next to the last regular ingot. The methods for making the analyses shall be those adopted by the American Society for Testing Materials.

(d) The ladle test ingots shall be of such shape and size as to induce quick sound setting of the steel, and, if necessary, a few pellets of aluminum may be added to the dipper to insure soundness. The drillings for analyses shall be taken not less than ⅛-in. beneath the surface.

(e) The complete analyses of each heat cast for rails shall be available for the inspector as promptly as possible and he shall always be furnished with a copy of it before the rails are loaded.

(f) The inspector may witness the manner of obtaining the drillings for analyses and the methods employed for analyzing, and he may take a portion of the original drillings at any time for checking purposes.

Physical Requirements

METHOD OF TESTING

5. The physical qualities shall be determined by the drop test.

DROP TESTING MACHINE

6. The drop testing machine used shall be the standard of the American Railway Engineering Association.

(a) The tup shall weigh 2000 lb. and have a striking face with a radius of 5 in.

(b) The anvil block shall weigh 20,000 lb. and be supported on springs.

(c) The supports for the test pieces shall be spaced 3 ft. between centers and shall be a part of, and firmly secured to the anvil. The bearing surfaces of the supports shall have a radius of 5 in.

PIECES FOR DROP TEST

7. Drop tests shall be made on pieces of rail not less than 4 ft., and not more than 6 ft. long. These test pieces, except as otherwise provided for, shall be cut from the top end of the rails rolled from the top of the second, middle and last full ingot cast on each heat.

TEMPERATURE OF TEST PIECES

8. The temperature of the test pieces shall be between 60 and 100 deg. Fahr.

HEIGHT OF DROP

9. The test piece shall be placed upward on the supports, and be subjected to impact of the tup falling free from the following heights:

For 80 to 91 lb. rail	17 ft.
For 91 to 101 lb. rail	18 ft.
For 101 to 111 lb. rail	19 ft.

DROP TESTS

10. (a) *If two of these test pieces do not break at the first blow, all of the rails of the heat shall be accepted, subject to the requirements of section* 11.

(b) *If two of the test pieces break at the first blow, all of the top rails of that heat shall be rejected.*

(c) *Second tests shall then be made from three test pieces selected by the inspector from the bottom end of the top rails of the same heat and ingots. If two of these test pieces do not break at the first blow, all of the remainder of the rails of the heat shall be accepted, subject to the requirements of section* 11.

(d) *If two of these test pieces break at the first blow, all of the second rails of the heat shall be rejected.*

(e) *Third tests shall then be made from three test pieces selected by the inspector from the bottom end of the second rails of the same heat and ingots. If two of these test pieces do not break at the first blow, all of the remainder of the rails of the heat shall be accepted.*

(f) *If two of these test pieces break at the first blow, all of the remainder of the rails of that heat shall be rejected.*

DESTRUCTION TESTS

11. (a) *A test piece representing the top end of the top rail from each ingot of each heat rolled, which has passed the drop test requirements of section* 10, *shall be nicked and broken to determine whether the interior metal is sound. If an interior defect shows on the fracture, the top rail of the ingot represented shall be rejected and a second test piece cut from its bottom end shall be nicked and broken to determine the character of the metal of the second rail. If an interior defect shows on the fracture, the second rail shall be rejected and a third piece cut from its bottom end for retesting. Thus the rails of each ingot shall be tested progressively from the top downward until the fracture shows sound metal, following which the rails of the ingot represented shall be accepted.*

(b) *An interior defect is interpreted to mean seams, laminations, cavities or interposed foreign matter, or a distinctly bright or fine grained structure in the center of the section evidencing segregation, made visible by the destruction tests, the saws or the drills.*

(c) *Rails represented by test pieces found to be segregated shall be accepted as No.* 2 *rails.*

(d) *If, under the drop test requirements of section* 10, *the "A" and "B" rails of a heat have been rejected, but the "C," "D," "E," etc., rails accepted, the destruction tests herein specified will be waived on the accepted rails of that heat.*

OPTIONAL CONDITIONS

12. (a) *In case the manufacturer elects after due notice, the purchaser agrees to accept hot sheared, punched and annealed tie plates rolled from the steel that would, in the ordinary course of the manufacturer's practice; be rolled into "A" or top rails from the ingots cast under this specification. It is understood that such tie plates shall be in accordance with purchaser's drawings and specifications.*

(b) *When a top discard of not less than* 20 *per cent is made on all ingots from which rails are offered for test and inspection, section* 11 *shall be waived.*

No. 1 RAILS

13. No. 1 classification rails shall be free from injurious defects and flaws of all kinds.

No. 2 RAILS

14. (a) Rails which, by reason of surface imperfections, or for causes mentioned in section 11 hereof, are not classed as No. 1 rails, will be accepted as No. 2 rails, but No. 2 rails which contain imperfections in such number or of such character as will, in the judgment of the inspector, render them unfit for recognized No. 2 uses, will not be accepted for shipment.

(b) No. 2 rails to the extent of 5 per cent of the whole order will be received. All rails accepted as No. 2 rails shall have the ends painted white and shall have two prick punch marks on the heat number side of the web at both ends of the rail, but so placed as not to be covered by the joint bars.

Details of Manufacture

QUALITY OF MANUFACTURE

15. (a) The entire process of manufacture shall be in accordance with the best current state of the art.

(b) *The steel must be well deoxidized in the furnace or ladle before the ingots are teemed, and the use of aluminum in the molds to insure the quiet setting steel desired will not be permitted.*

(c) *Heats or ingots, the metal for which has been poured over the top of the ladle or cast with a full running stopper not under control of the operator, will not be rolled.*

(d) *Special care must be taken to insure the casting of good, clean, sound ingots, free from scabs and cracks and with reasonably flat tops. Bled ingots shall not be rolled.*

(e) *Treatment of the ingots in the soaking pits must be such as to insure thorough soaking with the subsequent increase of temperature necessary. Overheated or burned or white sided ingots shall not be rolled, neither shall ingots that have once been allowed to get cold.*

LENGTHS

16. The standard length of rails shall be 33 ft., at a temperature of 60 deg. Fahr. Ten per cent of the entire order will be accepted in shorter lengths varying by 1 ft. from 32 ft. to and including 25 ft. A variation of ¼ in. from the specified lengths will be allowed. No. 1 rails less than 33 ft. long shall be painted green on both ends.

SECTION

17. The section of rails shall conform as accurately as possible to the template of the section ordered by the railroad company. A variation in height of 1/64 in. less or 1/32 in. greater than the specified height, and 1/16 in. in width of flange, will be permitted; but no variation shall be allowed in the dimensions affecting the fit of the joint bars.

WEIGHT

18. The weight of the rails specified in the order shall be maintained as nearly as possible, after complying with section 17. A variation of ½ per cent from the calculated weight of section, as applied to an entire order, will be allowed.

PAYMENT

19. Rails accepted will be paid for according to actual weights.

STRAIGHTENING

20. (a) The hot straightening shall be carefully done, so that gagging under the cold presses will be reduced to a minimum. Any rail coming to the straightening presses showing sharp kinks or greater camber than that indicated by a middle ordinate of 4 in. in 33 ft., will be rejected. The distance between the supports of rails in the straightening presses shall not be less than 42 in. The supports shall have flat surfaces and be out of wind and the gags shall have their corners rounded to a radius of at least ⅛ in.

(b) Rails heard to snap or check while being straightened shall at once be rejected.

DRILLING

21. Circular holes for joint bolts shall be drilled to conform to the drawing and dimensions furnished by the railroad company, a variation of 1/32 in. in size and location being permitted.

FINISHING

22. (a) *All rails shall be smooth on the heads, without rough crescent-shaped marks, and the bases shall be free from guide marks and scratches. They shall be milled square on both ends, but a variation of* 1/32 *in. in a vertical direction to make head-long rails will be permitted.*

(b) *All rails shall be free from twists, waves, kinks or short bends, but rails containing a uniform sweep, the middle ordinate of which does not exceed* 1 *in. in* 33 *ft., will be accepted without cold straightening.*

(c) Rails improperly drilled or straightened, or from which the burrs have not been removed, shall be rejected, but may be accepted after being properly finished.

(d) When any finished rail shows an interior defect at either end, or in any drilled hole, the entire rail shall be rejected.

BRANDING

23. Rails shall be branded for identification in the following manner:

(a) The name of the manufacturer, the month and year of manufacture, and the weight and type of section of rail and the letters "O-H" shall be rolled in raised letters and figures on the side of the web. The type shall be marked by letters, which signify the name by which it is known, as for example:

Sections of American Society of Civil Engineers.....A.S.C.E.
Sections of American Railway Association.....R.A.-A. (or B)
Sections of American Railway Engineering Association..R.E.

(b) *The number of the heat and of the ingot number in the heat and a letter indicating the portion of the ingot from which the rail was made shall be plainly stamped on the web of each rail where it will not be covered by the joint bars. The top rails shall be lettered "A" and the succeeding ones "B," "C," "D," etc., consecutively; but in case of a top discard of* 20 *per cent the letter "A" will be omitted, the top rail becoming "B."*

SEPARATE CLASSES

24. All classes of rails shall be kept separate from each other in loading.

LOADING

25. Rails shall be carefully handled and loaded in such a manner as not to injure them.

Announcement is made that the new 600-ton blast furnace erected by the Trumbull-Cliffs Furnace Co. at Warren, Ohio, will not be started for an indefinite period. The stack was virtually completed and ready to light on July 1.

By-Product Coke Plants in Operation in the United States, May 1, 1921

Owner or Operator—Location	Number of Ovens	*Kind of Ovens*	Annual Capacity, Net Tons Coal	Coke
ALABAMA				
Alabama By-Products Corporation, Birmingham	50	Koppers	335,000	235,000
Gulf States Steel Co., Alabama City	37	Koppers	237,000	175,000
Tennessee Coal, Iron & Railroad Co., Ensley	240	Semet-Solvay	760,000	530,000
Central Iron & Coal Co., Tuscaloosa	60	Semet-Solvay	290,000	220,000
Sloss-Sheffield Steel & Iron Co., Birmingham	120	Semet-Solvay	864,000	622,000
Tennessee Coal, Iron & Railroad Co., Fairfield	434	Koppers	2,560,000	1,920,000
Woodward Iron Co., Woodward	200	140 Koppers, 60 Wilputte (30 Koppers being rebuilt)	1,330,000	997,200
COLORADO				
Colorado Fuel & Iron Co., Minnequa	120	Koppers	720,000	550,000
ILLINOIS				
Chicago By-Product Coke Co., Chicago	100	Koppers building	667,000	437,000
Coal Products Mfg. Co., Joliet	53	35 Koppers, 18 Wilputte	340,000	238,000
Illinois Steel Co., Joliet	280	Koppers	1,500,000	1,200,000
International Harvester Co., South Chicago	88	Wilputte	578,000	376,000
North Shore Gas Co., Waukegan	13	Semet-Solvay	55,000	38,500
St. Louis Coke & Chemical Co., Granite City	80	Roberts	400,000	250,000
By-Products Coke Corporation, South Chicago	280	Semet-Solvay	1,300,000	975,000
INDIANA				
Central Indiana Gas Co., Muncie	22	Klonne	40,000	28,000
Citizens' Gas Co., Langsdale	41	Semet-Solvay	255,000	182,900
Citizens' Gas Co., Prospect	140	100 United-Otto, 40 Wilputte	567,000	409,400
Illinois Steel Co., Gary	700	Koppers	4,400,000	3,480,000
Indiana Coke & Gas Co., Terre Haute	60	30 Gas Mach., 30 Koppers	292,000	205,000
Inland Steel Co., Indiana Harbor	130	Koppers	890,000	666,000
Linton Gas Co., Linton	3	Gas. Mach.	15,000	9,300
Steel & Tube Co., Indiana Harbor	120	Semet-Solvay	864,000	622,000
KENTUCKY				
Kentucky Solvay Coke Co., Ashland	108	Semet-Solvay	864,000	648,000
MARYLAND				
Bethlehem Steel Co., Sparrows Point	360	Koppers	2,190,000	1,576,000
MASSACHUSETTS				
New England Fuel & Trans. Co., Everett	400	United-Otto	650,000	455,000
MICHIGAN				
Ford Motor Co., Dearborn	120	Semet-Solvay	864,000	622,000
Michigan Alkali Co., Wyandotte	54	United-Otto	169,200	118,400
Semet-Solvay Co., Detroit	215	Semet-Solvay	1,343,000	1,009,000
MINNESOTA				
Minnesota By-Product Coke Co., St. Paul	65	Koppers	400,000	300,000
Minnesota Steel Co., Duluth	90	Koppers	600,000	450,000
Zenith Furnace Co., West Duluth	65	United-Otto	160,000	112,000
MISSOURI				
Laclede Gas Light Co.	56	Koppers (8 Piette building)	320,000	240,000
NEW JERSEY				
Camden Coke Co., Camden	100	United-Otto (37 Koppers building)	240,000	68,100
Seaboard By-Product Coke Co., Kearny	165	Koppers	1,200,000	900,000
NEW YORK				
Donner-Union Coke Corporation, Buffalo	150	Koppers	1,000,000	650,000
Empire Coke Co., Geneva	46	Semet-Solvay	146,000	102,200
Lackawanna Steel Co., Lackawanna	530	188 United-Otto, 282 Rothberg, 60 Semet-Solvay	1,350,000	972,000
Semet-Solvay Co., Solvay	40	Semet-Solvay	65,000	45,000
Wickwire Steel Co., Buffalo	60	Semet-Solvay	386,000	289,500
OHIO				
American Steel & Wire Co., Cleveland	180	Koppers	1,080,000	750,000
Brier Hill Steel Co., Youngstown	84	Koppers	520,000	379,000
Hamilton-Otto Coke Co., Kokotto	100	United-Otto	240,000	168,000
McKinney Steel Co., River Furnaces	204	Koppers	1,300,000	960,000
National Tube Co., Lorain	208	Koppers	1,200,000	850,000
Penn Iron & Coal Co., Canal Dover	24	Roberts	144,000	100,000
Republic Iron & Steel Co., Youngstown	143	Koppers	1,020,000	744,600
Otis Steel Co., Cleveland	100	Semet-Solvay	450,000	337,500
Ironton Solvay Coke Co., Ironton	60	Semet-Solvay	432,000	311,000
Portsmouth-Solvay Coke Co., Portsmouth	108	Semet-Solvay	770,000	559,000
Toledo Furnace Co., Toledo	94	Koppers	560,000	408,800
United Furnace Co., Canton	47	Koppers	280,000	204,400
The Youngstown Sheet & Tube Co., Youngstown	306	Koppers	2,050,000	1,425,000
PENNSYLVANIA				
Allegheny By-Product Coke Co., Glassport	120	United-Otto	260,000	195,000
Bethlehem Steel Co., Bethlehem	424	Koppers	2,400,000	1,920,000
Bethlehem Steel Co., Lebanon	90	Semet-Solvay	640,000	465,000
Bethlehem Steel Co., Steelton	180	120 Semet-Solvay, 60 Koppers	876,000	621,500
Cambria Steel Co., Franklin	492	210 United-Otto, 92 Koppers, 190 Cambria-Belgian	1,839,000	1,226,000
Cambria Steel Co., Rosedale	60	Cambria-Belgian (60 Cambria-Belgian building, 885 Semet-Solvay building)	*286,000	192,000
Carnegie Steel Co., Clairton	768	Koppers	4,800,000	3,360,000
Carnegie Steel Co., Farrell	212	United-Otto	830,000	581,000
Jones & Laughlin Steel Co., Pittsburgh	300	Koppers	2,000,000	1,300,000
Philadelphia Suburban Gas & Electric Co., Chester	40	Semet-Solvay	125,000	87,500
Pittsburgh Crucible Steel Co., Midland	100	Koppers	667,000	435,000
Rainey Wood Coke Co., Swedeland	110	Koppers	800,000	600,000
American Manganese Mfg. Co., Dunbar	110	Semet-Solvay	248,000	173,000
RHODE ISLAND				
Providence Gas Co., Sassafras Point	40	Koppers	240,000	165,000
TENNESSEE				
Chattanooga Coke & Gas Co., Alton Park	24	Semet-Solvay	175,000	125,000
WASHINGTON				
Seattle Lighting Co., Seattle	20	Klonne	24,000	18,000
WEST VIRGINIA				
Domestic Coke Corporation, Fairmont	60	Koppers	400,000	260,000
La Belle Iron Works, Follansbee	94	Koppers	610,000	445,000
National Tube Co., Benwood	120	Semet-Solvay	270,000	189,000
WISCONSIN				
Milwaukee Coke & Gas Co., Milwaukee	160	Semet-Solvay (150 Koppers building)	750,000	562,500
Steel & Tube Co. of America, Mayville	108	United-Otto	450,000	384,000

*Refers to 60 Cambria-Belgian ovens now standing.

BY-PRODUCT OVENS

Steady Progress of the Modern Method of Coke Making in the United States

According to a report by the U. S. Geographical Survey, supplemented by a check up by THE IRON AGE, there were built and building in the United States as of May 1, last, 12,245 by-product coke ovens, with an annual coal carbonizing capacity of almost 59,000,000 net tons, yielding almost 44,000,000 net tons of coke. Actual figures of coal and coke capacity cannot be given for the reason that data are lacking pertaining to some of the ovens in course of construction. The figures given, which include all plants now standing and some which are being built, however, provide reasonably close approximations and as such convey a clear idea, when supplemented with figures as to the total production of coke, of how big a part the by-product plants have in supplying the coke requirements of the country. In the war period, pressure of the demand for iron, steel and other metals smelted with coke as the principal fuel, sent up the production of coke sharply, a total production of 56,478,185 net tons being reached in 1918. The following year saw a big drop in production, due to labor disturbances in the steel and coal industries. But from a total of 44,821,000 net tons in 1919, the coke production jumped to approximately 51,500,000 net tons in 1920. The normal annual requirements of the country may be placed at between the production for 1919 and 1920, or about 47,000,000 net tons. On that basis, the by-product ovens would be capable of producing more than 93 per cent of the coke needed, and this fact strengthens the oft-repeated assertion that in a short time all of the coke used in this country will be from by-product ovens.

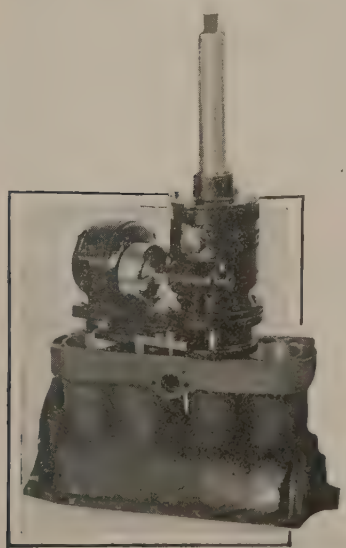
New by-product coke oven construction in the past year has been light, due to the high cost of labor and materials, but it is interesting to note the steadily upward slant of installations over a period of years. Between 1893 and 1908, there were put into operation 3799 ovens of this kind, capable of producing 4,201,226 net tons of coke. In 1918, according to Geological Survey data, there were 9282 ovens with an annual capacity of 32,200,000 net tons of coke. Thus in 10 years, there was a gain in installations of more than 240 per cent. The gain in the war period was marked, 3011 new ovens being constructed from 1915 to 1918, inclusive. This showing in no small measure is accountable to the war time demands for the coke oven by-products, exclusive of coke. As is quite natural, the increase in the number of by-product ovens has been accompanied by a decrease in the number of the older type ovens. In 1910 there were in this country 100,362 beehive coke ovens; at the end of last year there were 84,635, Geological Survey reports show. Production figures show that in 1919, the output of by-product oven coke for the first time went ahead of that from beehive ovens. The total production that year was 44,821,000 net tons, of which beehive ovens produced 19,650,000 tons and by-product ovens 35,171,000 tons. Last year, when total production was 35,505,000 net, the distribution was 30,680,000 tons of by-product and 20,825,000 tons of beehive oven coke.

Pennsylvania has the greatest number of by-product ovens of any State in the Union, the number being 3951, distributed among 13 plants and having a capacity of 11,156,000 net tons of coke a year. Ohio stands next with 1658 ovens capable of producing 7,197,000 tons of coke and Indiana third with 1216 ovens having a capacity of 5,601,700 net tons. Alabama has 1141 ovens with a capacity of 4,699,200 tons; Colorado 120 ovens, with a capacity of 550,000 tons; Illinois 894 ovens which can turn out 3,861,000 tons; Kentucky 108 ovens with a capacity of 648,000 tons; Maryland 360 ovens with a capacity of 1,576,000 tons of coke a year; Massachusetts 400 ovens with a potential production of 455,000 tons; Michigan 389 ovens having an output per year of 1,749,000 tons; Minnesota 220 ovens and 862,000 tons; Missouri 64 ovens and 240,000 tons; New Jersey 302 ovens and 968,000 tons; New York, 826 ovens and 2,058,000 tons; Rhode Island 40 ovens and 165,000 tons. Tennessee 24 ovens and 125,000 tons; Washington 20 ovens and 18,000 tons; West Virginia, 274 ovens and 894,000 tons and Wisconsin 418 ovens and 946,500 tons.

A summary of the ovens built and building shows 11,185 built and 1240 in process of construction. There are 6156 Koppers ovens built and 287 building; 2455 Semet-Solvay ovens built and 885 building; 1657 United-Otto ovens built; 282 Rothberg ovens built; 250 Cambria-Belgian ovens built and 60 building; 206 Wilputte ovens built; 104 Roberts ovens built; 42 Klonne ovens built; 33 Gas Machinery ovens build and 8 Piette ovens building.

Cylinder Reboring Tool

The Van Dresser electric tool for reboring cylinders now has the motor built in a unit with the tool, as shown by the accompanying reproduced photograph. It has a range from 2¾ to 5 1/16 in. The bearings are 10¼ in. in length. It has a tapered arrangement for fitting the boring head into the feed bar, emphasized as ensuring accuracy, and a quick return feature that allows the boring head to be brought instantly to the starting point. Another feature is the elimination of split guide rings. Without making changes, this tool can be used by a hand or drill press. The machine is marketed by the International Purchasing & Engineering Co., McKerchey Building, Detroit.



Cylinder Reboring Tool Having Motor an Integral Part of Unit

German Pig Iron Production

For nearly two years past the Association of German Iron and Steel Manufacturers has kept back the statistics of the home production of pig iron and of steel materials, but recently the German Ministry of Commerce and Industry published a set of figures stating that the capacity of output within the present frontiers of Germany is approximately 960,000 (metric) tons of pig iron monthly, or, in round figures, 11,500,000 tons a year, says the London *Ironmonger*. This does not include the Saar district, which is capable of producing 1,300,000 tons yearly, but is at present under French control. It is stated that the production of pig iron throughout the years 1919 and 1920 averaged between 400,000 and 500,000 tons monthly, or only one-half of the capacity. These returns do not agree with the figures already published by the Association of Iron and Steel Manufacturers. These are available until the end of October, 1919, and show a total output of 5,281,025 tons for the first 10 months of that year, or an average of 528,000 tons per month.

The Republic Rubber Corporation, Youngstown, Ohio, has resumed operations at its plant after a suspension of several weeks, under the direction of H. C. Booth, receiver. Employment will be given to about 700 operatives for an indefinite period.

Electric Furnace Heat Treatment

Dies and Forgings Well Handled in Metallic Resistor Furnaces—Uniformity of Product a Big Feature

BY E. F. COLLINS*

IT is being rapidly and conclusively demonstrated that electric heat will offer advantages equal or greater, in reheating and general heat treatment of steel, than it has done in melting and refining. A striking expansion in the use of the electric resistance furnace for the heat treatment of steel is shown in the past five years, and progress in the demands of industry is sure henceforth to require the overall economy and high quality which accompany the use of electric heating for such processes, as (1) annealing, (2) carburizing, (3) hardening, and (4) tempering or drawing of steels.

Important heat treating processes, in which the forge shop should be interested, and for which the metallic resistor electric furnace is peculiarly adapted, will be enumerated and briefly described, so that the working field for such a type of furnace may be clearly indicated. We may, for convenience, consider electric heat treating furnaces under two heads, viz., (1) those used in production of dies and metal cutting tools and (2) those employed in the heat treatment of drop forged parts.

Four Separate Processes Considered

The production of drop forge dies involves the following heat treating processes: (1) annealing, (2) carburizing, (3) hardening, (4) drawing.

In hardening drop forge die blocks, it is claimed that much trouble is obviated by annealing the blocks before performing machine operations on them. Bringing blocks up to the proper annealing temperature at a rate of perhaps 45 min. for each in. of thickness, followed by cooling in the furnace, insures against trouble such as warping and checking or cracking on hardening. The proper annealing temperature varies with the carbon content and the width of the critical range varies likewise. The Committee of the American Society for Treating Materials recommended the following range in temperatures:

Carbon Content	Annealing Temperature Range
Less than 0.12%	1607 to 1697 deg. Fahr. (875 to 925 deg. Cent.)
0.12 to 0.25%	1544 to 1598 deg. Fahr. (840 to 870 deg. Cent.)
0.30 to 0.49%	1499 to 1544 deg. Fahr. (815 to 840 deg. Cent.)
0.50 to 1.00%	1454 to 1499 deg. Fahr. (790 to 815 deg. Cent.)

Steel should be held at the annealing temperature for a period of time which varies with the size and shape of piece. It is important that the piece be heated through uniformly at the annealing temperature. Where quality of output is the watchword, modern heat treatment is not attempted without first carrying out correct annealing treatments as a proper foundation for subsequent processes.

Automatic Control With Autographic Records

Graphic record from an electric annealing furnace employing two thermocouples, one on the surface of the steel charge and the other near the resistor, shows the furnace controlled automatically. With the charge entering at 11.05 a. m., its surface reaches the desired annealing temperature of 1500 deg. Fahr. at 4 p. m. Complete equalization of the temperatures in the charge has occurred at 4.40 p. m. From this time on, the piece maintains a uniform temperature until removed from furnace or until power is shut off.

Here the perplexing question as to when the steel is heated uniformly throughout is not answered by guess, but it is clearly and definitely shown on the record of automatically controlled temperatures for the annealing cycle. Further description of this temperature chart would not be necessary to demonstrate that such equipment as this is practically ideal for annealing drop forge die blocks. Coupled with this heat control is a furnace atmosphere free from injurious products of combustion, and a heating by uniform radiation rather than by cyclonic convection blasts of hot gases met within the ordinary fuel-fired furnace.

Forging, forming and cutting dies may be made from high carbon steels (0.70 to 0.95 per cent carbon), hardened and drawn, or from low carbon steel (0.15 to 0.25 per cent carbon) case-hardened, the latter virtually eliminating the danger which exists with high carbon steel of spoiled dies through warping and cracking.

Heat Control Essential for Hardening Also

All theories concerning hardening are united upon the necessity of heat control as outlined for annealing. Hence the electric furnace, already described as suited to annealing, may be used just as successfully for heating high carbon steel dies which are to be hardened by quenching. No doubt can exist in the mind of the operator of the electric furnace as to the exact time when the die block, be it large or small, has reached an absolutely uniform temperature throughout. Hence, other things being equal, successful hardening can be thwarted only by improper quenching.

The electric furnace has important advantages for the carburization stage of the case-hardening process, where it is evident that close regulation and control of temperature, as well as uniform delivery and distribution of heat, are essential for best results. Uniformity of product requires that each part of the charge be subjected as nearly as possible to the same heat cycle, whether it be near the center of the carbonizing box or near its outer walls. The electric furnace with its automatic control will bring each part of a charge of material to the same temperature, through the control of a surface couple on that charge. Electric furnaces may be designed to give practically the same heat in each carbonizing box constituting the furnace charge, even though the control is actuated from pyrometer on a single box. In other words, uniform heating conditions exist throughout the heating chamber.

Remarks already made concerning the use of the electric furnace for hardening high carbon steel dies apply equally to heating for the quench of carburized dies.

Why and How to Draw the Temper of Dies

The temper should be drawn on all hammer dies, to relieve strains and to give resiliency or spring, resulting in better wearing qualities. An oil tempering bath electrically heated is a most satisfactory tool, and the hardened dies should immediately go into it even before the die is quite cooled from the hardening operation. The temperature of the oil bath should be about 400 deg. Fahr. In other words, hardened stock is "tempered" by being reheated to about 400 deg. Fahr., where it loses considerable brittleness and yet little of its hardness, making it suited for dies and metal cutting tools; reheated to 480 deg. Fahr. it is less brittle and suited for use in rock drills, stone cutting tools, etc.; at 525 deg. Fahr. it is suited to dental and surgical instruments, hack saws, etc.; at 570 deg. Fahr., the maximum usually employed, it may be used for wood saws, springs, etc. Sudden cooling after tempering does not affect hardness or softness of steel; hence

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when taken from the oil bath, it may cool either rapidly or slowly.

Sizes and Types of Electric Furnaces Used

Electric furnaces for heat treating drop forge dies and metal cutting tools are usually of the box type. Such furnaces, of the metallic resistor type, operate at temperatures up to 1800 deg. Fahr., and may be had with automatic control as previously described. A large furnace suited to heating large dies, punches and cutters at temperatures not exceeding 1800 deg. Fahr., and equipped with automatic control, made the following performance, as compared with a similar oil-fired furnace on the same work:

	Electric	Oil-Fired
Dimensions, heating chamber	30 x 36 in. x 22 in. high	48 x 24 in. x 20 in. high
Average temperature held	1450 deg. Fahr.	1400 deg. Fahr.
Fuel or power to hold at 1400 deg. Fahr	8.04 kw.	1.65 gal. per hr.
Cost per hr. to hold 1400 deg. Fahr	*10c.	†23.1c.
Amount of steel heated per hr	84 lb.	84 lb.
Fuel or power for heating steel	13.35 kw.	1.9 gal. per hr.
Cost fuel or power per hr	16.7c.	26.6c.
Cost per lb. heating steel	0.199c.	0.317c.

*At 1.25c. per kw. hr. †At 14c. per gal.

These results may be surprising to those who base their calculations solely on relative B.t.u. costs for oil and electricity. Were the upkeep costs included, the difference in favor of the electric furnace would increase, since in the past two years, the upkeep of this furnace has been practically zero.

Treatment of Drop Forgings Analagous to That of Tools

The foregoing has applied to the electric furnace for heating processes in producing drop forge dies and metal-cutting tools. A much greater field for the electric furnace lies in the heat treatment of drop forgings. Here we meet again the annealing, hardening by quenching, case hardening, and tempering or drawing processes. The metallic resistor furnace is here again ready to demonstrate its superiority in heating processes involving 1800 deg. Fahr. or less. The designs of furnace must comply with methods of handling a production having volume and tonnage. Electric heat can be utilized with practically all types of furnace, such as car bottom type, pusher type, conveyor type, box or tunnel type, either of vertical or horizontal construction. All furnaces may be well heat lagged without danger to refractories, and at the same time secure low thermal capacity, resulting in quick heating.

Performance Figures for Forging Heat Treatment

A vertical design of furnace has been constructed in capacities of from 200 kw. to 2700 kw. per unit; the latter has the ability to heat forgings weighing 320,000 lb. per charge. Actual performance figures for this type of furnace, when used for hardening and drawing, may be seen in the following table:

Charge		Weight, Charge and Holders (Heated to 1450 Deg. Fahr.)	Energy Kw. Hr. (100 Kw. Connected)
12	3-in. gun tubes	21,900 lb.	1874
7	4-in. gun tubes	22,300 lb.	1880
3	4-in. gun jackets	21,700 lb.	2080
	Total	65,900 lb.	5842

Average lb. per kw. hr. $\frac{65,900}{5,842} = 11.25$

Average kw. hr. per ton $\frac{2,000}{11.25} = 178$ kw. hr.

Energy cost at 1.25c. per kw. hr. = $2.23 per ton.

Drawing work back to 1100 deg. Fahr., a yield of 24 lb. per kw. hr. was realized, equal to 84 kw. hr. per ton. Combined power consumption for hardening and drawing per ton was 262 kw. hr., or with power at 1.25c. per kw. hr., a cost of $3.28 per ton. In other words, 7.7 lb. of steel was hardened at 1450 deg. Fahr. and drawn back to 1100 deg. Fahr. for every kw. hr. Four furnaces operating for one month, continuously hardening and drawing at 1450 deg. Fahr. and 1100 deg. Fahr. respectively, showed a total gross power consumption of 325 kw. hr. per ton of steel treated.

New Methods of Manipulation Unnecessary

The use of the electric furnace does not call for new methods of manipulation of present heating processes, but rather fits itself into standard and generally accepted heat treating requirements admirably, removing practically all uncertainties connected with proper application of heat; and eliminates almost entirely the handicaps inherent in fuel-fired furnaces.

For quality heat treating the electric furnace is rapidly replacing the fuel-fired furnace. Its simplicity, its dependability, its low upkeep, its improved products, its ability to turn out repetition work free from defects, are some of the factors which contribute to economy of operation in such a degree that, with prevailing rates for electric heat and fuels, the electric furnace usually shows an "overall" cost per piece less than that treated in the fuel-fired furnace. The writer has in mind a case where the saving in rejects alone, due to the use of electric heat over gas, was sufficient to pay for the total current used for heating, more than 75 times.

Discussion by Harold F. Wood*

We have followed with interest the many factors in the development of electric furnaces for the heat treatment of steel. The majority of industrial electric heat treating furnaces in use up to this time are for the treatment of finished machine parts such as gears, pinions, dies, etc. In this type of work we must secure freedom from distortion as well as freedom from decarbonization of the finished surface. Many thousands of dollars worth of finished parts are lost, due to the above causes, which loss can be reduced to a minimum by the use of a properly designed electric furnace.

Drop forgers have wished many times that they could have a safeguard against decarbonization in the heat treatment of dies in which the impression has already been sunk. With complete freedom from surface decarbonization, the life of dies is materially increased. Electric heat surely is the logical method to employ on this type of work, as the ultimate cost is the important cost, and this is the item to consider rather than a purely technical comparison on a B.t.u. basis.

Dependability of Drop Forgings and Castings

Drop forging is the only method whereby parts can be made one like another and free from blow holes, dross, etc., which are the defects that cause castings to be undependable. The drop forge industry is, therefore, vitally interested in the heat treatment of forgings. The forge shop is the logical place to heat treat forgings, as it enables the drop forger to supply his customer not only with a product that is within the tolerances demanded but also one that will show the proper physical characteristics and thereby give the proper service.

In other words, it becomes quite necessary from a metallurgical standpoint that the modern drop forger buy material to a chemical specification and sell the finished forgings to a guaranteed physical specification. This requires a very efficient heat treating department. In the production of a forging like a crank shaft, it is a fact that over half the labor cost of the

*Chief metallurgist Ingalls-Shepard Division, Wyman-Gordon Co., Harvey, Ill. Paper before American Drop Forge Association, Chicago, June 24.

crank shaft is consumed in performing operations after it leaves the forge shop proper, of which heat treating is a vital factor.

In the case of a forging, the question of scaling during the heat treating operation is not an important item if any degree of judgment is used by the furnace operator. Distortion is an important item, but from actual experience the difference in distortion on forgings heat treated in an electric furnace and a fuel fired furnace cannot be detected, as it is too small to interfere in any way in meeting the specifications with ordinary straightening operations. The up-to-date forge shop is equipped with a modern circulating system for fuel oil, and the cost of supplying oil to oil-fired furnaces consists merely in running feeder lines from the main circulating line. The furnace-hour burden on this is at most a very small item.

The drop forger, therefore, must study the electric furnace vs. the fuel-fired furnace on the following items, and be guided accordingly in making his decision on which type of equipment to install to produce lowest ultimate cost of heat treating:

1. Total fixed charges
   (a) Land and buildings factor
   (b) Equipment factor
      1. Interest
      2. Taxes
      3. Depreciation
      4. Repairs
2. Indirect labor
3. Supplies other than repairs
4. Power or fuel
5. General factory burden
6. Miscellaneous charges
7. Direct labor
8. Uniformity of results as determined by per cent practice obtainable; which in turn is determined by the heat uniformity of the furnace, provided the forgings are of proper chemical analysis and all from the same melt of steel.

If we take for purposes of comparison a battery of electric furnaces and the same number of oil fired furnaces, both types having the same hearth area and able to produce the same tonnage per furnace hour, we can easily see which type of installation is the most economical to install. The following factors are the same on either installation:

Land and buildings, Indirect labor, Supplies, General factory burden, Miscellaneous charges, Direct labor.

Equipment Factor Variable

Interest and taxes on the electric furnace are approximately twice those of the oil, because the first cost is in this proportion. Depreciation and repairs on a well built oil furnace will be approximately at a 5 per cent higher annual rate than on a well built electric furnace. Due to the higher first cost of the electric furnace, the actual dollars and cents loss from depreciation and repairs over a period of a year amounts to more in the case of an electric furnace, in spite of its lower percentage rate.

Power or Fuel Consumption

Mr. Collins gives in his paper a value of 262 kw.hr. per ton power consumption for hardening at 1450 deg. Fahr., and tempering at 1100 deg. Fahr. on a single heat, and a value of 325 kw.hr. per ton as a total gross power consumption on four furnaces operating for one month on continuous duty. The latter figure is the important one, as it indicates what can be accomplished in actual production over a period of time. On the electric furnace at our Harvey plant we have watched the power consumption very closely, and find a value of 318 kw.hr. per ton for hardening at 1525 deg. Fahr. and tempering at 950 to 1000 deg. Fahr., for a period of three months. This is in very good agreement with the value given by Mr. Collins. A power consumption of 318 kw.hr. per ton treated represents a thermal efficiency of 68.2 per cent.

On well-built oil-fired furnaces we have secured a total gross oil consumption of 30 gal. per ton treated, using 1525 deg. Fahr. hardening heats and 950 to 1000 deg. Fahr. tempering heats. On the basis of 140,000 B.t.u. per gallon, an oil consumption of 30 gal. per ton treated represents a thermal efficiency of 17.62 per cent.

Uniformity of Results in Oil-Fired Furnace

Mr. Collins states in his paper that it is possible to regulate electric heat to plus or minus 5 deg. Fahr., and fuel fire to plus or minus 50 deg. Fahr. Our experience in regard to regulation of electric heat agrees very closely with this; however, we cannot agree with him on the regulation of a fuel-fired furnace. We have several oil-fired furnaces in operation in our plants which we control to a variation of plus or minus 10 deg. Fahr., while coming up to heat, and to a total variation of plus or minus 5 deg. Fahr. during the soaking period. This is about the limit of uniformity that can be obtained in commercial practice by either an electric or oil-fired furnace. From a uniformity standpoint there is, therefore, no preference in one type of furnace over the other.

It is seen, therefore, that in the selection of heat treating furnaces for treating drop forgings, the factor which determines the most economical installation is cost per 100,000 B.t.u. effective. In the following table are given the corresponding costs per kw.hr. and per gallon of oil, based on the above conclusion that 318 kw.hr. are equivalent to 30 gal. of oil:

Cost per Kw. hr.	Cost per Gal. of Oil	Cost per Kw. hr.	Cost per Gal. of Oil
0.20c.	2.12c.	1.20c.	12.72c.
0.30c.	3.18c.	1.30c.	13.78c.
0.40c.	4.24c.	1.40c.	14.84c.
0.50c.	5.30c.	1.50c.	15.90c.
0.60c.	6.36c.	1.60c.	16.96c.
0.70c.	7.42c.	1.70c.	18.02c.
0.80c.	8.48c.	1.80c.	19.08c.
0.90c.	9.54c.	1.90c.	20.14c.
1.00c.	10.60c.	2.00c.	21.20c.
1.10c.	11.66c.		

In going over the above table one can tell at a glance which type of installation is the more economical to install, based on the particular contract prices on power and oil possible to obtain in a given locality. This table indicates that there are very few sections in the country at the present time that would make an installation of electric furnaces for heat treating drop forgings an economical investment.

This, however, should not in the least discourage the friends of electric furnaces for heat treating drop forgings, as the drop forge plant offers wonderful possibilities for the generation of electricity from waste exhaust steam by means of low pressure steam turbine generators. It is now possible to generate electricity by this means at a total cost, including all overheads on generator plant and transformer equipment, at a price not to exceed 0.40c. per kw.hr. This will show a very large saving over the very best price that can be secured on oil now or in the future, and is without doubt the most economical installation for the heat treatment of drop forgings.

The plant of the recently organized Damascus Tool Co., Oakmont, Pa., has begun operations. This company, which specializes in the manufacture of pneumatic hammer snaps and also makes punches, punch dies, pneumatic chisels and bull dies, is headed by T. S. See as president and general manager, with J. L. Conner as vice-president and general superintendent. Mr. See formerly was superintendent of the Keystone Works, Jones & Laughlin Steel Co., Pittsburgh, and Mr. Conner also formerly was identified with Jones & Laughlin Steel Co., having been master mechanic at Southside Works of that company. M. F. O'Conner is sales manager of the company.

The George J. Hagan Co. recently secured an order from the Mutual Enamel Ware Co., Chattanooga, Tenn., for one twin chamber electric furnace to be used for enameling bathtubs. This furnace has a total connected load of 399 kw. for operation on 440 volts, 3-phase, 60-cycles. The company also has taken a contract from the Illinois Watch Co., Springfield, Ill., for a special rotary electric furnace to be used for enameling watch dials. This furnace has a rating of 31 kw. and is for operation on 220 volts, single phase, 60-cycles.

Improvement in Open-Hearth Details

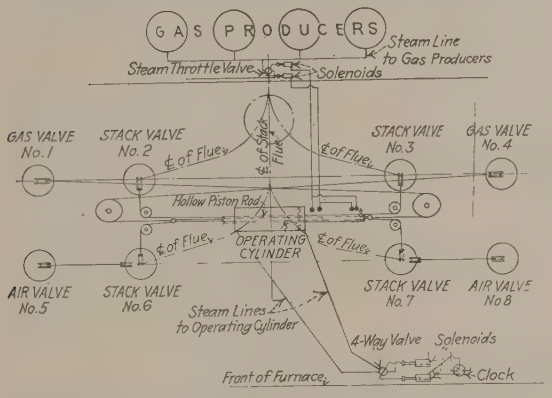
New Arrangement of Reversing Furnace Valves Promotes Economy—Burners for Liquid Fuel and Tar—Results in Operation

BY A. G. SCHUMANN* AND A. F. SCHUMANN

AS the valves of an open-hearth furnace have important duties to perform, it is necessary that they be well constructed, and so arranged as to prevent loss of fuel both during the furnace operation and while being reversed. The latter requirement makes it advisable that they be arranged to reverse as quickly as possible. They should also be handled in such a way as to require little of the furnace man's time and energy.

For proper furnace operation it should be possible to regulate independently both the amount of incoming gas and air and the flow of the outgoing gases through the gas and air regenerators. This is important in maintaining a proper ratio of temperatures between the two, and is of particular importance in economical furnace operation of furnaces of large capacity.

Study of open-hearth furnaces in the United States shows that many of them have reversing valves operating on crude principles which make the operation of the furnaces less efficient and economical than it should



Diagrammatic Plan Showing Arrangement and Operation of the Eight Valves, All from the Action of One Operating Cylinder

be. In efforts to overcome this, complicated and expensive mechanism has sometimes been installed which requires too large a part of the furnace man's time and energy. Besides, too much time is taken in reversing the furnace, resulting in leaving the gas off so long as to slow up the furnace operation and retard the heat.

Water seals on the stack draft, and allowing water to be drawn into the furnace with the incoming air and gas, will also cause a slowing up of the time of the heats, and may eventually require the shutting down of the furnace because of clogging up of the checkers due to moisture in the incoming gases. This causes long delays and results in heavy expense for the labor of cleaning out the regenerators. In case valves need repairs while the furnace is in operation, further delays are encountered, for it is rarely possible to do anything to the valve without shutting down the furnace temporarily, or running it over-long in one direction. Besides these delays, heavy investments in spare parts in stock usually have to be carried.

All water cooled apparatus in the path of incoming and outgoing gases will collect dirt and tar, etc., particularly if producer gas is used. This results in the loss of gas up the stack, a reduction in the draft of the stack and makes one end of the furnace pull against the other. Valves, however, which have no protection whatever against the intense heat to which they are subjected, will very shortly warp, with consequent leakage.

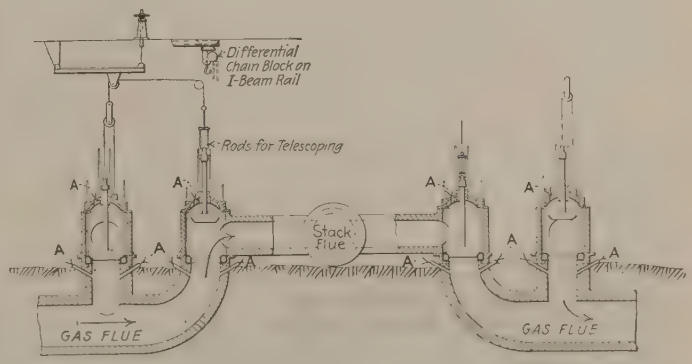
New Automatic Reversing Device

A reversing apparatus developed by the writers has been applied to four 200-ton tilting furnaces at Sparrows Point. The previous valves were continually leaking producer gas, because of the dirt and tar accumulating on the water-cooled valves and seats. The use of the mushroom-turning valve stopped these leaks, and kept the seats clean of the dirt and tar from the gas. The arrangement is such that it is possible to take the valve and seat out for repairs, when necessary, without delaying the operation of the furnace.

The diagrammatic plan of the arrangement of valves and operating mechanism shows that the control is located in a clock-work, which reverses the furnace valves every 15 or 20 minutes by means of solenoids, actuating a four-way valve controlling the steam supply to the long cylinder, which moves the furnace valves. By a system of pulleys and take-ups the operation of closing one valve and then immediately opening the other is performed without taking the attention of the furnace man, and without the loss of time so frequently required when the man has to walk from one end of the furnace to the other or clear across the charging floor to get at the different valves. By properly adjusting the timing mechanism, the reversing takes place with great regularity instead of depending upon a man's thoughtfulness or lack thereof, which results frequently in leaving gas on one end of the furnace much longer than on the other, with consequent lack of uniformity in temperature of the entering flame.

In the design shown here, the valve movement for complete opening and closing is placed at 5 ft. The piston in the operating cylinder travels a total of 7 ft. 8 in., and is so connected with the valves by the telescoping piston rods and the series of pulleys that the proper motion is applied to the several valves. Referring to the diagram:

While the piston travels 30 in., gas valve No. 1 will travel 60 in. and be closed, valve No. 3 will be lowered 30 in. and No. 7 will be lowered 60 in. Valves Nos. 2, 4 and 6 will be telescoped 30 in. The piston



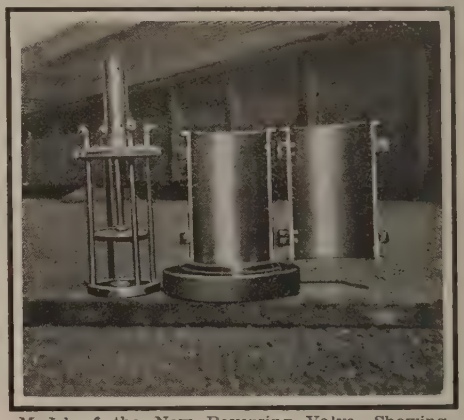
Section Showing How the Automatic Reversing Valves Are Interconnected and How a Valve Needing Repairs Is Handled

*Master mechanic, Bessemer and open-hearth departments, Bethlehem Steel Corporation, Sparrows Point, Md.

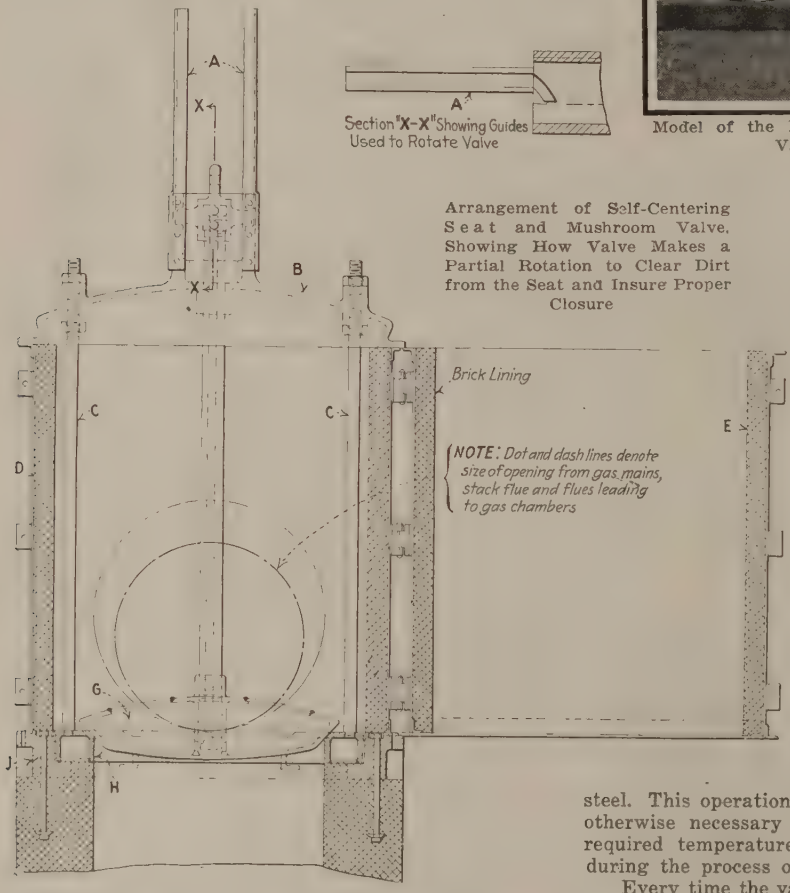
will then travel 2 in. farther to allow the gas valve No. 1 to be seated properly. This drops valve No. 3 an additional 2 in., telescopes No. 7 about 2 in., and increases the telescoping effect on Nos. 2, 4 and 6 to 32 in. After the piston travels 30 in. farther, valve No. 2 will be open 30 in., No. 6 will be telescoped 60 in. and Nos. 3 and 7 will be closed with a telescope of 32 in. At this point gas valve No. 4 will be telescoped 62 in. During the next 30 in. travel of the piston, valves Nos. 2, 4 and 6 will be opened 60 in., No. 3 will be telescoped 32 in. and Nos. 1 and 7, 62 in. The air valves are closed by the stack valves Nos. 6 and 7, and regulated by the stand on the charging floor.

This operation requires the cylinder to have a total stroke of 7 ft. 8 in. for a valve travel of 5 ft. When the furnace has started to reverse, the travel of the piston rod forms a contact to operate one of the solenoids in the gas producer building. This closes the steam throttle and shuts off the steam on the gas producer. When the furnace is completely reversed, the rod forms another contact which operates the other solenoid, and thus opens the steam throttle valve.

Each time the valves come within 3 or 4 in. of seating, the guides *A* (shown in the detail of the valve and chamber) will slightly rotate the valve, and thus grind all the foreign matter off of both the valve and its seat, and allow it to seat properly. The cover *B*, valve *G* and seat *H* are held together in one unit by



Model of the New Reversing Valve, Showing Valve Out of Casing



Arrangement of Self-Centering Seat and Mushroom Valve, Showing How Valve Makes a Partial Rotation to Clear Dirt from the Seat and Insure Proper Closure

the water inlet and outlet pipes furnishing cooling water to the valve seat. The valve casing (*D* and *E*) is split in halves, one half being on hinges so that it may swing open, and permit the hood, valve and seat to be removed by means of a chain and block arranged over the valve, as shown in the vertical section.

A spare valve and seat may then be swung into place and located on the cast iron holder *J*. After the casing is swung shut and bolted together, the furnace is again ready for reversing. Preparatory to taking out and replacing a valve, a sand damper is placed in the gas main leading to that valve, thus blocking off the gas until the exchange can be effected.

To standardize the valves, and thus reduce the investment in spare parts, the valves on all the gas and air flues are made of the same size, and are interchangeable. The inlets and outlets for the valves, however, will be smaller for the gas flues than for the air flues, so as to maintain the proper ratio of stack draft for the air and gas chambers.

Furnace Equipped for Oil Fuel

To enable the furnace to utilize either light or heavy crude oils, as well as tar recovered from the by-product coke ovens, an arrangement of burner, to go with the form of the valve described above, has been applied to the 200-ton furnaces, which are arranged so that they may burn either producer gas or the liquid fuel. The change between the two forms of fuel is effected easily, for the burner and burner coolers may be taken out of the gas ports or reinstalled without delaying the operation of the furnace.

A section in the longitudinal diagram shows the arrangement of one of these furnaces, which has been on the oil and tar burning system for the last two years; while five 50-ton tilting furnaces at the same plant have used this system for five years.

One incidental advantage, resulting from the ease of changing between systems, appears when the furnaces are running on producer gas. At such times the burners are put back into the gas ports during the period while the gas mains are being burned out, and the furnace is thus kept in operation to make bottom or melt steel. This operation saves both the time and the fuel otherwise necessary to get the furnace back to the required temperature after it has been cooled down during the process of burning out the mains.

Every time the valves are reversed, the same mechanism pulls back into its cooler, to a distance of about 1 in., the burner which has just been in operation, and at the same time shifts into position the burner at the other end of the furnace. This protects the burner not in use from the intense heat of the tip of the outgoing flame, projected across the furnace from the other burner. At the same time, the oil or tar and the vaporizing steam are shut off the burner going out of use, and turned on back of the burner going into use.

This dual operation is performed by a cable device operating triple cut-off valves, shown in the detail view of the burner arrangement at one end of the furnace. The operation of this device is so quick that, while the

flame is going off of one burner, the flame from the opposite burner is following it across the furnace. If, for any reason, hand operation is desired, the 4-way valve may be operated by hand independently of the clock.

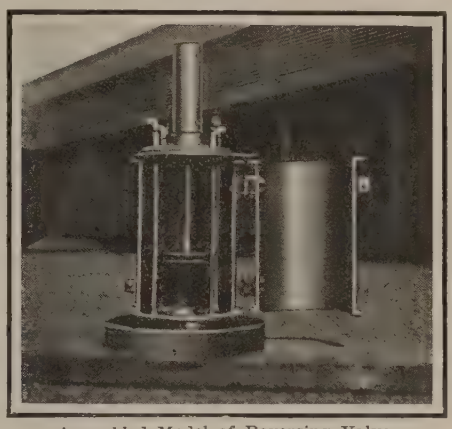
Temperature control of the automatic reversing device is possible by aid of properly constructed pyrometers in the two regenerators. As soon as one regenerator is brought up to the predetermined temperature at which reversing should take place, contact is made by the pyrometer to operate the solenoid, just as the clock does it. Alternative methods, such as the small cylinder shown in the detail of the furnace end, may be used to operate the burners.

Electrically operated reversing valves may readily be used in place of those operated by a steam or hydraulic cylinder, by using a single motor, a train of gears or a worm and worm gear and one drum. This would require a limit switch to control the automatic operation of the valve. By placing the drum on a crank shaft, it could be arranged to make the valve mechanism fool proof, in case the limit switch fails to operate properly.

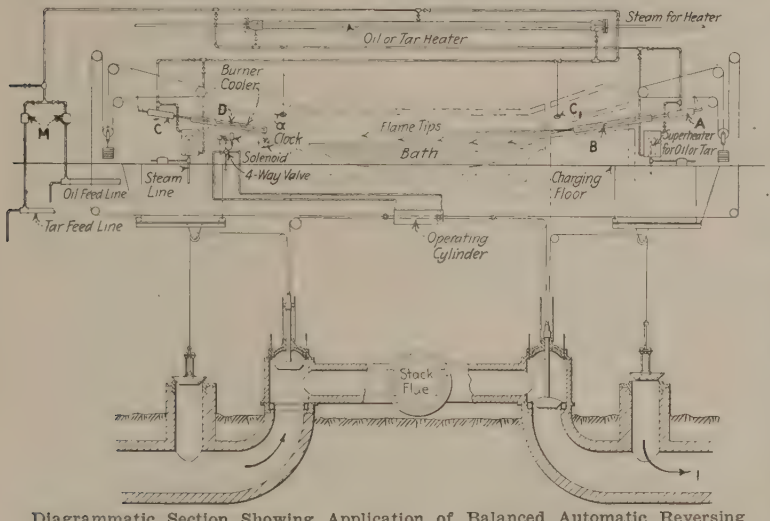
The main features of the automatic operation of this burner include perfect control of the temperature of the entering flame, simplicity of operation of burners, both while reversing the furnace and between reversals, and absence of leaky valves for shutting off oil and steam, as the triple cut-off valves can be made absolutely tight. This system also obviates frequent changing of the burner tips.

Each burner has at its tip a number of fuel-discharge ports from which the combustible vapor is projected in jets. Uniting, at a short distance from the burner, with the preheated air from the air port above the burner, the combustible from these jets produces a long flame, of which the tip will reach and extend over the entire surface of the metal in the bath. The use of shallow ports permits the flame to reach its objective sooner and, by having fuel-discharge ports of various depths, the jets have various lengths, resulting in the flames reaching over the surface of the bath more uniformly than if the entire mass of combustible vapor and air were projected uniformly. This results in heating the portions close to the burner, as well as those in the center and near the other end of the furnace, and promotes uniformity of temperature throughout the entire area.

As the several fuel-discharge ports are inclosed in one casing and controlled by one regulation, this permits the delivery of the flame at any desired distance from the burner. The fuel is atomized in each port at the tip of the burner, where the steam or air is at its highest velocity. This is due to the meeting at the restricted portion of each port, of the fuel with the steam or preheated compressed air.



Assembled Model of Reversing Valve



Diagrammatic Section Showing Application of Balanced Automatic Reversing Device to Regenerative Open-Hearth Furnace Using Liquid Fuel

Since the atomized fuel and the air or steam expand immediately after this atomization, the mixture becomes so thorough that heavy fuel, such as tar or Mexican crude oil, may be burned efficiently. The length and intensity of the flame are regulated by controlling the admission to the burner of the air or steam and the oil or tar. By thus obtaining great uniformity in temperature throughout the bath, a more even oxidation of the bath is secured Results from operation of furnaces fitted in this manner are shown in the table.

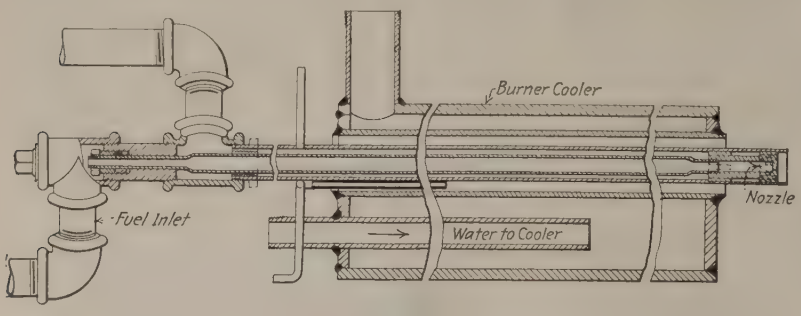
Test number	I	II	III	IV	V	VI
Size of furnace (tilting)	50-ton	200-ton	200-ton	200-ton	200-ton	200-ton
Charge (in lb.):						
Hot metal.....	40,000	80,000	.....	.....	60,000	55,000
Plate scrap....	45,000	33,000	85,000	95,000	170,000	175,000
Pit scrap.....	10,000	.....				
Tin scrap	20,000	79,900	40,000	40,000		
Broken molds.	15,000	48,200	75,000	75,000	55,000	55,000
Pig iron, cold.	.....	.....	70,000	60,000	.....	.....
Crop ends.....	.....	33,600	.....	.....	.....	.....
Total 130,000		274,700	270,000	270,000	285,000	285,000
Manganese (tapping) ...	..	1,300	..	..	..	..
Limestone	..	..	28,000	..	28,000	..
Burnt lime.....	..	..	..	17,000	..	17,000
Time (in hours):						
Charging	..	1⅔	2	2	2	2
Melting and making	..	8	9½	9½	8	8
Total for heat.	7½	9⅔	11½	11½	10	10
Product, ingots, Lb.	..	259,900	..	..	..	..
Tons	..	116	..	..	..	..
Yield, per cent..	..	94.2	..	..	..	..
Kind of steel....	Plate	Plate	Sheet bar	Plate	Sheet bar	Plate
Tar consumption (gal. per ton of ingots)	35	29	34	34	31.5	31.5

It may be noted that the 200-ton furnaces are emptied at each heat, and are not used on the Talbot process. The bottoms in the furnace have been raised so that the capacity has been reduced to about 150 tons. The ladle used, while rated at 110 tons capacity, will hold as much as 125 tons of steel, which is the maximum amount to which the furnaces are charged.

While open hearth managers have long been accused of lack of attention to those details of design and operation which would make for efficiency in the consumption of fuel, it is believed that both of the designs described in this article will go a long way to prove that the charge is not universally true. There is less unburned fuel going into the regenerators and up the stack by this means than under ordinary producer gas operation; this is shown by the fact that only a tiny tip of flame may be seen going into the discharge ports of the furnace, when looking between the chills at the furnace end. This compares with the heavy flame visible, passing this point when producer

gas is used, or with certain other types of burners.

Another exceptional feature which should promote long life for the furnace roofs and walls lies in the uniform temperature from one end of the furnace to the other, in place of the alternate heating and cooling, relatively speaking, which accompanies other methods of operation. This should save much money in repairs and much time in furnace operation, especially as compared with the extreme cases where the roof is actually sweating on one end and not much more than cherry red at the incoming end.



Section of the Oil and Tar Burner, Showing Arrangement of Parts

Uniformity of temperature and consequent equality of oxidation of the bath are made manifest when comparing the final and semi-final tests taken from the steel ladle. These show average analyses with much less variation than were obtained when using producer gas or other types of burners. This would promote that homogeneity in the steel so necessary under modern specifications.

It is possible to design the burner to suit the peculiarities of the furnace for which it is intended, and to produce the type and direction as well as dispersion of flame required. The burner may be designed for tar or oil or coke oven gas. For the latter, the gas is forced to the burner under several ounces of pressure, while preheated air, either from an air compressor or a positive fan, is used to mix with the gas for producing the length of flame required.

By reducing the lost time at and following reversal of the furnace, quicker melting and more uniform oxidation are obtained, and the heat of steel is made in less time. This also should increase the yield, due to a smaller percentage of oxidation of the metal. Comparison of yield figures, before and after the new arrangement was installed, show a gain of from 3 to 4 per cent. The effect of the gain in yield is shown by the fact that three of the 200-ton furnaces under the new arrangement were producing as much steel as the entire group of four furnaces using producer gas or the former type of burner, and this steel is reported to be of better quality.

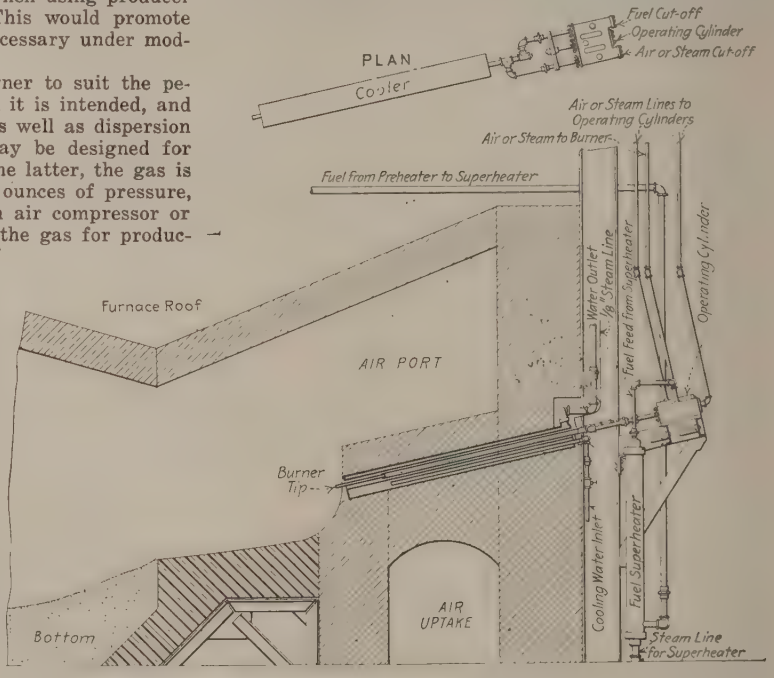
A blower has been placed on top of the stack flue, similar to the blowers used under producers, to siphon out the hot gases from the flue and use them to dry ladles, stopper rods, converter bottoms, etc. A newly lined 30-ton recarburizing ladle was recently dried by this gas in the same length of time an oil burner would have required. The consumption of compressed air for this purpose was about one-half as great as that required to atomize the oil or tar for the burner previously used for this same type of ladle. Arrangements are now being made to dry all the ladles with this waste heat.

Of course, where a furnace is equipped with a waste heat boiler, the hot gases can be taken off for boiler use after leaving the fan. The same fan can be designed to force the hot gases to the place of their utilization, without hindering the operation of the furnace, due to loss of draft from interposed resistance.

During the month of May comparison was made between furnaces operated with the new type burners and reversing valves, using tar, and others using producer gas. Based on 165,000 B. t. u. for one gallon of tar and 12,000 B. t. u. for one lb. of coal, it is estimated that the new burners save 23 per cent of the fuel value required by the old ones, and 32 per cent of the fuel value required when using producer gas. The time of making a heat of 120 tons of steel was reduced by 1½ to 2 hours and the yield increased by 2 to 3 per cent. Calculation of the cost of making steel at the Maryland plant, compared with other Bethlehem plants, showed that the Maryland plant made it at about $3.50 less per ton than at Bethlehem, and $6 less per ton than at Steelton.

New Warehouse for A. M. Castle & Co.

Work has been started by A. M. Castle & Co., Chicago, on the construction of a new steel warehouse at Blackhawk and North Branch streets, Chicago. The building will be 211 x 232 ft., of steel with pressed brick facing walls, steel sash, concrete floors and cement tile roofing, making a thoroughly fireproof building. The west 75 ft. is to be two stories in height and the second floor will afford an office space 75 x 211 ft. for the general offices of the company.



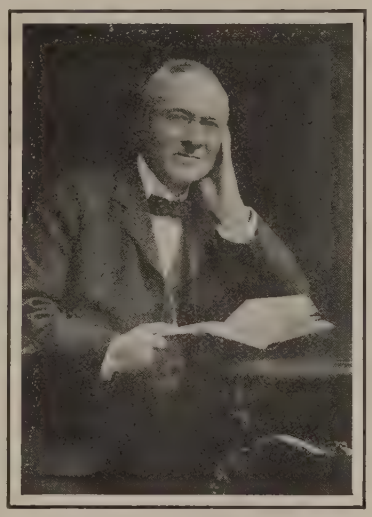
Section Through Center Line of Port and Plan of Burner, Cooler and Cylinder Arrangement

The main building will be used for the storage of sheets, tubes, cold rolled shafting, rivets, bolts, bars and boiler accessories. Materials will be handled by means of four electric traveling cranes, with entrances for trucks from the street under each crane. Carload shipments will be handled from switch tracks that terminate within the building after passing under each crane runway. With this new plant, the buildings of A. M. Castle & Co. will cover over five acres.

The Alvord Reamer & Tool Co., Millersburg, Pa., has reduced operations to a three-day week schedule. The company has been working on full time in the majority of departments.

Thomas Devlin: A Pioneer in the Malleable Foundry Business

SIXTY-SEVEN years in the malleable foundry business is the record of Thomas Devlin, president of three companies, the Thomas Devlin Mfg. Co., with plants in Philadelphia, and Burlington, N. J., Hardware & Malleable Iron Works and the National Specialty Co., both of Philadelphia. And, although 83 years old, he is still very active in business, going to his Philadelphia plant early each morning and taking charge of operations. He missed but two days at the plant in the past year; he has never had a vacation, except for five trips to Europe, including Ireland, and three trips to the Pacific Coast.



THOMAS DEVLIN

Thomas Devlin is the oldest active malleable iron man in the United States, from standpoint of both age and period of service. His success is indicated by his extensive membership in business organizations, some 30 in number, including the Philadelphia Foundrymen's Association, of which he is president; the National Association of Foundrymen; the American Foundrymen's Association, of which he is an honorary member; the Hardware Merchants and Manufacturers' Association; the Engineers' Club of Philadelphia; the Philadelphia Chamber of Commerce; the National Chamber of Commerce and the Manufacturers' Club. He is a happy example of a self-made man, his school education having consisted of the meager training which the common schools of Ireland could give, supplemented later by night school studies in this country. He came to the United States at the age of 16. His business career started with him in the role of office boy at $1.50 a week, paid to him on Mondays rather than Saturdays, lest he be tempted to spend this munificent sum with reckless abandon during the week end.

He has seen some great changes in the foundry business. In 1854, for instance, the best molders received $1.50 a day for a 10 or 11 hr. day; now his molders get $7.20 for an eight-hr. day. Molding machines have largely replaced hand molding; annealing methods have changed; the pots are piled four high, instead of two high; there were not over 50 employees in the foundry and finishing department in which he started to work, while the three plants can now employ from 1800 to 2500 when running at full capacity. Because some of the customers preferred to substitute drop forgings for castings, he recently installed drop forging equipment, thereby retaining these customers of half a century.

In speaking about the evolution in the use of pig iron, Mr. Devlin reminisced as follows: "All of the old foundrymen thought they must have Scotch iron in the early days to produce good machinery and hardware castings. Then they used pig iron to make malleable iron castings which was made in New York and known as Sterling, and we thought the 'jig was up' when we couldn't get it. Later we discovered that good iron was being made from Lake Superior ore. We also used some Crown Point iron in our mixture for malleable purposes. All came by rail, except some which we imported from Sweden. We have thought that recent prices for pig iron were the highest in history. I remember when the company had to pay $60 for malleable pig iron in the early days; it was smelted with charcoal and hence the high cost. Lehigh Valley irons were also popular."

The merchandising methods of Mr. Devlin's enterprises are unique in that they have never employed salesmen. The only sales activities are the publishing of advertisements in the trade journals. His companies sell through commission houses in New York and through them, until recently, much export business has been received. One of the New York connections has been handling their products exclusively for the past 38 years. Customers in California who patronized Mr. Devlin 35 years ago, still buy his products.

The long periods of service of many of the employees is a feature of the business. The oldest worker has been with Mr. Devlin for 55 years and never worked for any other concern, and several others have passed the half century mark of service. Employees' holdings total 32 per cent of the outstanding capital of the companies. Four of the directors are employees of the companies. One of the companies has originated a system by which employees are given the earnings of $1,000 worth of stock for a term of five years on the condition that the employees give to the company continued and faithful service during that period, and that the employees contribute $2 a week, this being retained by the company towards the purchase of the $1,000 worth of stock. Many, spurred on by the enjoyment of dividends before completing the purchase, have added more to the first $1,000 worth. Mr. Devlin has had but one strike since he has been a manager. He expresses the outcome in a paradox that would do credit to G. K. Chesterton: "We won, but we lost—we won the strike, but we lost $50,000 because of suspension of operations."

Mr. Devlin's companies make fittings for steam, water and gas, harness hardware, saddlery hardware, marine and awning hardware, registers, dampers and jobbing work. The original company made experimental castings for the first sleeping car berths about 1856 through Kimball & Gordon, car builders, who were later succeeded by J. G. Brill Co.; it manufactured castings for Blake & Willard mowing machines, Reyburn & Hunter lightning rod fasteners, Conrad Liebrick trunk locks and work for Henry Disston & Sons. For several years, it made castings for molasses faucets for a company before it decided to build its own factory.

The Philadelphia Hardware & Malleable Iron Works was started by Thomas R. Wood & Co. in 1852. The firm changed to E. Hall Ogden Jan. 1, 1855. It was the first bench shop in Philadelphia, the first malleable shop in Pennsylvania and was one of four malleable shops in the United States.

When THE IRON AGE representative called at the home of Mr. Devlin, he found a man whose appearance belied his 83 years of age. He found a short, well set-up man, with alert eyes and good complexion, wearing a grey suit with small black checks, whose trimness a younger man might well copy. He had been reading the *Literary Digest*, an indication that his interest is broader than affairs of gray and malleable iron. The quick replies to the many questions placed before him showed a mind as alert as his appearance. He tells the story of his career as follows:

"On Aug. 4, 1854, I was engaged as office boy by E. Hall Ogden, who was with the company of Thomas R. Wood & Co. I received as compensation $1.50 per week with the understanding that I would get an ad-

vance of 50 cents every six months. I continued until early in 1857 when there was a money panic. The shop was closed and I went to school for four months. The shop reopened in October, 1857. I went to work again and continued until 1865, when I was given an interest in the Philadelphia Hardware & Malleable Iron business with Mr. Carr, a salesman, and Mr. Crawley, the bookkeeper, each getting one-eighth of the net profits without salary, Mr. Ogden getting five-eighths. The first year my interest was a little over $5,000 and Mr. Ogden had more net profit that year than he had ever made before. That interest, without salary, continued until 1870 when Mr. Ogden, being in ill health, sold the business to Carr, Crawley & Devlin.

"Our firm started officially on Jan. 1, 1871. Outsiders, who did not know conditions, supposed that I was taken into the business as partner in consequence of the knowledge that I had of manufacturing and that Carr and Crawley had the capital, when the truth was that I had more money invested in the business than the other two. The names were arranged according to age, Carr being the oldest, etc.

"Carr, Crawley & Devlin continued in business until 1880 when I became dissatisfied because we were not progressing. Four years after the dissolution Carr & Crawley failed and after their double failure, Mr. Ogden's son attempted to run the business, but lost money. Our company made him an offer for the business which he accepted and we took it over in 1892 and have made money ever since."

Mr. Devlin had 11 children, eight of whom are still living. Two sons are associated with him: William J. Devlin, vice-president and manager of the plants at Third and Lehigh avenues, Philadelphia, and Burlington, N. J., and Frederick M. Devlin, vice-president and treasurer, located at the plant at Ninth and Jefferson streets, Philadelphia.

Interchangeable Manufacture Discussed*

Fundamental Principles—High Cost of Unnecessary Accuracy—Analyzing Conditions—Holding Extremely Accurate Dimensions to Minimum

IN dealing with so broad a subject as interchangeable manufacture, it is well to remember that in the course of time many false traditions and pseudo-scientific conditions are built around a process or system, either glorifying it unduly or condemning it beyond its deserts. This makes it necessary to be iconoclastic and tear down that we may build upon a firmer foundation, sometimes rearranging the former material and sometimes rejecting it. Likewise, it is well to start out with certain fundamentals plainly stated, and any discussion or theory that contravenes these fundamentals is useless for our purpose. True, we may dispute the fundamentals and possibly disprove them, but the statements hold until that shall have occurred. Personally, however, the author disbelieves in fundamentals, and prefers to employ the term "progressive standards."

Fundamental Principles

The first fundamental is that no two things are alike; the second, that the difficulty of maintaining accuracy increases in geometric ratio with each added accurate dimension on the same piece; the third, that no machine or tool under stress can be accurate; the fourth, that the manufacture of interchangeable parts in quantity is a matter of percentage; and the fifth, that irrespective of the method used, quality is a matter of insistence.

Nowhere, either in the arts or crafts, do we find two things alike. Nature herself has never succeeded in making two leaves or two grains of sand the same as far as man has ever been able to determine. Poe, in one of his essays, states that analysis consists of taking two things exactly alike and looking at them and continuing to look at them until we discern that which differentiates the one from the other, and our ability in that direction indicates our power of analysis.

The nearest approach to mechanical perfection that we know of is found in the Johansson gages, or was until the advent of the Hoke gages; but within their limits these are by no means interchangeable and the interferometer shows not only a variation in size but a difference in parallelism of the same piece.

Securing one very accurate dimension on a piece is a comparatively simple matter. The ease of securing two accurate dimensions, however, depends upon the relation of the second to the first. The figures given in the following table are based upon practice and general impressions, but the author believes them accurate enough to justify their publication for the purpose of showing the high cost of unnecessary accuracy:

No. of Dimensions on One Piece	Probable Number of Perfect Pieces	Per Cent Estimated Increase in Ratio of Cost per Operation
1	100	0
2	90	30
3	50	75
4	15	100
5	5	200
6	0	500

In making the foregoing statements the author has in mind automatic and other machines where the close-dimension work is done at one setting and in manufacturing quantities. Some will dispute the figures given in the table and will declare that it is not good practice to attempt finishing pieces in the automatic, but that they should be roughed out there and finished on a shaving lathe or elsewhere. This brings us to our third fundamental and we may ask, Why should they not be finished complete when a good automatic must, in the nature of things, be (and is) as accurate as a single-purpose machine **on a single accurate dimension?** It is not accurate on several close ones, however, and accepted practice confirms this statement; and the reason why it is not and cannot be accurate is because of conflicting stresses.

The extent to which we may go in accuracy of interchangeability is often determined by the price that can be secured for the finished product. This is also true where the system of building rather than manufacturing is followed, and where a much better class of labor is necessary.

Unnecessarily Close Tolerances Often Specified

There are many firms the engineering departments of which really believe they are producing an interchangeable product of close dimensions, but their inspection and manufacturing departments could tell a different story. It is not bad workmanship or lax inspection that is responsible for their failure to produce such work, but the —ofttimes—unnecessarily close tolerances specified on unimportant dimensions, or the insistence of close ones on several dimensions of the same piece, and it is well to stop and consider what may happen, say, to a piece of apparatus after it has been in service for some time when initially it required the centers of two shafts to be held within one-half thousandth of an inch.

Interchangeable manufacture requires both **relative tolerance** and **specific tolerance.** Relative tolerance has to do with its relation to the part to which it assembles and does not necessarily affect the tolerance of the spe-

*Paper presented by Chester B. Lord, Battle Creek, Mich., at the spring meeting of the American Society of Mechanical Engineers, Chicago.

cific dimension. Specific tolerance is that tolerance on a specific dimension required to render a particular part easy to manufacture, or to take care of the wear on tools. Any part increases in cost with each succeeding operation, and the probability of loss should decrease in the ratio of its added value. This result should be obtained, first, by a design having in view its relation to subsequent machining operations, and, second, through the proper sequence of operations relative to their difficulty, and sufficiently divided. This leads us up to the question of registration. Automobile-engine builders cast lugs on their cylinders to insure parallelism of bore; adding-machine and phonograph castings sometimes have bosses cast on, to take the pressure of milling or drilling operations. It is also true that sometimes we insert a pin in a drilled hole to guard against movement, but we do it only at times and usually as a matter of convenience, whereas it is a matter of necessity; and it will usually cost less to drill special holes or machine special lugs for registration and resetting than to attempt to do the work in fewer complex operations.

A Piece Under Stress Cannot Be Accurate

And nearly as important as registration is the question of clamping. One of the fundamentals laid down was that a machine under stress could not be accurate. This is just as true of a piece being machined, and unless a part is designed with its subsequent machining operations in view; unless it is supported sufficently near its pressure centers; unless it has a three-point support with the holding or clamping pieces immediately over them (and in the case of a drill jig, independent of the part that carries the bushings), then that piece cannot be accurate. This is true of drilling always, of milling generally, and of turning sometimes.

How tolerances shall be indicated; whether they shall be identical, independent, or overlapping; what the law of probability and what actual trial demonstrate as the probability of overlapping or identical tolerances interfering; the percentage that may be expected at different parts of the tolerance, and the lessons to be learned therefrom are subjects calling for extended treatment by themselves. The same is true of inspection, of machining methods, of analysis of product.

The automatic screw machine will, of course, always be with us, for in that we meet ideal manufacturing conditions as nearly as they may be met. But the fact that the single-spindle screw machine persists and is even exclusive in the small-part field, is still further corroboration of the price we must pay for accuracy. The question of accuracy is of course relative, as is the question of rigidity of machine; but it is important in its bearing upon the cheapness of manufacture by determining the number of cuts, retapping, reaming, grinding, etc., that are necessary.

Quality does not depend upon the method under which work is done, but it is usual to assume that men working for day wages take more time and consequently turn out better work than those on a piecework or premium basis. I believe people who reason thus are wrong in their psychology for the difference between the two methods does not in itself carry any incentive either to do better work or worse work. It is the remuneration received on the premium basis that gives the incentive; and where a premium does not work a wrong by inducing over-exertion, it lessens fatigue by increasing the workman's interest in his task; and as Taylor says, "Speed is a function of quality."

Commonsense In Interchangeable Manufacture

The law of compensation applies to mechanics as well as elsewhere in industry, and when we attempt to work to closer limits at the expense of increased operations, we must pay somehow. This is not to be considered as an argument against such a procedure, but an appeal for common sense in interchangeable manufacture—not to make the work easier, but to reduce the cost—and the firms that are really making a good interchangeable product are those that have analyzed all the different conditions and hold the extremely accurate dimensions at a minimum.

Neither should it be thought from what has been said that close dimensions may not be necessary or desirable. Some companies require them much closer than do others. It then becomes a question of whether the price received for the finished apparatus is commensurate with the close limits imposed. If not, then it is a matter of increasing the tolerances so as to permit manufacture on a cheaper basis. In other words, the percentage of rejections that can be tolerated must be figured out and kept within that limit. For instance, on an apparatus costing $10, for which a liberal price is asked and received, an allowance of 50 cents per apparatus for rejections may not be excessive. If, on the other hand, the price is close, 50 cents may mean the difference between profit and loss. This is a matter of policy to be settled by the administration and not by the shop, although we very often lose sight of this fact.

In the author's opinion there are no such things as close tolerances. All are relative and we only court trouble when we try to take too many steps at once. One-half thousandth is only five per cent of ten thousandths, and the chance of securing that accuracy in quality in one step is about five per cent multiplied by the extra cost. But one-half thousandth is fifty per cent of one thousandth and the probabilities are increased in the same ratio, so we may lay it down as a truism that subdivided operations are a function of accuracy.

Liberal Allowances Advocated

Analyzing our fundamentals, we find that there are three ways in which interchangeable parts may be secured: 1. By obtaining a percentage of good ones, with close tolerances; 2. by giving individual attention to each piece; 3. by employing liberal allowances.
The first is wasteful and the second is not manufacturing; the third one means liberal unnecessary allowances and close necessary ones, with the operations so divided that each individual working upon the part has but one thing to do. Thus, on a small shaft with six diameters all ground to a 0.0005-in. limit, there should be six roughing and six finishing operations because different wheels may be used; because less skilled men may be employed with less chance of scrap; because the wheel will be in better condition and will not need dressing so often and the operator will not have to change his sense of proportion, "hog off" material one moment and hardly touch it the next; because the finishing operations may always be done on the most accurate machine; and last, but not least, because as a rule one man can finish more work to close dimensions in four operations than four men can in one operation.

Let us not delude ourselves, however, that interchangeable manufacture or standardization is all profit and has no penalties. The French, even in large business, recoil from the idea of standardization, and this feeling has saved them through the ages from the rigidity of an arrested civilization. I am not competent to say whether the artistic qualities of the French are the result of their fight against standardization or whether it is the cause. Suffice it to say that no country that manufactures on the scale that France does and employs standardized methods, can either duplicate her excellence of manufacture or produce the artistic or scientific results she obtains. We must somehow pay for the repetition we call standardization, specialization, or interchangeability, and as usual the toll is collected from the intellectual.

Pump Associations Merged

WASHINGTON, Aug. 2.—Manufacturers of hydraulic and compressed air pumps at a conference last Wednesday with Secretary of Commerce Hoover, decided to consolidate the two associations representing the respective branches of the industry and to select a committee for the purpose of co-operating with the department in supplying statistics in order that the department may aid the industry in increasing foreign trade. Like representatives of other industries, the pump manufacturers intend to supply the department with vital statistics that are required to expand the foreign business.

A committee representing manufacturers of implements and vehicles has been formed and is co-operating with the Bureau of Standards in connection with work of standardization.

Mechanical Coal Trimmer

A mechanical coal trimmer that can be attached to any type of coal handling machine has recently been brought out by the Wellman-Seaver-Morgan Co., Cleveland, having been designed by A. F. Case, engineer of the coal and ore handling equipment department of that company. The first trimmer of this type has been installed at the coal handling plant recently completed by the Wellman-Seaver-Morgan Co. for the Western Maryland Railway Co. at Baltimore.

The coal trimmer consists of a rotating cowl and a pivoted frame carrying the trimming conveyor and driving motor. The cowl is divided into two sections, the upper of which is fixed to the lower end of the telescopic chute and forms a support for the lower or rotating section. This lower portion is in the form of an elbow which deflects the coal horizontally as it is discharged from the chute, giving it the proper direction to be handled by the trimmer belt. Rotation is accomplished by means of a motor, mounted on the upper section, driving a pinion which meshes with a rotating gear on the lower cowl.

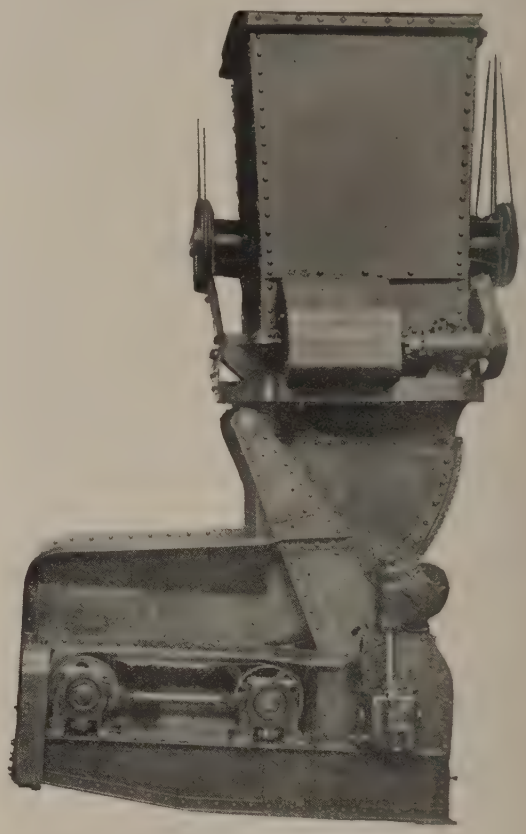
The conveyor frame is pivoted to the upper front side of the rotating cowl and is arranged to swing about this pivot as desired. When the frame is fully extended, all of the coal leaving the cowl passes over the trimmer belt and is projected, by the high speed of the belt, in a horizontal direction into the portions of the ship's hold which are inaccessible to a gravity flow. When the frame is retracted the belt occupies a position at the rear of the cowl where it is not touched by the coal discharged from the cowl. The

At Work in the Hatchway of a Ship, with Hatch Cover Showing at Right

trimmer belt can be easily and quickly moved to either position by power derived from the conveyor motor, through a selective reversing bevel gear and self locking worm gearing which drives two pinions meshing with gear segments attached to the cowl. A double throw hand lever on the side of the conveyor frame operates a jaw clutch to engage this drive and this clutch is automatically disengaged and thrown into neutral position at each limit of swing.

The trimming conveyor, approximately 4 ft. in length, is carried in the front part of the conveyor frame in proper position to receive the coal discharged from the cowl. This conveyor consists of fabric belting 36 in. wide and provided with protecting clips. It is carried on two steel pulleys supported in roller bearings connected to the conveyor frame. The bearings are adjustable and a takeup is provided on either side to keep the belt taut.

Power for driving the belt is applied to the rear



Side Elevation of the Coal Trimmer Shows the Essential Working Parts

pulley through a silent chain drive connected to the motor shaft. The motor is supported in a tight enclosure at the back of the conveyor frame. This motor box is provided with a hinged cover and made as tight as possible to exclude dust from the motor. The motor is of special construction provided with a ventilating attachment and has a rating of 50 hp. The chain drive is proportioned to give a belt speed of 2750 ft. per min.

On account of the severe service to which the belt is subject, frequent renewals are necessary, and in order to secure as long life as possible it is essential to eliminate all sources of weakness such as splices, etc. For this reason a continuous belt is used. The belt is made up in the required length and is slipped over the ends of the pulleys. One of the distinctive features in the design of this trimmer is the facility of endless belt renewals, accomplished by removing the bearings at one side of the trimmer, thus presenting the free ends of the pulleys over which the belt can be easily placed. Another feature is the guard plate which covers the return flight of the conveyor preventing coal dust from falling on the inside of the belt and passing between the belt and the pulleys, and causing rapid belt deterioration.

With this device it is possible to trim from 1000 to 1500 tons of coal per hour, when the material is delivered in a uniform volume to the trimmer. The distance to which the coal may be thrown will vary from 35 to 50 ft. according to the class of coal handled. It is stated that the trimmer will save the labor of from 150 to 200 men.

GOVERNMENT BUYING

Progress Made in Co-ordinating Control as Proposed by Director Dawes

WASHINGTON, Aug. 2.—Creation of a central co-ordinating control over Government purchases and the disposition of surplus property of the Government, brought about by an executive order of the President last Wednesday, was an expected development of plans devised by Director of the Budget Charles G. Dawes. The co-ordination is to be effected through the use of existing agencies, and while the control is general, special pressure will be directed at first toward the interdepartmental transfer of property which will prevent the departments from continuing purchases in the open market by one department where a surplus of the article in question exists in another. A partial list of those who will have charge of co-ordinated purchases and sales has been named. Col. H. C. Smither has been selected as chief co-ordinator of general supply. Those selected as co-ordinators on duty in areas include Maj. Joe R. McAndrews, Maj. T. W. Hammond, Lieut. Col. J. C. Rhea and Maj. D. A. Robinson. Officers of the Navy Department to be detailed will be announced later.

While it is doubtful whether it will have any sweeping effect either on Government purchases or sales of iron and steel, machinery, foundry supplies, etc., these products unquestionably will be purchased and sold by the Government on a more intelligent basis. Relatively, however, it is claimed that there has been but little overlapping in transactions of this nature. One of the best results of the order, it is believed, will be to establish more uniform practice as to bidding terms, requirement of bonds, etc., by manufacturers in these lines. The surplus iron and steel and machinery on hand has been inventoried with considerable thoroughness and requisitions made by departments wanting such material from others having it have not involved a great amount and probably will not. Because of this condition the quartermaster corps of the War Department has been authorized to dispose of surplus iron and steel which has been scheduled for sale in August, the tonnage being of a miscellaneous character and of a comparatively small amount. The greatest iron and steel surplus is held by the Shipping Board and is estimated at 300,000 tons, most of it being structural steel. While sales of this material have been held up pending completion of inventory, it is not thought any of it will be required by other departments, both because it is not of the kind or type other departments now need and also because it has been exposed to weather conditions to such an extent that it probably can be used for scrap purposes only.

While the necessity for using existing agencies to promptly meet the general situation, according to a statement by Mr. Dawes, requires for the co-ordinated control the detail to this duty of those already in different departments of the public service, this organization is independent of any department. Attention is called to the fact that the wording of the order must not create the impression that the War and Navy Departments are being placed in control of the organization, because of the fact that, for supply and purchase co-ordinating purposes, the country is divided along the lines of the present corps areas of the Army and some Army and Navy officers may be used in it. Experienced men, it is stated, will be selected, irrespective of the present departmental status.

The co-ordinating machinery set up does not interfere with existing departmental authority, save in the matter of co-ordination of action, which can be properly accomplished by executive order alone. Under the order there is set up the machinery to facilitate interdepartmental transfers of property. Negotiations between the departments as to price at which surplus material is transferred from one to another are rendered unnecessary by the authority given to the co-ordinating supply officers in the different corps areas to fix the price at which the bookkeeping entries incident to such transfer are made. This co-ordinating machinery will also be concerned in the systematizing of Government purchases. By the establishment of this machinery, immediate relief to the existing situation is expected, and it will continue to function pending the study of the question of whether or not better machinery can be instituted through legislation. The Director of the Budget stated that its operation will provide an opportunity for the Executive and Congress to determine whether or not the purchase and surplus supply situation will be better handled by a central organization created by law, or by the continuance and improvement of this system, which is one of the co-ordination of existing agencies.

Under the terms of the order, the co-ordinators have broad powers in their respective areas and are required to see that no branch of the Government purchases property in the open market where it can be obtained from another department and to keep fully informed regarding material needs and supplies both in their respective areas and in the areas of other co-ordinators. They also will be required to confer with officials of every executive department having activities in their areas.

TAX LEGISLATION

Pressure to Push It Ahead of the Tariff and Other Measures

WASHINGTON, Aug. 2.—Pressure for quick passage of tax legislation and its precedence over tariff legislation is coming from business interests of the country with increasing force. Considerable sympathy for this view has been expressed in Congress, while the Administration, apparently feeling that it is a question for the legislative branch of the Government to decide, has not gone on record. There are some who favor the idea of combining tax and tariff legislation, among them being Representative John Q. Tilson of Connecticut. Chairman Fordney of the House Committee on Ways and Means, now considering tax legislation, estimates that it will require two weeks to draft a bill following the recommendations of treasury and internal revenue experts at executive sessions. Under this plan the measure would probably reach the House about the middle of the present month. It is uncertain how long the measure may remain in the House, but it probably will be only a short time, some members predicting its consideration will require only a few days.

One difficulty the House Committee on Ways and Means encountered at hearings, according to members, was the lack of concrete suggestions for substitute taxes to take the place of those it is maintained should be repealed or modified. As a result it appears likely that Administration recommendations will be used as the principal basis for legislation. These include the repeal of the excess profits tax, making up the deficit through a modified tax on corporate profits, or a flat additional income tax upon corporations; repeal of the existing $2,000 exemption pertaining to corporations, to yield revenue estimated at from $400,000,000 to $500,000,000 annually; readjustment of the income tax rate to a maximum combined normal and surtax of 40 per cent, and the imposition of new taxes necessary to bring the total revenue up to $4,000,000,000 annually; increase of the first class postage rate from 2c. to 3c. which Postmaster General Hays estimates would yield between $75,000,000 and $80,000,000 annually. Except for the latter feature the proposals follow to a large extent those embodied in a bill introduced early during the present session by Representative Longworth of Ohio.

Suggestions of the National Association of Manufacturers for the adoption of a sales tax as a substitute for war excise taxes apparently have not met with much favor at the hands of the House Committee. The committee refused to admit testimony dealing with the sales tax under the claim that it is not germane to present plans. Secretary of the Treasury Mellon declined to endorse the proposition and Secretary of Commerce Hoover was non-committal. The indications are, therefore, that the sales tax will not be considered in the new measure. James A. Emery, general counsel of the association, told Secretary Hoover, as he later

told the committee, that one-third of the income of corporate business is paid in State and National taxes and that the excise taxes, excess-profits taxes and other special taxes make it impossible for business to forecast definitely what costs are going to be. He insisted that under a non-discriminatory sales tax, properly administered, business would not be confronted with the uncertainties of the present system and could figure its cost of taxation accurately. J. Philip Bird, general manager of the association, expressed a similar view at the conference between the association and officials of the Bureau of Census last Friday.

W. H. Stackhouse of Springfield, Ohio, president of the National Implement and Vehicle Manufacturers' Association, in appearing before the committee, urged repeal of all excise taxes and of all surtaxes to the 20 per cent group and the funding of the entire war debt for a period of 50 to 75 years. His alternative was a sales tax. E. F. McGrady, for the American Federation of Labor, presented a resolution adopted at the Denver convention in favor of retaining the excess profits and income taxes. The Chamber of Commerce of the United States has urged a general turnover tax on all business transactions, repeal of the excess profits tax and war excise taxes, both those on transportation and communications and those levied in relation to particular business.

Should it be concluded to enact tax legislation before the Senate receives the tariff bill, it is believed by some that Congress would take a recess after the new internal revenue law had been enacted and take up the tariff bill immediately after convening.

PLANNING THE CENSUS

Secretary Hoover Expects to Effect Saving by Cutting Out Dead Wood

WASHINGTON, Aug. 2.—Plans for cooperation between the Bureau of the Census, Department of Commerce, and the National Association of Manufacturers and its members, in compiling the 1921 biennial census were made at a conference here last Friday. Proposals to simplify and expedite the work and to save money were especially emphasized and a committee was selected to bring this about. It is the desire of the bureau officials and the association to determine what possibilities of simplification can be developed in the census schedules for 1921, which raised the question as to the scope of the undertaking. The first point involves the scope of the establishments to be considered and the need of limiting it. For example, it was pointed out that the iron and steel schedule of 1919 regarded a manufacturing establishment as an institution employing five or more persons producing material valued at $500 or more annually. On this basis there were 285,000 establishments of all kinds included in the schedule. In 1914 only 4.7 per cent of the value of products was produced in establishments whose individual output was valued at less than $20,000. It is contemplated for the 1921 census to include only establishments whose products have an annual value of $25,000 and more and to approximate values below that figure, based on past figures, which was held to be a logical plan in view of the fact that it was shown that 35 per cent of the plants have an annual production of less than $100,000 each. It also will be the purpose to set forth only essential facts.

Another object of the conference was the linking of the National Association of Manufacturers and the particular industries with the Department of Commerce in order to supply information to be carried in the monthly survey of business conditions. This has a bearing on the census figures as shown by the statement of Secretary of Commerce Herbert Hoover, who, in addressing the conference, said governmental statistics on industrial production will be gathered in the 1921 biennial industrial census on a commodity basis. He asked for and was promised cooperation. Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, explained the commodity relation of the new industrial divisions of the bureau to business and trade associations. With the bureau reorganized on a commodity basis, he stated that *Commerce Reports*, the official publication of the Department of Commerce, soon will be issued weekly instead of daily, as at present, and information will be carried under commodity heads in accordance with the new industrial divisions created and being established. The iron and steel division was the first one organized with Walter S. Tower in charge, while the heavy machinery division was the third one to be established, with Walter H. Rastall in charge. The work of preparing information for publication under commodity heads will be under the direction of the heads of the industrial divisions.

Secretary Hoover said that proper and accurate statistical information would be vital equally to the Government in determinations of policy and to industry itself in its daily necessity of ascertaining the economic trend.

"These statistics hitherto have been secured in terms of money," Mr. Hoover stated. "I think we all realize now how uncertain and indeterminate monetary values can be, and therefore we have decided to place it next year on a commodity unit basis, as well as monetary.

"We want to get these facts without plaguing industries, and we also want to get it in a form that will be of practical utility to the industry when it is obtained. Thus, nobody but the manufacturers can tell us in what form to proceed."

The secretary said that about $23,000,000 had been provided for expenditures of the Department of Commerce this year and that it was planned to "save between $2,000,000 and $2,500,000 of it by elimination of dead wood and elimination of services," but that notwithstanding it was intended to spend extra money in the study and promotion of foreign trade and the manufacturing census.

J. Philip Bird, general manager of the National Association of Manufacturers, presided at the conference.

INDEPENDENTS EXCLUDED

Steel Corporation Alone Will Respond to Pittsburgh Base Complaint

WASHINGTON, Aug. 2.—The Federal Trade Commission has decided to center its attack in the Pittsburgh base case upon the United States Steel Corporation exclusively. This fact has been made evident by the refusal of the commission to grant requests of independent steel companies to intervene. The attitude of the commission has been a source of surprise. The presumption has been that it was desired to obtain all the information possible concerning the case, but it is pointed out that this cannot be done if the independents are not privileged to present their views which necessarily take a form of their own. The contention is made that the great majority of the independent steel companies operate only in a single district and that in such cases their entire output, when produced outside of the Pittsburgh district, would be affected by a change of practice, save in those instances where material is invoiced at flat prices. Even in the case of the latter it is desired to maintain the present custom as a sound business principle.

During all previous hearings, the commission accepted testimony from independent steel companies, but its complaint was directed against the Steel Corporation only. It was not believed, however, that this meant that the independents would be denied the right to intervene, and refusal to permit such intervention has been vigorously resented. The commission apparently is of the opinion that it will simplify the case and strengthen its own position by concentrating the attack on the Steel Corporation solely. The hearings, according to plans, will begin early in September.

Commissioners of Allegheny County, Pa., have voted to submit to the voters on primary election day, Sept. 20, a bond issue of about $38,000,000 to be used for new roads, new bridges, the raising of old ones, for a new building at Ross and Diamond streets, Pittsburgh, and the remodeling of the old county courthouse.

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Why High Duties on Manganese?

In the recent debate on the tariff bill in the House a Congressman asked Chairman Tilson, of the sub-committee in charge of the metal schedule, why his committee had recommended the high duty provided for ferromanganese. The reply was that Chairman Tilson had opposed the duty of 2.2 cents per pound of contained manganese, but that it had been adopted against his vote. The Congressman who inquired said he had received many protests against the ferromanganese duty. These protests will go also to the Finance Committee of the Senate and it already appears that various members of the House who voted for the bill will not oppose reductions the Senate may make in the ferroalloy paragraph when the final try-out comes.

We have called attention already to the high rate of duty imposed on manganese ore. To-day a ton of foreign manganese ore can be bought, f.o.b. Atlantic port, at 22 cents per unit of contained manganese. That would mean, for a 50 per cent ore, $11.20 per ton duty, or slightly over 100 per cent on the sum of the foreign price, the ocean freight and insurance. For a mineral, which in mining and handling cost is comparable with iron ore, such a rate is so high as to call for a full statement of the reasons which led to its imposition.

Figuring that it takes 2.2 tons of a 50 per cent manganese ore to produce a ton of 80 per cent ferromanganese, the duty on that amount of ore, under the bill, would be $24.64. The interest of the domestic producer of manganese ore was apparently the controlling factor in the drafting of the manganese rates. The producer of ferromanganese, with all his investment in blast furnace property, which is subject to greater depreciation than that devoted to pig iron, turning out a product that on to-day's market is six or seven times as valuable as manganese ore, ton for ton, has only about 60 per cent as much protection on his operations as the bill gives to the ore entering into a ton of ferromanganese. In other words, the duty on a ton of 80 per cent ferromanganese is $39.42, under the Fordney bill, and the duty on the ore necessary to produce a ton of 80 per cent ferromanganese (assuming 50 per cent ore to be used) is $24.64. The protection to the ferromanganese maker is thus $14.78.

Assuming 16 pounds of 80 per cent ferromanganese to a ton of steel ingots, the duty of $39.42 on a ton of imported ferromanganese would mean 28.15 cents per ton of steel ingots. As the finished steel yield is roughly 75 per cent of the ingot output, the 28.15 cents on a ton of ingots becomes about 37.5 cents on a ton of finished steel. That is the handicap, in other words, which the Fordney bill imposes on a ton of American finished steel going into the export trade, as compared with the present condition of free manganese ore and free ferromanganese.

It is hard to believe that the facts concerning manganese ore supply and the status of American manganese mining and ferromanganese production were seen by the Ways and Means Committee in their right light. The manganese problem is not free from complications. It would require a voluminous pamphlet to present the facts fully. The Tariff Commission did well in putting them in permanent form, even though the import of this well-digested information was not grasped by the framers of the pending bill. From another pamphlet, which argues the question from the standpoint of American users of ferromanganese, we present extracts on another page. The pivotal fact in the situation as there emphasized is that high-grade manganese ores exist in the United States in scarcely more than negligible quantities, compared with the requirements of our steel industry. Alongside that fact stands another significant one—that the one considerable twelve-months' output of domestic ores, that of 1918, required for its stimulus ferromanganese prices six to ten times those prevailing before the war.

Sufficient reasons have not yet been given for imposing a new burden of 37.5 cents on every ton of finished steel exported by independent steel manufacturers. To maintain a weak manganese mining industry at home our steel manufacturers are asked to pay millions of dollars annually on the imported manganese ores that must continue to come from abroad. And that annual outlay would tend, not to the development of a native manganese supply against the next war, but rather

to the exhaustion of the domestic reserves, such as they are, with the alternative of entire dependence on foreign mines when the country again faces a national crisis.

The Subnormal Steel Demand

The most important fact in the steel market situation at present is that of late the demand upon the mills has been below a normal relation with the general business or industrial activity of the country. Some reference to this fact was made in THE IRON AGE, July 21, page 149, a comparison being given showing relative activity in iron and steel and in several other industries.

The production of steel recently dropped to about 20 per cent of capacity, or about 25 per cent of the rate maintained during the greater part of last year. The rate in tonnage was about 30 per cent of the rate from July 1, 1912, to July 1, 1913, in which period the pre-war record in freight ton-mileage was made. Of late, however, the freight movement on the railroads has been only a few per cent less than in that period, while steel production is about 70 per cent less. Debits to individual accounts at banks, which the Federal Reserve Board itself says "are indicators of the volume of the nation's business" have been running only 20 or 30 per cent less than those of a year ago.

These comparisons do not prove that the production of steel lately has been at a rate less than is requisite for the country to continue indefinitely its present industrial activity, but they are strongly suggestive. It is true that if one take conditions such as obtained in the United States in 1906 and eliminate construction work the steel industry would suffer a larger percentage of loss than would business or industry in general, but there is some construction work, regarded as absolutely necessary, going on now and other work in immediate prospect, and the quantity of steel required to keep the country going, without any construction, is large.

The flow of steel from mill has been held back by the existence of stocks of steel in the hands of jobbers and manufacturing consumers, the existence of stocks of manufactured wares in the hands of manufacturers and wholesale and retail dealers and the persistence in use of old machinery, implements, tools, etc., which in normal conditions would be replaced with more freedom than has lately been exhibited. The stocks are being liquidated, the things in use are wearing out, and eventually they must be replaced. The demand upon the mills has undoubtedly been below a normal relation to the general activity of the country of late, and is bound eventually to return to a normal relation, such improvement being entirely apart from what may come at one time or another by betterment in business activity generally and the development of more favorable conditions for construction work of a strictly investment character.

That the country is not loaded with wares made from steel is a reasonable assumption. There was much extravagance in 1920, but there was no particular evidence of extravagance in the purchase of things made of steel. Much has been said about extravagance in buying automobiles, but there has been buying of automobiles in the past few weeks. Carpenters did not throw away all their old tools and buy new ones. Over a year ago the National Hardware Association issued an extensive compilation showing percentages of price advances, Jan. 1, 1915, to June 1, 1920. Carpenter's augers were at three and a third prices, common braces at four prices and planes at three prices. Many comparisons could be made, suggesting the improbability that the ordinary everyday consumers of wares made from steel bought in such a way that they will not have requirements in future.

The matter of the buying power of the people being reduced is not involved in this issue, for the point is that demand upon the steel mills should return to a proper relation with the buying power that exists, as employment and earnings stand to-day. Before the war the steel industry felt that the minimum requirements of the country, even in a period of depression, represented about 50 or 60 per cent of the productive capacity, and the dictum rested upon experience rather than theory. A 20 or 25 per cent demand was unthinkable and has been brought about by unprecedented conditions. It could not last for any length of time with the country as a whole running as it now is.

German Metal Industries Active

The Berlin correspondent of the New York *Times*, discussing the marked revival in German industry, cites the fact that German manufacturers can secure all the American cotton and copper they need at rock bottom prices. He quotes a leader in the German electrical industry as saying that exports of brass and copper tubes for Russian locomotive repairs have been heavy and that Germany is getting all its copper from America at "cost-of-production price." Recent export statistics bear out this statement as to Germany's activity in the American copper market. Whereas in 1919 Germany bought no American copper and in 1920 was third in the list of foreign buyers, for the eleven months ended with May that country had bought more of our copper than any other, taking over 27 per cent of the total exports. Of the total purchases of the 11 months nearly 72 per cent was bought in 1921, or from January to May inclusive. Germany's recent purchases are not far short of her 33 per cent of the total in 1913 when she was preparing for war. The significance of this movement is not light; it is clearly indicative of a revival of industry in that country which means much to the world in many ways. Concerning the German iron industry, late reports are that it is "going strong, the mills having orders sufficient to keep them busy until the first of the year."

Not in many years have British imports of iron ore been at so low a rate as at present. Against a monthly average in 1913 of 620,100 tons, iron ore imports for the first half of 1921 were only 214,028 tons per month, while May and June had

less than 25,000 tons each. During the war the ore imports did not reach the 1913 figures, nor were the latter equaled in 1920. Spain has always contributed by far the greater part of Great Britain's foreign supply of iron ore, the imports from that country in 1920 having been about 70 per cent of the total. Sweden, which formerly stood second on the list, is now quite outranked by Algeria. The slump in ore demand not only means much to the exporting countries, but is an index of the very low ebb of the British iron industry.

Prospects for Building

The cost of building has lagged conspicuously on the road toward a level comparable with pre-war conditions. Railroad freight rates have not even started. Coal has had a great decline, but presents the spectacle of profits being absent while prices are still relatively high. In the three cases the influence of labor unions is seen, and indeed if the unions in these three lines of activity are deducted there is not much left of labor unionism. The three cases are different. Coal mining wages are extremely high, relative to other things, largely through the accident of there being a wage scale signed to April 1 of next year. The railroad wage situation is gradually being worked out. In the building trades there has been some introduction of the open shop principle and there have been some adjustments by agreement with labor unions, slightly reducing wages and improving working conditions.

On the whole, however, the cost of building is conspicuously high when compared with wage rates in general or commodity prices in general. There are a number of reasons, some of them being rather well concealed. In some districts there is too much co-operation between contractors and unions of building trades artisans to produce the competition the public expects when it proposes to pay out money. There has been work in progress that the builders could not afford to delay for the purpose of conducting a contest. Wage rates had gotten so extremely high that compromises presenting the appearance of involving materials concessions left rates very high still.

While forces are at work that will undoubtedly bring about a proper adjustment in time in the cost of building the adjustment seems to lag. The lagging can be understood better by consideration of the attitude or position of those who build or might build. A common tendency is to consider building construction as a simple thing, like bread or coal. Nearly all bread is produced for consumption to sustain human life, while nearly all coal is produced for the single purpose of burning to produce heat. Building construction on the other hand, represents a wide variety of purposes and there is a wide variety in the attitudes of the builders toward the work. This complexity in construction demand accounts for the slowness in the readjustment of building costs, when from a narrow viewpoint it might appear that the readjustment could be forced very quickly by a "strike of buyers."

The character of the occasion for considering a building project ranges all the way from a mere notion to an absolute necessity. A man who lives in his house and owns a vacant lot adjoining may feel in the morning that he would rather like to put up a better house on the lot and live in it, while in the evening he may feel that he does not want to bother. At the other end of the list may be a storekeeper who sees that he is missing trade that would come to him voluntarily if he would merely enlarge his store. Some students have endeavored to classify by calling some building "necessary" and some "optional." The terms are not adequate, of course, but they bring out the antithesis.

This correct conception of the variations in character of demand or desire in connection with building was ignored by those who last year were shouting that the country "needed" a certain number of homes, some putting the number in the hundreds of thousands and others setting it at a million or one and a half millions. The obvious fact is that some men will indulge in building construction no matter what the cost, some will be encouraged to embark by declines in cost of one percentage or another, some, particularly those whose incomes have been greatly reduced, have been reducing what may be called their bids faster than the offers have declined, while others will require extremely favorable conditions before they will even think of building. They must have a real bargain. Building costs will presumably decline from time to time as it becomes necessary to pick up one class after another. The call for building, or what may be called by the generic term of "demand," ranges all the way from absolute necessity down to a mere whim, and the building market will cater to as much of the demand as it needs.

Our Half-Yearly Index

The index of THE IRON AGE for the half year January to June, 1921, inclusive, has been compiled and printed and is now ready for distribution. It will be forwarded promptly to those who have entered their names on our list as desiring it. Others who may have use for copies can obtain them by addressing our Circulation Department.

Brazilian Iron and Steel Production

The production of pig iron in Brazil is about 15,000 tons per year, the Esperanca Works, in Minas Geraes, being the only producer, according to the London *Ironmonger*. There are two electric furnaces in operation in San Paulo, one making steel and the other producing iron castings. The Companhia Electro-Metallurgica Brasileira by the end of the year will have in operation at Ribeirao Preto a steel-rolling mill. The Anglo-Brazilian Iron and Steel Syndicate also intends to erect not far from the city of Rio de Janeiro iron and steel works.

To Guarantee Belting on a Mileage Basis

Selling leather belting on the basis of mileage has been determined on by the Olmstead-Flint Co., Cambridge, Mass. As the company expresses it, it is taking a leaf from the book of the tire manufacturers, and it plans to guarantee the service of two of its brands of leather belting, Pacemaker and Oilskin. The guarantee has been established at 250,000 miles, to be determined from the belt speed and the number of hours of use.

CORRESPONDENCE

Who Made Swords for the Generals of the American Revolution?

To the Editor: Where and by whom were the swords manufactured which the American officers carried during the French and Indian war and during the American Revolution, a period approximately 1750 to 1780?

I have run through the pages of most of our standard histories, searched the libraries in our largest cities, the museums and historical societies, and consulted our own American authority on arms and armor —Bashford Dean of the Metropolitan Museum of Art, New York; Charles Foulks, curator of the armories, Tower of London, England; the State Department and the historical branch of the War Department at Washington; and that great institution founded for the purpose of disseminating knowledge and yearly costing us in upkeep approximately $750,000—the Smithsonian Institution—the U. S. National Museum, Washington, D. C., with its cases and cases of swords, arms and uniforms, could not tell me where or by whom those swords on exhibition, carried by the American officers during the above mentioned period, were made.

I wish this information to designate and locate more particularly the maker of an old sword on whose blunt edge, near the hilt, are stamped into the metal these initials:

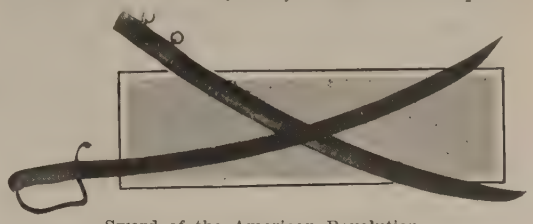
I read these as "J. T. & Co.," or, being old type script, they might be "I. T. & G."

The legend in connection with this sword is that it was carried through the French and Indian war in Vermont and later by the same general through the American Revolution with the Green Mountain boys. I have promised this sword to a historical society in New England, in the little town where the general who carried it lived, and I desire to give at the presentation something of its technology of manufacture. I know that some 24 of General Washington's associate officers were from the furnace and forge, but I am unable to link any of them with actual sword making or to find any of their names which fit to the initials stamped in my blade. The Sterling Iron Works at Chester, N. Y., where the great chain was made, was succeeded by Peter Townsend and later by James Townsend & Co. John Taylor, of Sarum, Pa., the famous nail maker of the colonies, whose nails "rattled" through the halls of Parliament, also had a forge and furnace. Both of these names might fit the initials on my sword, if I could connect them with sword making.

One of the five swords of General Washington was made by J. Bailey, Fishkill, N. Y., where the Continental Army supplies were stored. His name does not fit the initials and I do not associate him with sword making apart from this particular one which undoubtedly was in the beginning a presentation sword. The Ames Sword Co., Chicopee Falls, Mass., reputed the oldest sword maker in the country, could not answer my inquiry and from Victor Clark, editor of the *Living Age*, Boston, an authority on early American industries, I learn that the blister steel made at the Sterling Works probably did not find its way into important weapons of that date, and he is of the opinion that sword blades of that period were of English make.

I enclose a picture of the sword, together with some rough pencil sketches of the four gold etchings on the blade. The steel of this blade is blue annealed and in its day it undoubtedly was a bright and shining weapon. I am of the opinion that you or some one connected with your well known publication, may be familiar with some of the smaller artisans of that period, who may have made swords and whose name might fit the stamped initials on my blade.

The sword of Commodore Oliver H. Perry used in the battle on Lake Erie, 1813, is similar in shape and



Sword of the American Revolution

design and mounting. It was made by Capt. David Dobbins of Erie, Pa., in 1812.

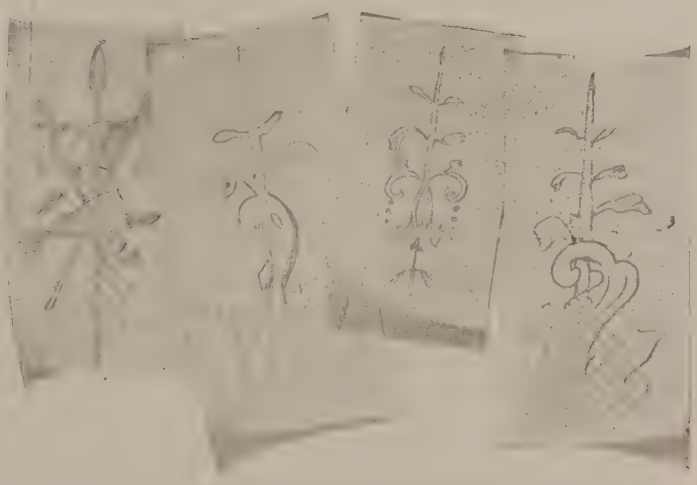
Likewise, the sword of John Brown, found between the mattresses of his cot in prison at Harper's Ferry, was similar in size, shape and etchings, but bears no maker's marks. This sword is now in possession of the Chicago Historical Society, Chicago. None of the present owners of these similar swords knew of other earlier makers of swords.

EDWIN R. BURDICK.

Kalamazoo, Mich., July 20, 1921.

Electric Melting of Cast Iron Scrap

To the Editor: THE IRON AGE of June 23, photographs and particulars are given of tests run at Alliance, Ohio, on a resistance type of furnace in which the heat is generated in troughs lying over the charge, reflected on to the roof and from the roof to the charge. The furnace was used for melting cast iron borings and the article states that this is an application in a new field.



Gold Etchings on the Sword Blade

I should like to state that quite a number of electric furnaces have been operating with success for some time on the melting of cast iron borings. We have had Greaves-Etchells arc resistance type of electric furnaces doing this work for the past four years.

While the tests made at Alliance are not a new application, there is undoubtedly a very large and fertile field for the electric furnace as applied to the melting or refining* of cast iron. The present cupola iron is made almost identically with that from even pre-historic times. The type and design of furnace have been changed little if any in centuries, and the ancients often had a crude device of leather bellows for forcing an air draft through the cupola. The chief trouble with cupola iron has always been that impurities are increased rather than decreased by the process.

A paragraph appeared in THE IRON AGE, Jan. 6, on a 1-ton Greaves-Etchells furnace installed at the

Holmes Foundry Co., Port Huron, Mich. Unfortunately a printer's error occurred in giving the sulphur content in the hot metal from the cupola. This should have been 0.102 per cent, not 0.012 per cent as stated. This hot cupola iron containing 0.102 per cent of sulphur was put into the electric furnace and in 40 minutes the sulphur was reduced to 0.023 per cent. On a cold charge consisting of cylinder scrap and iron borings, which was melted down and poured in 65 min., the sulphur in the final product was reduced to 0.013 per cent. The time and the sulphur reduction compare most favorably with the 6 hr. and 10 min. taken at Alliance with a hot furnace where the sulphur increased from 0.021 per cent in material charged to 0.047 per cent in the finished charge.

In connection with this melting or refining of iron borings, it is very important to take into consideration the design and proper application of electric heat. In the Alliance tests, the furnace used was one in which the heat is generated in a trough containing granular resistance carbon and this trough is suspended over the bath. The heat goes first up to the roof and then is reflected down on to the charge. The figures given would show that 657 kw. hr. of energy were used to bring 1500 lb. of pig iron to a pouring temperature; 317 lb. and 325 lb. of iron borings were added later. Apparently on the kilowatt hours used for melting the 642 lb. of borings in a 1500-lb. bath of metal already molten, figures were calculated based on the energy put into the furnace after the small quantity of borings was added and it was assumed that by increasing the kilowatt hours correspondingly a larger weight of cold borings could have been melted at the same rate. This is by no means correct, as an increase in the weight of cold scrap added to the molten bath would probably have doubled the kilowatt-hour consumption.

The point that I wish to bring out is that the type of furnace which was suitable for the lower temperatures of brass and non-ferrous melting is not at all suitable for the high temperatures required for melting or refining iron. Heat reflected to a furnace roof and from there to the charge cannot be as economical as a direct arc playing on the charge. The temperatures required are too high and at these high temperatures the life of the granular resistance elements and the refractories as used in the furnace at Alliance will suffer severely.

The simplest and the obvious way of melting cast iron borings, and one we have consistently advocated, is a direct application of the arc to the charge either by a 3-ton electrode type of furnace or the Greaves-Etchells type, where two phases of the three-phase supply are attached to the top electrodes and the third phase to the furnace hearth.

One of the most important features in connection with the melting or refining of iron borings is the reduction of sulphur. This increased instead of decreased in the Alliance test. The simple, direct arc type of furnace also occupies considerably less foundry space than the furnace illustrated in your recent article.

FRANK HODSON, President,
Electric Furnace Construction Co.

Philadelphia.

[*It should be stated that the article referred to by Mr. Hodson did not claim any refining efficiency, but was a suggestion regarding melting scrap iron only.—EDITOR.]

"The Man at the Fire" and Others

To the Editor: We were surprised to note in the leading editorial, "Now He Is Bossing Dad," of the July 13 issue of *Chemical and Metallurgical Engineering*, an agitated criticism of our recent advertisement, which appeared on the front cover of THE IRON AGE in the form of the poem, "The Man at the Fire."

We are sorry to have been responsible for any censure your publication may have suffered from our illustrious and esteemed friends of *Chemical and Metallurgical Engineering*, but at the same time we are amused at and pleased with the results of our advertising effort.

We believe if the poem had been carefully studied the editorial criticism would never have been written, because the poem warns against "rule of thumb" methods.

Fortunately our position in the metallurgical field is so sound, viewed from the standpoint of progressiveness in either manufacturing or heat treating methods, that we cannot take seriously the conclusion of the editorial as contained in the four points—a, b, c and d.

We are proud of the fact that one of our officials is a poet as well as an expert maker of fine steel. The criticism has inspired further effort and our opinion of and answer to the editorial can be best expressed as follows:

The Practical Man or the Technical Man—
Which has the right to boast
That he is the one that brings success,
That Industry needs him most?

The driving wheel or the steering wheel,
Ignition or carbureter,
Which is the most essential part?
Which would you call the better?

Airman, gunner or engineer—
Which do you think did more?
General Staff or infantryman—
Who was it "won the war"?

If by a chance you had the power
To fashion yourself again,
Would you omit your arms and legs
And put in an extra brain?

Then let us forget this foolish talk
Of "whom do we most require";
Why—the Technical Man and the Clerical Man
And the Practical "Man at the Fire"!

FIRTH-STERLING STEEL CO.,
Roy H. Davis, General Manager.

Pittsburgh, July 29, 1921.

Census Bureau Will Issue Price Bulletins

WASHINGTON, Aug. 2.—Following the announced greater activity of the Department of Commerce in the economic-statistical field, the Bureau of the Census is preparing to issue at once a monthly compilation of building material prices, along with those on other commodities. The building items will number about 25, upon which it is proposed to secure prices. Among the products to be included are nails, pipe, reinforcing steel bars, structural steel, lumber, cement, etc. Price information is to be obtained from builders' exchanges throughout the country. The figures will represent prices paid on the first of each month by contractors delivered at a local distributing point, such as car, siding, pier, yard, or warehouse.

Farm Implements Manufactured in 1920

Gas tractors stand far above all other items of farm implements in value produced last year. According to a bulletin of the Department of Agriculture, there were 203,207 tractors made by 90 firms, the aggregate value being reported at $193,563,000, or an average of $953 each. Four-fifths of these were sold in the United States; 29,143 were exported and about 11,000 added to stocks. Other articles, under the same heading of farm equipment, which were made in 1920, are shown in the following table:

Manufacture of Farm Equipment in 1920

Implements	No. of Firms	No. Manufactured	Total Value	Average per Unit
Gasoline tractors....	90	203,207	$193,563,000	$953
Steam traction engines	15	1,766	4,661,000	2 639
Plows and listers....	79	1,361,578	43,222,000	32
Tillage implements...	92	.....	22,919,000	...
Planting machinery..	84	472,248	20,097,000	43
Cultivating machinery	61	580,179	15,186,000	26
Haying machinery...	29	411,556	24,703,000	60
Harvesting machinery	53	232,177	41,015,000	177
Machines for preparing crops for market or use.....	128	196,772	35,612,000	181
Horse-drawn vehicles.	85	449,095	42,423,000	94
Other items	..	.....	93,544,000	..
Total	583		$536,945,000	

It will be noted that the total value produced was $536,945,000, of which $471,442,000 represent the value of domestic sales, while sales for export account for $78,614,000.

In a recent interview at Youngstown, Ohio, H. Koppers, maker of by-product coke ovens, expressed the belief that Germany will get back to normal as soon if not sooner than France or England. The fact that Germany is not hampered by upkeep of extensive armament is assisting materially in her industrial rehabilitation, it was stated.

TARIFF BILL PLANS

Decision as to American Valuation May Have Important Effect on Rates

BY L. W. MOFFETT

WASHINGTON, Aug. 2.—Recognizing that determination of its policy on the American valuation basis for assessing duties is the first essential to framing a tariff bill, the Senate Committee on Finance will go into executive session on Thursday of the present week to reach an agreement on the subject. This system of fixing ad valorem rates has been the source of widespread differences which have been presented to the committee since it began its hearings, and the question plainly is one which underlies the entire matter of arriving at duties to be carried. In the event the American valuation as passed by the House is adopted, it is known that there will be a general revision downward of rates throughout the bill. Should the American valuation plan be eliminated, prominent members of the committee, some of whom are not attracted by the plan, contend that the whole bill will have to be worked over as to administrative and other features and that hearings will be more extended than was originally planned. Because of the desire to close the hearings as early as possible and to get the legislation enacted, they apparently are ready to adopt the plan as it passed the House or to accept it in a modified form.

Compromise Plan

A probability of the latter alternative being decided upon is seen in the fact that the Treasury Department has prepared a tentative draft for the committee which is said to follow the lines suggested by George C. Davis, in charge of the comparative value report bureau, customs division, Treasury Department, in New York. He opposed the plan carried in the House bill on the ground that it would be difficult of administration and that it would also be difficult to adjust the rates to meet the new plan. His idea is to have the American producer prove the comparability of his article with that which is imported and in competition with the domestic product. Where the comparability was shown, the imported product would be appraised at the domestic price, but not the gross, and taken out of the domestic price would be the rate of domestic transportation, the bringing of the merchandise to the United States, and a reasonable profit and expense, not to exceed 8 per cent. This is explained as building from the American selling price of the domestic article a fair and constructive foreign market value to be applied to the imported articles that are directly comparable to the American-made article. In instances where the interested party comes to some one, preferably the Secretary of the Treasury, Mr. Davis told the committee, and proves the comparability, the secretary could proclaim the article, and all such articles coming from foreign countries would be appraised on those articles. As to the remainder, where none can be appraised, the duty would be assessed at the foreign market value.

Wide Difference of Opinion

The variance among Government officials regarding the plan was shown by the testimony of Chairman Thomas W. Page of the Tariff Commission, who opposed it, and of two other members of that body, William S. Culbertson and William Burgess, who favored it. Mr. Walker was of the opinion that the plan "will cause confusion in the customs laws, will make foreign business highly speculative and add another element of uncertainty to a business situation already chaotic." He thought, however, that the plan could be administered successfully "ultimately." Mr. Culbertson said that the plan "has become important at the present time because of the very disturbed economic conditions in foreign countries, and I feel, personally, that it will tend to help meet the very unusual conditions which you are confronted with today." Mr. Burgess said that "the advantages of the American valuation plan so far outweigh the difficulties as to make the latter seem insignificant." Domestic interests strongly urged the adoption of the plan, while importing interests are strongly opposed to it.

The plan has found strength in the fact that, aside from the proposal of Mr. Davis, no satisfactory substitute has been offered for it, and it is generally conceded that it would be a difficult problem to fix ad valorem duties on the existing foreign market valuation system with an idea of protection in mind.

The Metal Schedule

The American valuation plan could be applied to the metal schedule without any difficulty, it has been stated by members of the committee, because of "comparability" and "competitive" nature of the products carried in it. Moreover, the plan would not apply to the greater number of the metal products because of the specific duties applying. But the question of determining a policy as to the plan is vital to all schedules because of the effect it will have on rates. It appears to be a foregone conclusion that ad valorem rates in the metal as well as in other schedules will be reduced by the Senate Committee if the American valuation plan incorporated in the House bill is adopted. At least that is plainly the intention of leading Republican members of the committee, and it goes without saying that lowering of rates would be acceptable to the Democratic members. Whether specific rates may be lowered apparently is to be determined.

The committee will continue hearings over to-morrow, after hearing witnesses on the American valuation plan and on the chemical schedule, and after determining its policy at executive session, to be held Thursday, will resume hearings on the schedules. It is not possible to say when the metal schedule will be reached, but the committee is expediting the hearings, and it is assumed the iron and steel producers will be given an opportunity to be heard soon. The committee is accepting briefs and statements, and it is said that a number have been filed by iron and steel interests, with attacks on House duties on ferroalloys as a notable feature.

Hot mills of the N. & G. Taylor Co., Cumberland, Md., which have been idle since June 30, were started up July 25.

The Iron Age and Its Readers

The Composite Price shown week by week following our "Comparison of Prices" table (appearing this week on page 293) is the average of the prices of the seven principal forms of finished steel.

Steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets, the seven products whose prices enter into the composite, constituted 88 per cent of the country's output of finished steel in each of the past two years. They are the forms of finished steel most commonly thought of in gauging consumption or market prices at a given time. In the 10 years preceding the war the average of the weekly quotations on these seven products was 1.684c. per lb. This week the Composite Price is 2.364c. per lb. or 40 per cent above the 10-year pre-war average.

IRON OUTPUT VERY LOW

July Production 7605 Tons Per Day Less Than in June

Down Close to 1903 Record—Net Loss of Seven Furnaces

A new low record for many years was made in July for the output of the blast furnaces of the country. According to the data gathered by telegraph, the pig iron output last month was close to the lowest record made in the last 19 years. In the panic of 1903-04 the country's output in December, 1903, was 846,695 tons, or 27,312 tons per day, while in January, 1904, the corresponding figures were 921,231 tons, or 29,717 tons per day. The July total this year falls between these two figures at 864,555 tons, or 27,889 tons per day. This is a decline of 199,278 tons, or 7605 tons per day from the June figures, or nearly 20 per cent.

The production of coke and anthracite furnaces in July, a 31-day month, amounted to 864,555 gross tons, or 27,889 tons per day, as compared with 1,064,833 tons, or 35,494 tons per day in June, a 30-day month, and with 846,695 tons, or 27,312 tons per day in December, 1903, a 31-day month. In July, 1920, the total output was 3,067,043 tons, or 98,931 tons per day. The total furnaces in blast on Aug. 1 was 69, as compared with 76 on July 1 and with 201 on Jan. 1. The 69 furnaces in blast Aug. 1 had a capacity of 28,175 tons per day, as compared with 32,195 tons per day for the 76 furnaces on July 1. There were 10 furnaces blown out or banked and three blown in in July, making the net loss for the month seven furnaces and for the last 10 months 250 furnaces. Only about one-sixth of the total normally active furnaces of the country were in operation on Aug. 1.

The July output of ferromanganese and spiegeleisen was about 1000 tons larger than that in June, or 5524 tons, as compared with 4536 tons. Of the July total only 1509 tons was ferromanganese. This is the smallest production of this alloy ever recorded.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from July, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
July	71,954	26,983	98,937
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,185	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101,643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94,473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107,592	111,165	109,607	82,607	91,327	39,768
May	73,015	108,422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107,820	110,354	78,340	98,931	27,889
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	.....
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101,244	110,394	106,859	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302,260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2,978,879	1,937,257
Mar.	3,251,352	3,213,091	3,090,243	3,375,907	1,595,522
Apr.	3,334,960	3,288,211	2,478,218	2,739,797	1,193,041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3,043,540	1,064,833
July	3,342,438	3,420,988	2,428,541	3,067,043	864,555
7 mos.	22,412,330	21,423,560	18,462,349	21,206,029	10,292,721
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	.....
Sept.	3,133,954	3,418,270	2,487,965	3,129,323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292,597	.....
Nov.	3,205,794	3,354,074	2,392,350	2,934,908	.....
Dec.	2,882,918	3,433,617	2,633,268	2,703,855	.....
Total, yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.

Pig Iron Production by Districts, Gross Tons

	July (31 days)	June (30 days)	May (31 days)	April (30 days)
New York	34,407	34,241	37,202	41,223
New Jersey	5,554	6,051	10,291	9,875
Lehigh Valley	24,059	29,929	42,289	45,329
Schuylkill Valley	19,210	21,172	24,471	21,279
Lower Susquehanna and Lebanon Valleys	20,401	25,809	26,491	24,799
Pittsburgh district	185,643	243,025	281,391	304,308
Shenango Valley	none	12,077	27,981	30,763
Western Penna.	47,680	63,802	73,661	70,930
Maryland, Virginia and Kentucky	14,201	15,289	20,781	17,575
Wheeling district	16,167	18,207	17,981	1,991
Mahoning Valley	92,305	88,515	87,090	102,826
Central and Northern Ohio	80,150	116,003	133,801	107,747
Southern Ohio	6,266	25,798	29,103	11,843
Illinois and Indiana	201,175	214,834	249,671	239,585
Mich., Minn., Mo., Wis., Colo. and Wash.	50,764	56,857	65,004	68,058
Alabama	66,573	93,224	94,013	94,910
Tennessee	none	none	none	none
Total	864,555	1,064,833	1,221,221	1,193,041

Capacities in Blast Aug. 1

The following table shows the number of furnaces in blast Aug. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast July 1:

Coke and Anthracite Furnaces in Blast

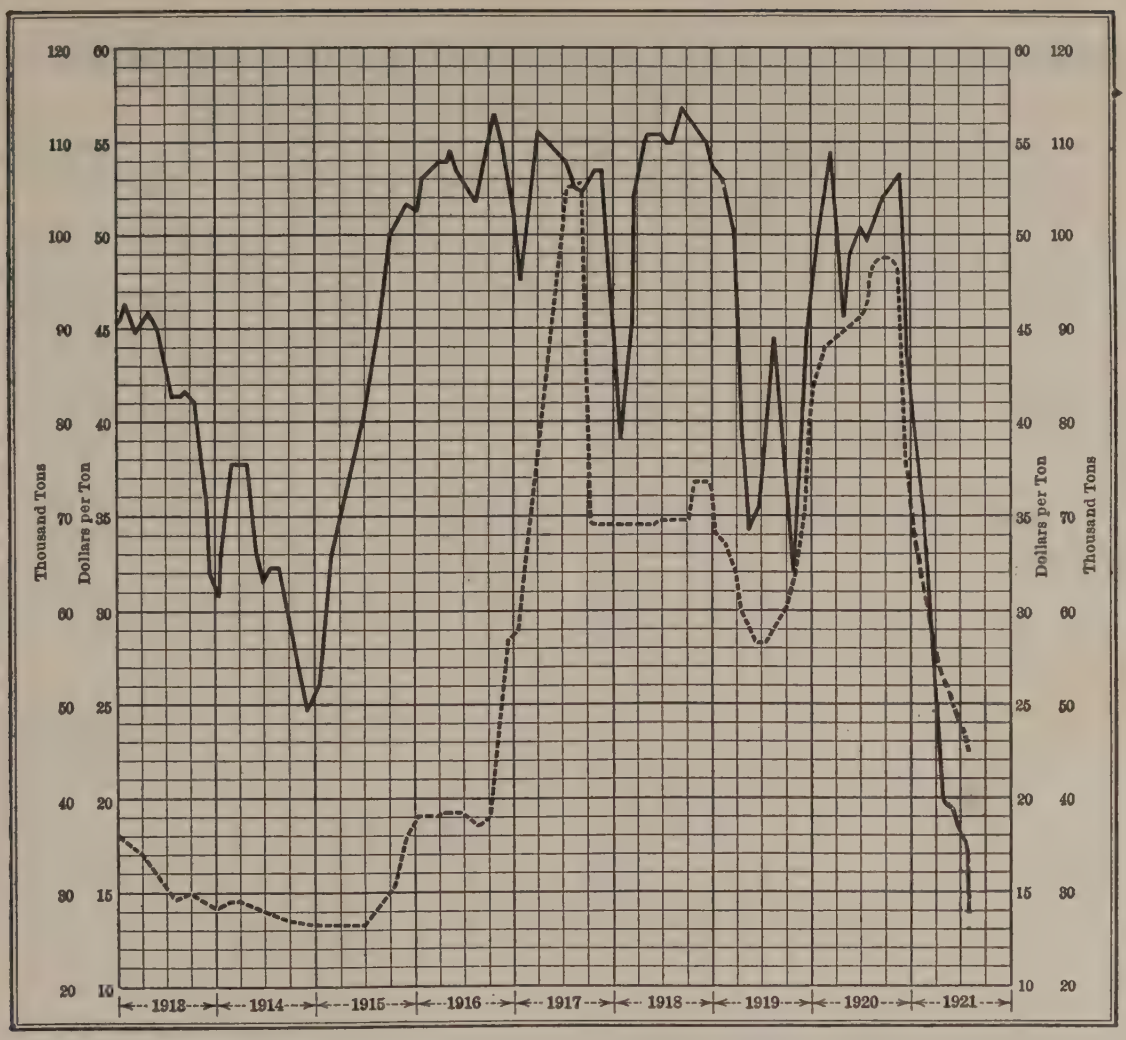
Location of Furnaces	Total Stacks	Aug. 1: In Blast	Aug. 1: Capacity per Day	July 1: In Blast	July 1: Capacity per Day
New York:					
Buffalo	22	3	1,110	3	1,140
Other New York	4	0	....	0	....
New Jersey	4	1	180	1	175
Pennsylvania:					
Lehigh Valley	18	2	775	2	900
Spiegel	2	0	....	0	....
Schuylkill Valley	15	2	620	2	705
Lower Susquehanna	10	1	395	1	380
Lebanon Valley	8	2	260	1	135
Ferro	2	0	....	0	....
Pittsburgh District	55	17	7,000	16	7,550
Ferro and spiegel.	4	1	180	1	110
Shenango Valley	19	0	....	0	....
Western Penn.	26	4	1,540	6	2,100
Maryland	6	1	340	1	335
Wheeling District	15	1	520	1	600
Ohio:					
Mahoning Valley	27	7	3,330	6	3,000
Central and Northern	26	5	2,650	6	3,220
Southern	16	1	100	2	200
Illinois and Indiana	42	12	6,125	13	7,000
Mich., Wis. and Minn.	11	1	510	2	850
Colorado and Missouri	6	2	775	2	740
The South:					
Virginia	16	1	110	2	175
Kentucky	7	0	....	0	....
Alabama	41	5	1,655	8	2,880
Tenn., Ga. and Texas	16	0	....	0	....
Total	418	69	28,175	76	32,195

The following furnaces were blown in during July:

The Robesonia furnace in the Lebanon Valley; one Donora furnace of the American Steel & Wire Co. in the Pittsburgh district, and Mary furnace in the Mahoning Valley.

Among the furnaces blown out or banked during July were the following:

The Perry furnace and the second Josephine furnace in western Pennsylvania; the Alleghany furnace of the Alleghany Ore & Iron Co. in Virginia; the last of the four River



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

furnaces in northern Ohio; the Globe furnace in southern Ohio; the last of the three Calumet furnaces in Illinois; the last of the two Mayville furnaces in Wisconsin and the last Clifton furnace of the Alabama Co., the Alabama City furnace of the Gulf States Steel Co. and one Ensley furnace of the Tennessee Coal, Iron & Railroad Co. in Alabama.

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace at Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430,022	2,232,455	1,932,159	32,787	23 957	22,228
Feb.	2,209,470	2,181,679	1,625,695	28,105	28.038	29,013
Mar.	2,277,507	2,480.668	1,323,443	26,644	35.275	41,294
Apr.	1,838,677	1,968.542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1,024,678	14,604	33,407	9,232
June	1,655,944	2,209,770	883,312	14,254	34,751	4 536
July	1,906 604	2 230,567	715,664	14,805	36,789	5,524
Aug.	2,108,566	2.254,943	.....	17,419	36,985	.....
Sept.	1,828,613	2.247,250	.....	20,631	39.546	.....
Oct.	1,295,690	2,393 644	.....	20,238	34.786	.....
Nov.	1,727,656	2.150,075	.....	19,964	26.944	.....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	.....

Bar Iron Association Agreement with Amalgamated

CHICAGO, Aug. 1.—The Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers came to an agreement on Saturday last on tonnage rates for iron puddling and rolling. The new scale comes within 3 per cent of the pre-war rates. The workers accepted a reduction to the scale of 1919-1920. On the basis of the new agreement, the rate for puddling at the July-August average selling prices of $2.30, under which the men are now working, is $11.38 per gross ton compared with a rate of $12.52 a ton figured on the same selling average. This is a reduction of 9.01 per cent. On bar mill heating, the recent rate was $1.116 per ton based also on the $2.30 average, and the new rate is $1.041 per ton. On ½ and 9/16 in. sizes the rate is reduced from $2.567 to $2.445 and on ¼ in. the reduction is from $5.452 to $4.957. Taking the base rate of $1 under the old scale,the new agreement is 62 per cent above base, whereas the 1919-1920 agreement was 74½ per cent above base.

The National Works of the American Sheet & Tin Plate Co., Monessen, Pa., a plant of 25 hot tin mills, will resume operations Aug. 1, after a shutdown of more than three months.

Against Restrictions on Manganese Imports

Domestic Ores, if Used Exclusively, Would Be Exhausted in Six or Seven Years, and High Grade Native Ores Would Last But Two Years

AN important contribution to the literature of manganese ores and of ferromanganese is made in a pamphlet prepared by the raw materials department of the Midvale Steel & Ordnance Co. and published under the title "Why the Importation of High-Grade Manganese Ores and Ferromanganese Alloys Should Not Be Restricted," and the sub-title, "National Defense Endangered by Any Restriction on Imports of Manganese Ores and Alloys of Manganese." The compiler has brought together the facts as to the consumption of manganese ores and ferromanganese in the United States, the sources of supply and the amount and quality of domestic manganese ores, in support of the argument that the dependence of the American steel industry is very largely on foreign supplies and that therefore the admission of manganese ores and of foreign-made ferromanganese should not be restricted. The line of argument followed in the pamphlet is indicated in the summary quoted below:

Native High Grade Ores Scarce

"For the steel industry, manganese is an absolutely essential raw material for which no substitute is known. As an alloy, it is added to the steel as the final constituent and carries with it some deleterious impurities. To keep these impurities down to a minimum, high grade alloys must be used and such alloys can be made only from high grade manganese ores.

"Such ores occur abundantly in foreign countries but are almost entirely lacking in the United States. Lower grade ores occur in fairly large quantities in this country.

"From these lower grade ores alloys are made which can be and are largely used by manufacturers of steel, but the higher grades, desirable in nearly all cases, are necessary in the fabrication of such important lines as plates, structural steel, open hearth rails, spring steel, locomotive, freight and passenger car wheels, tires, axles and all war materials.

"While inferior alloys made from domestic ores were used as a matter of necessity during the war, this was only done by sacrificing quality of product.

"Domestic reserves of manganese-bearing ores cannot meet all or even a major part of the nation's requirements, although they can to some extent be substituted. If they could be used exclusively the supply would be exhausted in six or seven years, leaving this country with no reserves of this raw material so essential in times of war.

"Domestic ores are as a rule in small deposits, widely scattered, to a considerable extent remote from railroads and at great distances from points of consumption. Rail transportation alone frequently amounts to more than the delivered cost of higher grade foreign ores.

Tariff Cannot Create Ore Deposits

"The proposed tariff on manganese ores and manganese alloys will not protect an American industry from foreign competition. The industry of mining manganese ores does not and cannot exist in this country. A tariff cannot create raw materials. It will force to some extent the use of inferior substitutes produced by expensive methods and transported long distances by rail at excessively high rates. The importation of foreign manganese will continue because requirements can be met in no other way. The net result will be to add to the cost of steel for domestic consumption and put an increased burden on that portion of the industry which seeks a foreign market.

"Only a few exceptionally well located manganese mines in this country can be operated profitably at the prices which will prevail if this tariff [as proposed in the Fordney bill] is imposed, and the benefits from the tariff will extend to but a few individuals. It does not appear to be the part of wisdom to stimulate artificially the depletion of our inadequate reserves in order to benefit a few at the expense of our individual and national welfare.

"Manganese is the only raw material necessary for the production of steel, the reserves of which within our borders are entirely inadequate to meet requirements in times of war. The lack of this material must be considered as one of the very weak points in our system of national defense."

Survey of the Problem

The facts concerning the importance of manganese to the manufacture of steel and foreign and domestic supplies of manganese ores and the domestic manufacture of ferromanganese are presented under the following heads:

1. Uses of Manganese
2. Ores and Alloys of Manganese
3. Alloys in the Manufacture of Steel
4. Sources of Supply
5. Domestic Manganese Ore Production
6. Requirements of the Steel Trade
7. Reserves of Manganese Ore
8. Quality of Foreign and Domestic Ores
9. Location of Domestic Ore Reserves with Reference to Points of Consumption

Two maps of the United States are given. The first indicates, State by State, the reserves of manganese ores of 35 per cent manganese and over; the second shows the distance of the principal domestic manganese ore supplies from the approximate center of the steel producing industry.

Sources of Supply

"Previous to the late war," the pamphlet says, "95 per cent of the manganese consumed in the United States was imported from India, Russia and Brazil. Some of it was imported in the condition of ore and some had been smelted in foreign countries and entered the United States as ferromanganese. Because of the great necessity of conserving shipping space, an effort was made in the late years of the war to substitute wherever possible lower grade domestic ores and alloys, with the result that in 1918 the domestic output supplied 40 per cent of the requirements as compared with 5 per cent in former years. This increase in the use of domestic ore, however, was effected only by submitting to a material sacrifice in the quality of the product. [It should be stated also that the stimulus to such a production of domestic manganese ore was an advance in the price of ferromanganese to ten times the price prevailing just before the war. The peak was $450, while the average of weekly quotations was $327 in 1917 and $277 in 1918.—EDITOR] In 1918 the imports amounted to 491,303 tons of ore and 27,168 tons of ferromanganese, equivalent to a total of 559,223 tons of ore."

Imports and Domestic Production

In the following table the imports of manganese ores and of ferromanganese are shown for 1910 to 1920 inclusive and a comparison is made of imported ores and domestic production:

Year	Imports Ferro-manganese, Gross Tons	Im-ports Ore, Gross Tons	Imports of Ore and Alloy in Terms of Ore Averaging About 50% Mn.	Domestic Product'n 35% Plus Ore	Domestic Product'n 15–35% Ore†
1910...	114,228	242,348	771,266	2,258	61,101*
1911...	80,263	176,852	554,361	2,457	44,437*
1912...	99,137	300,661	548,503	1,664	51,517*
1913...	128,070	346,070	666,245	4,048	59,403*
1914...	82,997	283,294	490,786	2,635	98,265*
1915...	55,263	320,778	458,935	9,613	70,202
1916...	90,928	576 321	803,461	31,474	176,130
1917...	41,969	629,972	734,894	129,405	730,759
1918...	27,168	491,303	559,223	305,869	818,003
1919...	33,022	333,344	415,899	55,322	211,632
1920...	59,000	607,000	754,500	94,000	416,000

In the 11 years 1910-20 about 62,000 tons of spiegeleisen was imported, and this is represented in the figures for ore in the third column of the table.

*Includes ores containing less than 15 per cent manganese.

†Exclusive of ore used for flux.

Requirements of the Steel Trade

The production of steel and the consumption of manganese ores in the making of ferromanganese are set forth as follows:

During the years 1915 to 1919 inclusive the average annual production of steel amounted to 39,823,800 tons. The average consumption of imported manganese in terms of ores was 592,500 tons, domestic ores, over 35 per cent manganese, 106,300 tons—total ferro-grade ores 698,800 tons. Ores from 10 to 35 per cent manganese—spiegel grades—401,300 tons. The ferromanganese consumption amounted to 273,670 tons per year.

The average production of steel for these years, 40,000,000 tons, is probably a reasonable estimate of the future production in this country over a period of ten years. Substitution of low-grade alloys was carried to the limit during these years. The normal consumption of ferro would exceed the above figures with a corresponding decrease in the use of spiegel.

From these calculations, based on records of recent years, it appears that the steel manufacturers in this country will require about 300,000 tons annually of high-grade ferromanganese to maintain a normal rate of manufacture. This is the equivalent of about 750,000 tons of high-grade manganese ore. The experience of the last few years has shown that the lower grade domestic product can, to some extent, be substituted, but the use of high-grade alloys in a very large proportion of cases is absolutely necessary. The above tables of imports and production clearly show how, with the necessity for substitution largely removed, the use of domestic ores has been practically discontinued.

Reserves of Manganese Ores

The pamphlet next considers the reserves of manganese ores, particularly at home:

"(1) Foreign: Russian reserves of high grade ore are estimated by various observers at from 50,000,000 to 100,000,000 tons, Brazil, India and Chile likewise contain large reserves of high grade ore, although definite estimates of tonnage are not available.

"(2) Domestic reserves: During the war the United States Geological Survey working in the interests of the War Industries Board examined nearly all known deposits of manganese and promising localities in the United States.

"A summary of domestic reserves in 1918 from Mineral Resources for 1919 as determined by the United States Geological Survey is given below:

	Gross Tons
Manganese ores containing 35 per cent manganese and average 40 per cent	699,750
Possible additional reserves	1,130,000
Manganiferous ores containing 5–35 per cent Mn, over 20 per cent silica and less than 30 per cent iron	1,323,000
Possible additional reserves	480,000
Manganiferous iron ores containing 5–35 per cent manganese, over 30 per cent iron and less than 20 per cent silica	16,157,800
Additional reserves in prospect	2,150,000
Total all grades	21,940,550

Life of Domestic Supplies

In discussing the domestic supply of manganese ores in their relation to the requirements of steel production in the United States the pamphlet makes this summing up:

"Of the domestic reserves 699,750 tons are suitable for the manufacture of *low grade* ferromanganese with a possible domestic 1,130,000 tons additional. While most of these ores are too high in silica and low in manganese to be of the most desirable quality, they will make a usable grade of ferromanganese. The known and possible reserves *represent about two years' consumption of steel makers in the United States.*

"Of the balance of the reserves estimated, 11,374,000 tons on the Cuyuna Range in Minnesota contain less than 10 per cent manganese and high percentages of phosphorus, making them unfit even for the manufacture of spiegeleisen.

8,719,800 tons contain a possible average of 18 per cent manganese and although much of this is high in silica, can be used for the manufacture of spiegeleisen or silico-spiegel and will produce approximately 3,480,000 tons of these alloys. The manganese content of this spiegel will be less than one-fourth as great as standard ferromanganese, so this is the equivalent of about 800,000 tons of ferromanganese *or two and one-half years' supply.*

"It thus appears that the domestic reserves, both known and possible, which can be used to make the standard alloys or an alloy approaching them in composition, *amount to about four years' supply for the steel trade.*

"The 11,374,000 tons classed as unsuitable for the manufacture of spiegeleisen contain about 1,135,000 tons of manganese. If it be granted that this manganese can be effectively utilized as high manganese pig iron, thus saving an equal amount of additions, and an effective recovery of 75 per cent be assumed, 851,750 tons of manganese are added to the reserves. This would prolong the life of domestic reserves *about two and one-half years.* All the manganese ores and manganiferous iron ores containing over 5 per cent manganese estimated in the United States will meet domestic requirements for but six or seven years."

Brick Manufacturers Reduce Prices

PITTSBURGH, Aug. 1.—Effective July 28, manufacturers of fire clay and silica brick outside of Kentucky and the Chicago district, reduced prices $2 to $3 per 1000. Prices of Kentucky fire clay brick were cut about a week earlier, as were also those for Chicago district silica brick. A few Pennsylvania makers of fire clay brick still are quoting high duty brick up around $45 per 1000, but the general maximum is $40 and this price refers chiefly to small lots. The going prices on large lots of this grade range from $34 to $37. There has been some increase in blast furnace and steel works activities in the past week or two, and this development finds reflection in a large inquiry for brick. Republic Iron & Steel Co. is referred to as a prospective buyer. The reduction in prices may be ascribed to lower producing costs, through a reduction of 10 per cent in wages, common labor going from 30c. to 27c. per hour, and also to a realization that recent quotations could not be obtained. Actually, the cut is merely public affirmation of prices which previously had been named against inquiries. Magnesite brick also are lower, because supplies are large and competition for the small amount of business offered is extremely sharp.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	40.00 to 45.00	35.00 to 38.00
Silica Brick:		
Pennsylvania		33.00 to 37.00
Chicago		38.00 to 42.00
Birmingham		15.00
Magnesite Brick:		
Standard size, per net ton		65.00 to 70.00
Chrome Brick:		
Standard size, per net ton		60.00 to 65.00

In June the United Engineering & Foundry Co., Pittsburgh, shipped 2300 tons of finished products from its Youngstown district plants, as compared with 1900 tons in May. Ninety per cent of the June shipments was on foreign orders, all of which were boxed and crated for ocean shipment. Much of this material was consigned to France and some to Japan. The company has erected one 2000-tons and one 800-ton forging press at the U. S. Navy yard, Mare Island, Cal.

COKE WAGES REDUCED

Frick Company Lowers Rates Ten Per Cent—May Resume Operations

UNIONTOWN, PA., Aug. 1.—A further reduction of 10 per cent in wages, which would affect, under normal operations, 40,000 men, was announced in notices posted at noon July 30 by the H. C. Frick Coke Co., subsidiary of the United States Steel Corporation. The new scale carries Frick wages back approximately to the wage scale of Nov. 10, 1917. The rates of the new scale, compared with those of the independents, follow:

	Frick Scale— Aug. 1, 1921	May 16, 1921	Independent
Pick mining and loading room and rib coal per 100 bu.	$2.38	$2.65	$2.06
Pick mining and loading heading coal per 100 bu.	2.63	2.92	2.27
Pick mining and loading wet heading coal per 100 bu. (Pick miners to drill holes and furnish powder)	2.77	3.08	2.45
Loading shortwall machine coal per 100 bu. (Company to drill holes and furnish powder)	1.50	1.65	1.50
Drawing coke per 100 bu. charged	1.40	1.51	1.30
Drivers, rope riders, cagers, track-layers, blasters, timbermen (shafts and slopes) per day (8 hr.)	5.05	5.55	4.55
Same (drifts) per day (8 hr.)	5.00	5.50	4.50
Assistant track-layers and timbermen per day (8 hr.)	4.35	4.75	3.95
Fire bosses per day	6.30	7.00	5.40
Mine laborers per day (8 hr.)	4.15	4.55	3.75
Leveling per oven (hand)	.20	.22	.19
Outside day labor per day (9 hr.)	3.00	3.30	3.00

Action of the Frick company at this time was unexpected. While observers had expected a further reduction from the May 16 scale, still none believed that the reduction would come before fall. The independent operators, on July 1, put into effect their second reduction of the year, carrying approximately a 20 per cent reduction and which now is still beneath the new scale put into effect by the Frick company to-day.

The action is considered highly significant and as indicative of an early resumption on the part of the Frick company. All coke ovens of the Frick company are idle and coal production is now about 35 per cent normal.

The Pittsburgh Steel Co., which resumed operations at Monessen this week to the extent of giving employment to an additional 2500 men, ordered simultaneously resumption at Alicia No. 1 and Alicia No. 2 mines, near Brownsville, which the company recently acquired. The mines are operating at about 70 per cent normal under reduced wage scales and shipments are being made by river. Three hundred ovens were put into operation by the Bourne-Fuller Co. this week. Reports that this company has landed a part of the Spencer-Wickwire contract lack confirmation.

Promoting Group Enthusiasm

United Effort is the title of the publication started by the United Engineering & Foundry Co., Pittsburgh, for its employees, the first issue of which appeared in July. In an introductory article, President F. C. Biggert, Jr., states that "an organization is successful in proportion to the amount of 'group enthusiasm' which it possesses. The man whose every hammer blow is for the good of the group is among the most valuable assets an organization can have. His is the spirit of all the great things men have accomplished. He is possessed of that high type of self-interest which realizes that what is good for the group is good for him. He is a 'getter-done.' He does not stand out momentarily as does the individualist, but slowly and surely takes his permanent place of importance."

It is to promote this spirit of "group enthusiasm," Mr. Biggert explains, that the company instituted social and business meetings of department heads, a suggestion system, provided group life insurance and publishes the monthly bulletin.

Effective Aug. 1, the American Can Co. of New Castle, Pa., reduced wages of its employees 10 per cent. The company's plant is operating at 80 per cent, which rate it is planned to increase if the present volume of business continues.

MORE MEN EMPLOYED

Large Increase in Forces Working in Detroit Automobile Plants

DETROIT, July 30.—The question as to whether automobile sales are really increasing and whether the outlook in the automotive industry is really brighter is best answered by the labor statistics that cover the automotive plants.

The report of the Employers' Association of Detroit for the two weeks of July 12 and 19 show that a total of 6500 men was added during that period. On July 5 there were 108,798 men employed in the 79 plants of the association, and on July 19 there were 115,397. Normally three-quarters of these men would be in the automotive plants.

The Packard Motor Car Co., during the last week has added 700 men to the payrolls, making a total of 4000 now employed in the plants. This because of additional business on hand and in sight.

Figures compiled by Detroit newspapers for Saturday, July 30, show that automotive production in the city has now reached 87 per cent of normal.

Conditions in Indianapolis

The foundrymen's association of Indianapolis has just made a survey of the labor situation in foundries in that city to counteract rumors which it was reported the molders' union was circulating, to the effect that union foundries in Indianapolis, following their recent wage reduction from 90c. to 75c. per hour, eight hours per day, had entered into a year's agreement with the union. The association in its report states that there are 34 foundries in Indianapolis, one of which has always been a union shop. Of the 33 remaining foundries, eight are union shops, but only two of these have any agreements whatever with the molders' union for any definite period of time, these two being stove foundries. Five are non-union shops, 19 are open shops and one has not started operations. The 24 open and non-union shops do not deal with the union at any time. The six union foundries other than the two stove foundries have no agreement with the union, and since the 15 cent reduction in wages, their molders have been working from day to day without any agreement. The two union stove foundries are bound by an agreement with the Stove Founders' National Defense Association. A third stove foundry is operated on an open shop basis.

May Not Sign Amalgamated Scale

Recent developments indicate that the A. M. Byers Co., Pittsburgh, operating the largest puddling mill plant in the world at Girard, Ohio, may not sign the bar iron agreement with the Amalgamated Association of Iron, Steel and Tin Workers this year. The company was not a party to the conference which was held at Atlantic City in June nor to the conference last week in Chicago. It was announced that the company would await developments and indicate its position following scrutiny of the scale agreed upon. It is stated that some extra concessions may be demanded from the boilers before the scale is signed. In years past the Byers company refused to sign the Amalgamated scale and accepted instead the agreement of the Sons of Vulcan, composed of dissatisfied members of the Amalgamated who broke away from that organization. Subsequently there was a fight against the Sons of Vulcan scale and the company went back to the Amalgamated scale, thereby causing the virtual disintegration of the Sons of Vulcan.

The works of the Nash Motors Co. at Kenosha, Wis., is now operating five and one-half days a week with 3000 employees. Its payroll there never exceeded 5000.

Because since last fall some employees have had wages reduced three times, some twice and others only once, the Spencer Wire Co., Spencer, Mass., Wickwire-Spencer Steel Corporation, has placed the payroll on an average scale, which represents a wage reduction average of about 8 per cent. The plant has been operating on a four-day week schedule, but beginning Monday, last, will operate five days a week.

Jones & Laughlin Production

A reduction in the rate of pay of common labor to 30c. an hour from 37c. will become effective Aug. 1, in the works of the Jones & Laughlin Steel Co. It is understood that adjustments will be made in the pay of all other wage and tonnage employees, effective the same date. The new rate will be approximately the same as already has been established by the other Pittsburgh and Valley independents.

Reductions in Chicago

Following the example of Eastern steel mills, Chicago district steel makers are making further cuts in wages. The Republic Iron & Steel Co. at East Chicago, Ind., and the Interstate Iron & Steel Co., East Chicago, Ind., and Chicago, have reduced common labor to 30c. an hour. The Inland Steel Co. expects to take similar action.

In the Field of Labor

The final draft of a blanket agreement designed to prevent strikes and lockouts in the building industry and to fix wage scales by arbitration is being voted on this month at St. Louis by the unions affiliated with the Building Trades Council and the employing contractors in the Building Industries Association.

Union blacksmiths, helpers and dropforgers employed at the New York, New Haven & Hartford Railroad Co. Readville, Mass., shops have voted to reject working rules submitted by the management and have demanded the retention of the national agreement put into effect under Government control of the carriers.

Molders in Boston and the vicinity, for the second time within a year, have accepted a reduction in wages. The present reduction is from $6.25 per 8-hr. day or 78c. plus per hr. to $6 per day or 75c. pe hr., is effective Aug. 15, and continues until Feb. 15, 1922. The previous wage agreement ran for three months only. The $6 per day rate compares with $7.20 per 8-hr. day or 90c. per hr. during the war, and with $3.50 per 9-hr. day or practically 39c. per hr. prior to the war.

Employees' Suggestions

Following adoption of a plan which would enable employees to make suggestions for their welfare and that of the company, the United Engineering & Foundry Co., Pittsburgh, received from its various plants 145 suggestions, of which 62 were accepted. Prizes as high as $100 were awarded for these ideas. One useful suggestion was to the effect that a cheaper form of letter head be used for inter-department letters. The interest of an employee in the company's efficiency was revealed in a suggestion that tool room service be improved so as to prevent the loss of time due to a line of men waiting at the tool room window. A scheme of insurance was proposed, which, while not adopted, had some influence in urging action by the company on another plan which it had under consideration and has since inaugurated.

The P. & F. Corbin plant, American Hardware Corporation, New Britain, Conn., has established a 44-hr. weekly schedule, as against 32 heretofore.

The Milwaukee works of Nash Motors Co., Kenosha, Wis., manufacturing four-cylinder passenger cars exclusively, which resumed operations July 5 after a recess of a month, has increased its working force to capacity, namely, 1000 men, and is producing 50 cars a day, the limit of existing facilities. Construction of additional units, including a foundry, probably will not be undertaken until next spring. B. W. Twyman is general manager at Milwaukee.

The New York Central Railroad has resumed operations in its Collinwood shops at Cleveland, employing about 500 men, or half the normal force. These shops have been closed five months.

The Timken-Detroit Axle Co., Canton, Ohio, has resumed operations on a 50 per cent schedule.

PLANT OPERATIONS

Increased Operations at Pittsburgh and Wheeling

PITTSBURGH, Aug 1.—Steel plant activities in this and nearby districts are on the increase and while it is probable that plants which have started up in the past week or ten days may be forced to slow down again before steady work is established, it is generally believed that early July saw the low ebb of operations. A number of idle units started up last week after suspensions varying from a few weeks to several months, and this week has brought several additions to the active list. Exhaustion of mill stocks, due to more frequent, if not of really heavy, demands from consumers and distributers, is behind the resumption at some plants, while at others it may be ascribed to an accumulation of orders during the recent period of non-production. It is probable, therefore, that in the immediate future plant activities will be intermittent, for real price stabilization is lacking and consequently, until price declines seem to have run their course, buyers will continue to order supplies only when needed. Such buying is not conducive to the building up of order books or of constant mill and steel works operation.

In the Wheeling district, the Wheeling Steel & Iron Co. to-day started up a portion of its tubular plant at Benwood, W. Va. The schedule for this week follows:

Wheeling Steel & Iron Co.—Top furnace idle; Martins Ferry furnace idle; Belmont furnace and plate mills idle; Benwood steel plant and tube works operating 40 per cent; Yorkville plant idle.

LaBelle Iron Works—Steubenville plant operating 30 per cent; Wheeling plant operating 40 per cent.

Whitaker-Glessner Co.—Martins Ferry plant idle; Beech Bottom plant idle; Portsmouth plant idle.

U. S. Steel Corporation—Carnegie Steel Co. plant, Bellaire, idle; Laughlin plant, American Sheet & Tin Plate Co., Martins Ferry, idle; LaBelle plant, American Sheet & Tin Plate Co., Wheeling, idle; Riverside plant, National Tube Co., Benwood, idle.

On July 27 the Pittsburgh Steel Co. turned on the blast at one of its blast furnaces, which had been idle since July 1, and resumed making steel in six open-hearth furnaces at Monessen, Pa. This represents about 50 per cent of capacity. On June 30, the entire plant shut down. National works of the American Sheet & Tin Plate Co., also at Monessen, Pa., resumed operations today after a suspension of several weeks. Of the 139 blast furnaces in the territory extending from Johnstown to Wheeling, W. Va., to Pittsburgh and Youngstown, 29 now are in blast. These are distributed as follows: Cambria Steel Co., 2; Carnegie Steel Co., 14; Jones & Laughlin Steel Co., 2; Weirton Steel Co., 2; Pittsburgh Steel Co., 1; American Steel & Wire Co., 1; National Tube Co., 2; Weirton Steel Co., 1; Republic Iron & Steel Co., 1; Youngstown Sheet & Tube Co., 2; Brier Hill Steel Co., 1; Sharon Steel Hoop Co., 1; American Manganese Mfg. Co. (merchant), 1.

An interesting feature in connection with the operation of the active blast furnace of the American Steel & Wire Co., which is at Donora, Pa., and recently went into blast, is that the experiment of operating it on three 8-hr. shifts is being tried. This step primarily is for the purpose of providing work for as many men as possible, but it also will give the management a line on the possibilities of this plan.

Railroads Add to Forces

The Union Pacific Railroad has ordered the taking back of 1500 men on the Mountain division between Cheyenne, Wyo., and Ogden, Utah. The Chicago Great Western Railroad has opened the locomotive department of its shops at Oelwein, Iowa, which had been shut down for two months. Several hundred men were re-employed. The officers of the Chicago, Rock Island & Pacific Railroad have voluntarily recommended to the board of directors and the board has approved a 10 per cent reduction in the pay of all executive officers and also such a reduction in the pay of supervisory officers as will meet changed conditions.

Iron and Steel Markets

PRICES IRREGULAR

Further Business at the Low Figures of Last Week

New Low Record in Pig Iron Production—Somewhat Better Operation

The latest transactions in steel products have shown substantially the same low prices that were uncovered in the previous week, with here and there a new decline, sheets and plates apparently being the lines of least resistance. Willingness to name a price that will take the business, where the tonnage is larger than usual, is still the attitude of the leading steel companies, albeit sentiment is better in view of a somewhat larger volume of orders and inquiries and the feeling that improvement in other industries will soon be felt in iron and steel.

Some publicity has been given to what is called a new and lower schedule of prices by the Steel Corporation, particularly on bars, plates, shapes, tin plate and sheets, but the figures given have been the basis of ordinary transactions for more than a fortnight.

The general average of steel mill operations in the Pittsburgh, Youngstown and Wheeling districts is somewhat higher this week, due largely to the starting of departments that have been idle in some cases for several weeks. A maintenance of the new rate of activity is dependent in most cases on the developments of the next few weeks.

The returns of July pig iron production confirm the week-to-week reports last month that iron and steel works operations were declining. In the 31 days of July 864,555 tons of pig iron was made. This was at the rate of 27,889 tons per day, or more than 20 per cent less than the June rate of 35,494 tons per day, the June total being 1,064,833 tons.

Not since December, 1903, nearly 18 years ago, when 846,695 tons was produced, has the country seen so small a pig iron output as last month's.

July showed a net loss of 7 in active furnaces, 69 being in blast Aug. 1, with a capacity of 28,175 tons per day, against 76 on July 1, representing a daily capacity of 32,195 tons. The July output was at a yearly rate of about 10,000,000 tons, or not far from 20 per cent of the country's capacity.

Pittsburgh, Cleveland and Chicago reports agree as to continuing irregularities in nearly all finished products. Some bars have been taken at 1.70c., Pittsburgh. At Chicago 1.60c. to 1.70c., Pittsburgh, on plates has been the usual range, whereas Cleveland reports 1.70c. to 1.75c. Smaller transactions are at $2 to $3 per ton above these levels.

The $5.25 price on tin plate which is referred to in some quarters this week as new, is the formal recognition of recent competition, aided by the new wage scale. Hoops and bands have shown new price cutting, and in all markets irregularities are reported in nuts, bolts and rivets.

The Western Bar Iron Association has reached an agreement with the Amalgamated Association on the wage scale, the workers going back to the 1919 basis, which is about 3 per cent above pre-war rates. The reduction from present labor cost is about 10 per cent.

The orders for repairs to 6500 cars distributed by the New York Central Lines will require about 30,000 tons of steel. Repairs to over 900 cars are planned by the Illinois Central, on about 275 by the Pittsburgh & West Virginia and on 500 to 1000 in addition to the 500 awarded last week by the Buffalo, Rochester & Pittsburgh. Car builders feel that the turn has come in railroad purchases, though the increase in volume of business will be gradual for some time.

While bids on the 105-mile Bombay water pipe line, a $10,500,000 project requiring about 78,000 tons of steel, were opened last week, the award is not yet known. It is known that American bids on lock bar pipe were not the lowest, but that fact does not determine that American pipe and American plates are out of the running.

Pig iron price reductions include $1 on charcoal and 50c. on foundry grades at Chicago, $1 on basic and 50c. on Bessemer and malleable at Pittsburgh and $1 on Southern iron; while in the East very little change has taken place and some improvement in demand is reported. In ferroalloys prices of silveries have been marked down $8 and of Bessemer ferrosilicon $8.50.

A set back to the recent promising improvement in the fabricated steel trade is generally reported but new work totaling 8400 tons has appeared and awards for the past week cover 11,000 tons.

Pittsburgh

PITTSBURGH, Aug. 2.

Interest in the steel trade here centers largely in the placing of about 7000 tons of plates, shapes and bars recently inquired for by the Mt. Vernon Bridge Co., Mt. Vernon, Ohio. This is the largest piece of business that has been before manufacturers and its allocation is the subject of much speculation in view of the fact that the Ohio State University stadium, which will take more than half of the total tonnage, was placed at a price which would indicate a plain material base of around 1.60c. It is said the Mt. Vernon company did not have protection at a price anywhere near that low. While the general average of steel plant and mill operations is somewhat higher this week than it has been, and the more cheerful sentiment of the past few weeks continues, actual business has not grown appreciably and the improvement in the undertone seems to have been generated largely by the lowering of the Federal Reserve Bank discount rate, the improvement in the condition of the banks of the country, the attitude of the Administration toward tax reductions, the disarmament proposal and other developments that are in the making and outside, rather than within, the industry itself. The fact that two or three large automobile interests which a short time ago were on the ragged edge in a financial way have in the recent past been refinanced also has helped sentiment. As a rule, increases which have come in plant activities are due to accumulations of orders or to the

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 2, 1921	July 26, 1921	July 5, 1921	Aug. 3, 1920
No. 2X, Philadelphia‡	$21.35	$21.35	$25.50	$49.15
No. 2, Valley furnace†	19.50	19.50	21.00	46.00
No. 2 Southern, Cin'ti†	*23.50*	24.50	25.50	45.60
No. 2, Birmingham, Ala.†	*19.00*	20.00	21.00	42.00
No. 2, foundry, Chicago*	18.50	18.50	20.00	46.00
Basic, del'd, eastern Pa.	21.25	21.25	23.50	44.40
Basic, Valley furnace	*18.00*	19.00	20.00	46.50
Bessemer, Pittsburgh	*21.96*	22.46	23.46	48.40
Malleable, Chicago*	18.50	18.50	20.00	46.50
Malleable, Valley	*20.00*	20.50	21.50	46.00
Gray forge, Pittsburgh	21.46	21.46	21.96	44.40
L. S. charcoal, Chicago	*35.00*	36.00	37.50	57.50
Ferromanganese, del'd	70.00	70.00	70.00	225.00
Rails, Billets, Etc. Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	30.00	30.00	33.00	65.00
O.-h. billets, Pittsburgh	30.00	30.00	33.00	65.00
O.-h. sheet bars, P'gh	32.00	32.00	35.00	70.00
Forging billets, base, P'gh.	35.00	35.00	38.00	85.00
O.-h. billets, Phila.	35.74	35.74	38.74	69.10
Wire rods, Pittsburgh	42.00	42.00	45.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	*1.85*	1.90	2.00	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.10	2.10	2.25	4.75
Iron bars, Chicago	*1.75*	1.85	2.10	3.75
Steel bars, Pittsburgh	1.75	1.75	1.90	3.25
Steel bars, New York	2.13	2.13	2.28	4.02
Tank plates, Pittsburgh	1.80	1.80	1.90	3.25
Tank plates, New York	2.18	2.18	2.28	3.52
Beams, etc., Pittsburgh	1.85	1.85	2.00	3.10
Beams, etc., New York	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh	*2.40*	2.50	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire,	Aug. 2, 1921	July 26, 1921	July 5, 1921	Aug. 3, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.50	7.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.50	9.00
Sheets, blue an'l'd, 9 & 10.	2.40	2.40	2.65	6.00
Wire nails, Pittsburgh	2.75	2.75	3.00	4.25
Plain wire, P'gh	2.50	2.50	2.75	3.50
Barbed wire, galv., P'gh.	3.40	3.40	3.65	4.45
Tin plate, 100-lb. box, P'gh.	*$5.25*	$5.50	$5.75	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$12.50	$12.50	$13.25	$37.50
Carwheels, Philadelphia	16.00	16.00	18.00	40.00
Heavy steel scrap, P'gh.	12.00	12.00	12.00	27.00
Heavy steel scrap, Phila.	11.00	11.00	11.00	23.00
Heavy steel scrap, Ch'go.	10.00	10.00	10.00	24.50
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	16.00	38.00
No. 1 cast, Chi'go (net ton)	11.50	11.50	12.50	36.00
No. 1 RR. wrot, Phila.	**14.00**	13.50	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	9.25	9.25	9.50	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$3.00	$18.00
Foundry coke, prompt	*3.75*	4.00	4.25	19.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	*12.00*	12.50	12.75	19.00
Electrolytic copper, N. Y.	*11.75*	12.25	12.62½	19.00
Zinc, St. Louis	*4.20*	4.25	4.35	7.70
Zinc, New York	*4.70*	4.75	4.85	8.05
Lead, St. Louis	*4.20*	4.35	4.25	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	**26.50**	26.00	29.87½	48.50
Antimony (Asiatic), N. Y.	*4.60*	4.65	4.75	7.25

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 2, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

July 26, 1921,	2.364c.
July 5, 1921,	2.557c.
Aug. 3, 1920,	3.939c.
10-year pre-war average,	1.684c.

building up of mill stocks, which have been depleted by recent demands.

Possibly there is a little more adherence to the quotations recently established than there was to the previous schedules. It is too soon, however, to venture the suggestion that an open market has disappeared. A good many manufacturers are complaining of the losses entailed on to-day's prices, but others seem to have thrown their cost books into the discard and in a market such as the present one the prices are established by the lowest seller. Tin plate has settled since last reports another $5 per ton to $5.25 per base box, while the price of hoops and bands is not more than 2.40c., Pittsburgh, a drop of $2 per ton from the recent base. The latter change points to a further revision downward of hot-rolled strips. The market is very unsettled in nuts, bolts and rivets and prices of track fastenings are steadily working downward.

The pig iron market has fallen to $18 on basic grade at Valley furnaces, but even this price would have to be shaded on Pittsburgh district business to compete with furnaces having a more favorable freight rate.

An interesting development in the coke market is the fact that the fuel for the furnace of the Sharon Steel Hoop Co., which went into blast last Saturday, will be provided from by-product instead of beehive ovens. The by-product coke in this instance was obtained at least 25c. a ton below the prices quoted on beehive oven fuel.

Pig Iron.—The price of Valley basic pig iron has dropped $1 a ton since last report, on a sale of 2000 tons, which moved at $18, furnace. Even at this figure, Valley furnaces have not much chance of getting business within the Pittsburgh district for the reason that iron of this grade is available at a lower delivery figure from furnaces which have a lower freight rate. No business recently has been done in Bessemer iron, but it is being offered at $20 from Valley furnaces, and we revise our quotations accordingly. Business in foundry iron is entirely of small lots on which prices varying anywhere from $19.50 to $20 furnace for No. 2 grade are claimed to have been paid. The W. P. Snyder & Co. averages for July show that sales of basic grade from Valley furnaces moved at an average price of $18.802, against $20.70 in June, and Bessemer at $20.875, against $23 in the previous month.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00
Bessemer	20.00
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleable	20.00

Ferroalloys.—Price tendencies still are down. Against a recent inquiry for a moderate tonnage of ferromanganese a quotation of $69 delivered, was made on 76 to 80 per cent domestic material and one maker was willing to provide 80 per cent alloy at an advance of only $1 per ton over that price. The general asking price of domestic producers is $75 delivered, but $70 measures to-day's maximum price possibility, on sales. Current quotations of $67.50 to $70 seaboard on English ferromanganese are nominal as far as business in this district is concerned. It is believed that substantial concessions would be made against an inquiry calling for future shipment and involving a fair sized tonnage. English makers are not pressing for business, evidently waiting to see what is done with regard to the American tariff. The protest against the supposed duties by American steel manufacturers is so strong that the belief prevails here that manganese ore will be put back on the free list and a moderate tariff allowed on ferromanganese. Spiegeleisen is quoted at $25 to $30 furnace.

for average 20 per cent material, with no business doing in this district. One large consumer of this alloy is said to be considering changing over to ferromanganese on the ground that the latter is the cheaper material. The most recent business in 50 per cent ferrosilicon was a carload at $64 delivered. A Valley steel maker is asking prices on a carload but figures on buying it at around $60 delivered. Bessemer ferrosilicon has been reduced $8.50 and silvery has been reduced $8.

We quote 76 to 80 per cent ferromanganese at $70 delivered on domestic; English, 76 to 80 per cent, $67.50 to $70, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $25 to $30 (nominal) furnace; 50 per cent ferrosilicon, $64 to $65 furnace, freight allowed, for domestic and foreign material. Bessemer ferrosilicon is quoted f.o.b. Jackson County and New Straitsville, Ohio, furnaces as follows: 9 per cent, $33; 10 per cent, $36.50; 11 per cent, $41; 12 per cent, $43.10. Silvery iron, 6 per cent, $24; 7 per cent, $25.50; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $32; 11 per cent, $35.30; 12 per cent, $38.60. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—The recent cut of $3 per ton in prices does not seem to have materially stimulated the demand, which also as yet has failed to reflect the increased sheet and bar mill operations. The explanation probably is to be found in the fact that finishing mills generally still have rather large stocks of high-cost steel which they are anxious to work off.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The general quotation is $42 Pittsburgh on common soft rods of the base gage, but makers here frankly admit that only small tonnages can be moved at that price and it is also stated that a substantial tonnage would bring out a lower price. Prices are given on page 305.

Plates.—Practically all of the inquiries developing in this market are for small tonnages for early delivery and only occasionally does an individual sale reach as much as 500 tons. Against such inquiries the recently established price of 1.85c. is fairly well observed.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Structural Material.—Only small jobs lately have been coming to fabricating shops in this district and the number of such awards have been few. The Memphis Steel Construction Co. recently took 650 tons for a new hotel at Greensburg, Pa., and McClintic-Marshall Co. reports 100 tons for three-deck plate girder stands for Stephen Sanford & Sons, Amsterdam, N. Y. The common complaint of fabricators is that only by sacrificing all profit and even going into their own pockets is it possible to secure an order these days. Competition for orders in plain material is pretty sharp and the public quotation of 1.85c. is said to refer only to small tonnages. Prices are given on page 305.

Iron and Steel Bars.—There has been no decided improvement in the demand for soft steel bars, but small lot orders are slightly more numerous than they were recently and some makers have accumulated enough of such orders to put on some idle capacity. There is not much disposition by makers here to shade 1.75c., Pittsburgh. Reinforcing bars rolled from new billets also are held at 1.75c., but are encountering considerable competition from such bars rolled from old rails. The latter nominally are quoted at 1.75c., but this price is understood to have been shaded $2 to $3 per ton. Refined iron bars are quoted at 2.40c., base, but this is purely against small lots, and it is admitted that a sizable inquiry would develop a price as low as 2.25c.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. to 2.40c., in carloads, f.o.b. mill, Pittsburgh.

Steel Rails.—Railroads tributary to Pittsburgh are not specifying at all freely against their orders for standard rails placed early in the year. Business in light rails also is pretty limited. The Delaware, Lackawanna & Western Railroad recently inquired for 2000 tons of light rails in connection with its coal mine operations, and is understood to have had a quotation of 1.85c. Pittsburgh on rails rolled from new billets, and of $40 per gross ton delivered Scranton, on rerolled rails.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c. to 1.90c.; rolled from old rails, 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Nuts, Bolts and Rivets.—There is no improvement in business and prices are unsettled and weak. It is reported that makers outside this district recently have taken business in large machine bolts at 65, 10 and 10 off list. This is below the ideas of makers here, but rather than lose regular customers, some are meeting this price. Rivets have had a further drop of about $3 per ton, being quotable at $2.50 for large structural rivets and $2.60 for large boiler rivets. Small rivets are quoted at 70 and 5 off list. Makers here are inclined to doubt that large structural rivets have sold as low as $2.40, although there have been fairly authentic reports of that character. Track bolts are down to 3.80c. base for carloads of one size, with an extra charge of 1c. per lb. for less than carloads of one size. Prices and discounts are given on page 305.

Spikes.—The market shows very little activity in spikes or other track fastenings in this district. Such inquiries as are coming out for spikes produce intense competition, and the result is that prices are very much in buyers' favor. Some makers still are asking $3 base on all except bolt and barge spikes but with a number of makers willing to take orders at $2.75 base, the higher merely is a quotation. Tie plates are quotable at $2 to $2.05, such prices having been named against recent inquiries. Prices are given on page 305.

Cold-Finished Steel Bars.—Prices are not very well defined. The "official" quotation of most manufacturers is 2.60c. base, but at least one maker has taken business at 2.50c. and it is stated that on some purchases recently made by a large automobile manufacturer a price of 2.40c. was done. Conversion charges vary with the different manufacturers; hence the difference in price ideas. Business still is of moderate proportions.

Hot-Rolled and Cold-Rolled Strips.—The decline in the past week in the hoop and band base to 2.40c., Pittsburgh, is expected to bring a revision in prices of hot-rolled strips to the same quotation. Hoops, bands and hot-rolled strips, in recent efforts to stabilize prices, all have been quoted at the same figure. Some makers of hot-rolled strips still are quoting 2.50c. to 2.60c., according to the specifications, but these prices may be said to be passing as a basis of sales. Cold-rolled strips range from 4c. to 4.25c. base. Business still is spasmodic, running well one day only to fall away the next.

Hoops and Bands.—The price has settled since last reports to 2.40c. base, Pittsburgh, but this seems to be more of a quotation than a selling price, as mills which ordinarily make no effort to secure cooperage or band business now are competing actively with those which always have catered to this trade. Reports are current that some business recently was done at 2.30c. base.

Cotton Ties.—The August price is 1.36c. per bundle of 45 lb., this being the July price plus 1c. a bundle per month, the carrying charge. Demand still is light and although rollings were much curtailed, they promise to be quite ample for this year's requirements.

Iron and Steel Pipe.—There is gradual improvement in the demand upon the mills from jobbers of merchant pipe, but trading between jobbers has not entirely ceased and the orders going to the mills do not yet reach a volume that is at all satisfactory. It is evident that a good many of the current orders are being supplied from mill stocks, as plant operations do not exceed 30 per cent of capacity. Oil country goods still are very slow of sale. There is general adherence to the July 7 price card, except possibly in the case of line pipe, in which manufacturers who want business are obliged to compete with the oil companies having a surplus supply which they are anxious to dispose of. Discounts are given on page 305.

Boiler Tubes.—A slightly better demand is noted for lap welded steel tubes, but there still is considerable

room for improvement, which is not expected to develop until the railroads are better off financially. Seamless tubes are finding such a limited demand that makers still are withholding quotations. Discounts are given on page 305.

Steel Skelp.—Plates and skelp having been placed on the same basis on previous price revisions and owing to the fact that 1.85c. now is maximum on plates, efforts to get more for skelp are proving futile. There is a little better market in both pipe and tubes, but the increase as yet has not been sufficient to create much demand for skelp.

Wire Products.—Rather more business is being done than was the case recently, but all makers are not sharing alike in the improvement. Some companies still report business as extremely slack. Manufacturers willing to guarantee buyers against a decline in prices seem to be faring best in the matter of orders, but it cannot be said that there is any pronounced breaking away from the hand to mouth buying policy on the part of jobbers, and because a bushel of grain will buy considerably less wire and fence than a year ago, demand from the agricultural districts is pretty slim. Public quotations on nails and wire are unchanged at $2.75 per keg and $2.50 per 100-lb., respectively, but reports of shading on nails are still frequent.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Sheets.—The market appears to have settled to 3c. base, for black, 4c. base, for galvanized, and 2.40c. base for blue annealed. These are the quotations of the leading independent manufacturers and while the American Sheet & Tin Plate Co. has quotations about $5 per ton higher, it is no secret that it is meeting the independent prices on desirable business, or where there is danger of its losing any of its regular customers. Demand for sheets is slowly but steadily expanding and this is finding reflection in a gradual increase in mill operations. The American Sheet & Tin Plate Co. is running about 40 per cent of its sheet mills and independent operations, as a whole, are about the same ratio to capacity. One large Valley sheet maker last week announced a re-establishment of the stabilized bases of 3.50c., 4.50c. and 2.65c. respectively for black, galvanized and blue annealed sheets and another has announced that its minimum prices were 3.25c., 4.25c. and 2.50c. on the three kinds. At the same time, $5 per ton below the latter prices is being freely quoted and in the Chicago district a price as low as 2.25c. has been quoted on blue annealed sheets by the leading independent of that district. Because there are such wide variations in prices of the different manufacturers, buyers lack confidence and consequently are not inclined to order very far ahead, although a number of them are known to be running pretty low in supplies. Prices are given on page 305.

Tin Plate.—The market still is a limited affair with the demand coming chiefly from manufacturers of condensed milk and tobacco and dry food containers. Even the demand from these sources is below normal and the important outlet for tin plate in perishable food containers and oil cans could increase 100 per cent and still be unsatisfactory. The packers and the oil companies still are carrying heavy stocks of tin plate and are withholding specifications until they have begun to make some inroads on them. Recent quotations of $5.50 or more, on production tin plate have disappeared and $5.25 now measures the top of the market. On stock items as low as $4.75 per base box now is possible.

Coke and Coal.—The Sharon Steel Hoop Co., which blew in its furnace at Lowellville, Ohio, last Saturday, will use by-product coke, presumably from one of the three steel company plants in the Youngstown district. The contract runs for the remainder of the year and is understood to have been placed at about $2.50, Connellsville base. Otherwise, the situation shows little change. On spot furnace coke the general asking price of bee-hive oven operators is $3, but there is so little demand that notwithstanding a very limited production, this price is being shaded anywhere from 10c. to 25c. per ton. Larger operators are declining to take business at $2.75, on the ground that this means only $1.70 per ton for coal and that they are able to sell the coal as high as $2 per ton. Foundry coke is quotable from $3.75 to $4 per net ton, oven, generally, but some operators are not inclined to go below $4.25 to consumers. There is a fair demand for foundry coke, but it is entirely in small lots. The coal market still is inactive and not especially firm, except possibly on slack grade. Owing to the fact that little coal is moving to the lakes, not much is being screened and slack consequently has become pretty scarce. This grade readily is salable at $1.75 to $1.90. Mine run grade of steam coal ranges from $1.50 to $2.15, the latter for coal from union fields while by-product grade is quotable from $1.50 for "distress" tonnages to $2 for fresh production. Gas coal coming chiefly from the union districts is quotable from $2.25 to $2.50.

Old Material.—Prices show no material change from those of the past few weeks, but the undertone of the market is a little stronger, due to the fact that slightly heavier steel works operations are reflected in more willingness on the part of the several companies to take in contract tonnages and there is some new buying by some companies which have stocks of desirable material bought at reasonable prices which they do not want to melt. Bids were opened yesterday by the Pittsburgh & Lake Erie Railroad on 25 carloads, or approximately 1000 tons, of old material, and the Pennsylvania Railroad, Eastern Region, August list closed yesterday. In the latter about 22,000 tons of material was offered.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.00 to $12.50
No. 1 cast cupola size	15.50 to 16.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	13.50 to 14.00
Compressed sheet steel	9.00 to 9.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.25
Railroad knuckles and couplers	12.50 to 13.00
Railroad coil and leaf springs	12.50 to 13.00
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	15.50 to 16.00
Railroad malleable	11.50 to 12.00
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	13.50 to 14.00
Cast iron wheels	13.00 to 13.50
Rolled steel wheels	12.50 to 13.00
Machine shop turnings	7.00 to 7.50
Sheet bar crop ends at origin	11.50 to 12.00
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Opposition to Secretary Mellon's Suggestions

WASHINGTON, Aug. 2.—Opposition common to all tax proposals has developed in Congress as the result of the suggestions of Secretary Mellon for revision of the internal revenue laws, and while they may not be accepted in full, it is believed they indicate the trend legislation will take. In addition to protests coming from the country against the proposed flat tax of $10 on automobiles, there is considerable protest by business interests against the suggested increase of 50 per cent on first-class postage and the 2c. tax on bank checks. The suggestion for elimination of excess profits tax and $2,000 exemption on corporation income with increase from 10 to 15 per cent on corporation taxes had been anticipated and the former approved warmly by business interests. The House Committee on Ways and Means, which received the suggestions, is now engaged in framing rates and Chairman Fordney hopes to report the bill in two or three weeks.

The annual convention of the Ohio State Association of Electrical Contractors and Dealers was held July 27-28 at Toledo.

Chicago

CHICAGO, Aug. 2.

The past week has brought out further low prices on nearly all steel products. The so-called "official" prices of 1.85c. on plates and shapes and 1.75c. on bars, announced a little more than a week ago, have not held. Prices are erratic and there is no telling to-day what to-morrow's prices may be, gaged by the manner in which competition has been waged during the past week. Steel bars have sold as low as 1.65c., Pittsburgh, shapes at 1.70c., Pittsburgh, and plates at 1.60c. to 1.65c., Pittsburgh. Sheets are now freely offered at 2.25c. base for blue annealed, 3c. base for black and 4c. base for galvanized, all f.o.b. Pittsburgh. Bar iron is $2 lower at 1.75c., Chicago mill, and this price appears to-day to be the top rather than the bottom of the market. Further low prices have been made on bolts, nuts and rivets. Railroad spikes and track bolts are $3 per ton lower and tie plates are freely quoted at 2.25c., Chicago, with interest centered in bids this week on 400,000 wanted by the Chicago, Burlington & Quincy Railroad, which may bring out even lower figures. Warehouse prices have been reduced $3 a ton in line with recent adjustment of mill prices. Extremely low prices have been made in public bids on cast iron pipe, one company quoting $41.95, delivered, Detroit, on 1500 tons for that city, while the low bid on 275 tons of 16-in. pipe for Milwaukee was $44.35. A little business has been done in semi-finished steel at the recent reduction of $3 per ton.

While the Pittsburgh base is usually quoted on inquiries, buyers with a fair amount of tonnage to place have little difficulty in getting Chicago mill prices that compare very favorably with Pittsburgh prices, leaving the freight rate out of consideration. There are many wild rumors of extremely low prices which are difficult to confirm, such, for example, as 1.70c., Chicago, on steel bars. At any rate, there is no apparent bottom to the steel market at the moment, some of the mills having abandoned all effort to get even cost out of their products in the scramble to find a level at which buyers will take hold more aggressively.

The Western Bar Iron Association has come to an agreement on wage rates with the Amalgamated Association of Iron, Steel and Tin Workers, as reported in another column, the workers going back to the 1919-1920 basis, which is about 3 per cent higher than the pre-war rates. The new rates become effective immediately and will reduce costs roughly about 10 per cent.

Railroad Equipment.—Despite the great number of bad order freight cars, inquiries for car repair work are coming very slowly from the railroads. The past week has brought nothing of importance either in inquiries or orders. Those in close touch with the car situation admit the possibility of a car shortage this fall unless something is quickly done to put a large part of the useless railroad equipment in serviceable condition.

Pig Iron.—Lower quotations on nearly all grades of pig iron are appearing in the local market. Foundry iron, silicon, 1.75 to 2.25, has been sold to several consumers within the past week at $18 furnace, a reduction of 50c. per ton, with No. 1 foundry, 2.25 to 2.75 silicon, at $18.50. A new price of $30, Valley furnace, has been quoted on standard low phosphorus iron, making the delivered price $35.32, Chicago. Jackson County makers of silvery iron have announced an $8 per ton reduction. [The new prices, effective Aug. 1, will be found in our Pittsburgh market report.] Lake Superior charcoal iron is now available at $34 and $35, delivered, Chicago, the higher price being named by the principal makers. There is a slight improvement in foundry iron buying and inquiries are more numerous, indicating that more melters are reaching the bottom of their stock piles. Inquiries range from carload lots to 200 or 300 tons. Consumers, though realizing that pig iron prices are now extremely low, are not interested in speculative buying. Some have stated that they would rather pay a dollar or two more for iron next month or the month after than to buy more iron now than they actually need for week to week requirements.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$34.00 to $35.00
Northern coke, No. 1, sil. 2.25 to 2.75	18.50 to 19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.00 to 19.00
Northern high phos	18.50 to 19.00
Southern foundry, sil. 1.75 to 2.25	26.67
Malleable, not over 2.25 sil	18.50 to 19.00
Basic	18.50 to 19.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	30.00
Silvery, sil. 8 per cent	32.82

Ferroalloys.—A car wheel company which recently inquired for 300 tons of ferromanganese has not yet bought. Business is not sufficient to test the market, which remains nominally on the basis of $75, delivered east of the Mississippi River. A recent authorization by an Eastern maker to quote $72.50, delivered, has been withdrawn, due, it is said, to the expectation that the new tariff, if adopted, may place the market on a firmer basis. Spiegeleisen is not in demand, but is obtainable at $25, Eastern furnace, with a freight rate of $10.07 to Chicago. A price of $71, delivered, for a carload of 50 per cent ferrosilicon, reported last week, stands as the lowest reported figure on this alloy.

We quote 78 to 82 per cent ferromanganese, $75 delivered; 50 per cent ferrosilicon, $71 delivered; spiegeleisen, 18 to 22 per cent, $35.07 delivered.

Plates.—The so-called "official" price of 1.85c., Pittsburgh, on plates is too high to-day to take anything but the very smallest orders. On fairly large lots, which to-day mean anything from a carload upward, prices have ranged from 1.60c. to 1.70c., Pittsburgh. There appears to be as much uncertainty about prices among sellers as among buyers. At the moment there is no bottom, and just how far the mills will be willing to go to find a level at which a greater number of buyers will become interested is a matter for conjecture. The price situation changes almost from day to day. It seems certain that any fairly good-sized tonnage could be bought at 1.80c. to 1.85c., Chicago, prices which have been previously made. Although quotations are being put out on a Pittsburgh basis, the actual competition for business generally results in a price at Chicago mill. The astute buyer can usually place an order on a Chicago base. This situation applies to all finished steel. Jobbers have reduced plates out of stock $3 a ton.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Some of the business in plain material in the past week has been taken at 1.70c., Pittsburgh, and this price appears to be easy of duplication on any fairly good tonnage. The price quoted on small lots is 1.85c., Pittsburgh. A high school building at Omaha, Neb., requiring 1500 to 2000 tons of shapes, will probably be let within the next week, and on a job of this size it is expected some low prices will come out. Among the lettings of the past week are the following:

Viaduct at Racine, Wis., 170 tons, to Worden-Allen Co.

City of Des Moines, Iowa, water works extension, 110 tons, to unnamed fabricator.

East St. Louis, Columbia & Waterloo Railway, 121 tons, plate girder spans, to American Bridge Co.

Zion Co-operative Mercantile Institution, Salt Lake City, Utah, 189 tons, to American Bridge Co.

Orpheum Theater and Office Building, Wichita, Kan., 136 tons, to Christopher & Simpson.

Atlas Life Insurance Co. Building, Tulsa, Okla., 655 tons, to Kansas City Structural Steel Co.

The mill quotation is 1.70c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts, Nuts and Rivets.—There has been some fairly good buying of cold-punched nuts by the automobile industry. The Ford Motor Co. last week bought several million nuts and is in the market for a considerable quantity of bolts, there being 750,000 of one size in the inquiry. Some railroad orders are also coming out. All business is being taken at the expense of prices which are low and irregular. In large machine

bolts, some makers have quoted discounts of 70, 10 and 5 per cent off list; on hot-pressed nuts from 5c. to 7c. per lb. off list. Cold-punched nuts are quoted by a leading maker at 4.65c. per lb. off list for tapped and 5c. per lb. off list for blank. Small rivets, 7/16 in. and smaller, are being quoted at 70 and 10 per cent off list by some manufacturers, while going prices for structural and boiler rivets are 2.40c. and 2.50c. per lb., respectively.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ¾ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ¾ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Steel bars have been shaded at least $2 a ton, sales having been made within the past week at 1.65c., Pittsburgh. The top price to-day for bar iron is 1.75c., Chicago mill, and on a fairly good order this price doubtless could be shaded. Jobbers have reduced their prices $3 a ton.

Mill prices are: Mild steel bars, 1.65c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.80c. to 1.90c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—Sheet mill are now definitely on the lower price basis mentioned in this report last week, namely, 2.25c. for No. 10 blue annealed, 3c. for No. 28 black and 4c. for No. 28 galvanized. For small lots about $5 a ton above these prices is asked. The low prices have stimulated some business.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Rails and Track Supplies.—The Chicago, Burlington & Quincy Railroad will close bids on Aug. 5 on 400,000 tie plates, about 2000 tons. On ordinary lots of tie plates, either iron or steel, the uniform quotation for Chicago mills is 2.25c. per lb., Chicago. Railroad spikes and track bolts are lower, the mill quotation being 2.85c. on standard railroad spikes; track bolts with square nuts, 3.85c.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills.

Standard railroad spikes, 2.85c., Pittsburgh; track bolts with square nuts, 3.85c., Pittsburgh; steel tie plates, 2.30c., and steel angle bars, 2.75c., Pittsburgh and Chicago; tie plates, steel and iron, 2.25c., f.o.b. makers' mills.

Warehouse Prices.—Local jobbers have reduced prices $3 per ton on plates, shapes, bars, hoops and bands, cold-rolled steel bars, all grades of sheets, and 35c. per 100 lb. on structural and boiler rivets.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Cast Iron Pipe.—Some extremely low prices were brought out in the public opening of bids for 1500 tons of 8-in. cast iron pipe at Detroit. The Lynchburg Foundry Co. was low bidder with $41.95, delivered. The National Cast Iron Pipe Co., the second lowest bidder, put in a figure only slightly above this. The National Cast Iron Pipe Co. was low bidder on 275 tons of 16-in. pipe for Milwaukee, its price being $44.35, delivered. These prices are considerably below the figures quoted in the paragraph below, which are for carload lots. Milwaukee will close bids Aug. 10 on 3500 tons of 54-in. pipe; Detroit is in the market for 500 lengths of 6-in. class B, about 100 tons, bids closing Aug. 5. Bids close in Minneapolis this week on 200 tons of 6, 8 and 12 in., and in Saginaw, Mich., on 800 tons of 6, 8 and 12 in. Bids closed Monday in St. Paul on 125 tons.

We quote per net ton, f.o.b. Chicago, ex-war tax as follows: Water pipe, 4-in., $49.10; 6-in. and above, $46.10; class A and gas pipe, $3 extra.

Semi-finished Steel.—There has been a slightly better demand for billets at the new price of $30, Pittsburgh.

Jobbers quote out of stock 2.59c. on billets, 0.15 to 0.25 carbon, and 2.63½c. on 0.35 to 0.45 carbon.

Old Material.—There is a slightly improved tone in the scrap market, not so much due to any actual increase in demand from consumers, but to the expectation of the scrap dealers that the present improvement in steel trade, slight though it is, will be steadily maintained, and will therefore result soon in a demand for old material. Within the past week, there has been a little better speculative buying by dealers, but those who have scrap and are not forced to sell are holding their stocks in the expectation of a rise in the market prices. Where transactions have occurred, they have been at prices from 25c. to 50c. a ton above those quoted last week.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	12.50 to 13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.50 to 12.00
Heavy melting steel	10.00 to 10.50
Frogs, switches and guards cut apart	10.00 to 10.50
Shoveling steel	9.50 to 10.00
Low phos. heavy melting steel	13.00 to 13.50
Drop forge flashings	6.00 to 6.50
Hydraulic compressed sheet	6.50 to 7.00
Axle turnings	7.00 to 7.50
Per Net Ton	
Iron angles and splice bars	13.25 to 13.75
Steel angle bars	9.50 to 10.00
Iron arch bars and transoms	13.50 to 14.00
Iron car axles	17.50 to 18.00
Steel car axles	12.50 to 13.00
No. 1 busheling	8.25 to 8.75
No. 2 busheling	5.75 to 6.25
Cut forge	9.00 to 9.50
Pipes and flues	5.50 to 6.00
No. 1 railroad wrought	9.50 to 10.00
No. 2 railroad wrought	9.25 to 9.50
Steel knuckles and couplers	10.25 to 10.75
Coil springs	11.75 to 12.25
No. 1 machinery cast	12.00 to 12.50
Low phos. punchings	11.00 to 11.50
Locomotive tires, smooth	10.25 to 10.75
Machine shop turnings	3.00 to 3.50
Cast borings	4.50 to 5.00
Stove plate	11.00 to 11.50
Grate bars	9.50 to 10.00
Brake shoes	9.50 to 10.00
Railroad malleable	11.50 to 12.00
Agricultural malleable	11.50 to 12.00
Country mixed	7.50 to 8.00

New York

NEW YORK, Aug. 2.

Pig Iron.—A number of agencies report that as furnaces which they represent are out of blast and have exhausted stocks, they have no iron to sell. They are receiving few inquiries, but agencies representing furnaces that are still in the market report very fair activity. Within the week, sales amounting to 2500 to 3000 tons have been made, the largest being for 500 tons, and inquiries for about 3000 tons are pending. The sales were for foundry iron, nearly all for prompt delivery. One was for delivery over the remainder of the year at about the same as prevailing prices. The price situation shows little change. Reports have been current of eastern Pennsylvania iron being offered for sale at $19, furnace, but $20 is apparently the present minimum and sales have been made at higher figures. One reason for the slow delivery of iron in many cases is that furnaces are, as a rule, loading only two days a week and have no labor available on other days.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$24.02 to $25.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.02 to 24.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.52 to 23.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25	29.16 to 30.16

Ferroalloys.—In the last week inquiries for ferromanganese have appeared from various consumers totalling 700 to 800 tons, but no definite buying is reported yet. Quotations are nominal for both the American and British alloy and it is conceded that demand would bring out lower prices. One representative of a British producer has a limited amount in storage for prompt delivery, for which he is asking $70, delivered, within a reasonable distance from the seaboard. There are inquiries for a few carload lots of spiegeleisen for which the quotation remains unchanged. There is very little demand for 50 per cent ferrosilicon, nor has there been any business reported in high-grade manganese ore, though there are inquiries for two carloads. Sales are reported as low

as $62.50 per ton, delivered, and the alloy can be bought as low as $60. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$70.00
Spiegeleisen, 20 per cent, furnace, per ton...	$26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal...	55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	16c. to 16.50c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00

Ores

Manganese ore, foreign, per unit, seaboard..	22.00c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2	55c. to 60c.

Warehouse Business.—Despite the reduction of prices earlier in the month, effective July 29, the warehouses in this district made a second price drop, reducing soft steel bars from 2.93c. per lb. to 2.78c. per lb. This is a correction of warehouse quotations to the prevailing mill price of 1.75c. per lb., Pittsburgh, based on a spread of about $13 per ton. Structural material is now 2.88c. per lb. as well as plates ¼ in. thick and heavier. Hoops are generally quoted at 3.88c. per lb. and bands at 3.43c. per lb. Sheet prices are also down, blue annealed sheets, No. 10 gage, being offered at 3.53c. per lb.; black sheets, No. 28 gage, at 4.25c. per lb., and galvanized sheets, No. 28 gage, at 5.25c. per lb. Dealers in wrought iron and steel pipe report conditions dull. The following prices are now quoted on lap-welded and seamless steel boiler tubes:

Lapwelded Steel Boiler Tubes

1¾ in.	+ 6
2 and 2¼ in.	—12
2½ to 3¼ in.	—26
3½ to 4½ in.	—32

Seamless steel boiler tubes, cents per ft.: 1½-in., 19c.; 1¾-in., 24c.; 2-in., 20c.; 2¼-in., 22c.; 2½-in., 26c.; 2¾-in., 30c.; 3-in., 33c.; 3¼-in., 33c.; 3½-in., 34c.; 3¾-in., 37c.; 4-in., No. 10 gage, 43c.; 4-in., No. 9 gage, 47c.

The foregoing prices represent a 20 to 25 per cent reduction, some items having been reduced as much as 50 per cent. Brass and copper warehouses report no improvement, although mills have resumed operations on half time. We quote prices on page 320.

High Speed Steel.—The market continues sluggish, although some producers report a slight improvement in the number of orders. Prevailing quotations on 18 per cent tungsten are nominal and range from 90c. to $1 per lb. with some selling at 85c. per lb.

Finished Iron and Steel.—Assertions of a betterment in business sentiment are increasing. Sellers say that their representatives are bringing reports of increased interest on the part of buyers, because of the disappearance of stocks and the active consideration of new projects. It remains that the most tangible fact is the broadening activity of railroad buying, evidenced chiefly in car and locomotive repair work; in fact in some quarters it is believed that railroad buying has taken a turn and that it will be gradually and increasingly better. It also seems that a slight stiffening has occurred in the price situation, due perhaps to the fact that there are less large attractive items for early settlement than there were a few weeks ago. At the moment the fabricated steel outlook is not so bright as it recently promised. The New York Central has distributed repairs for 6500 cars, involving 30,000 tons of steel, and may of course exercise an option to double the amount within a month or two. This business was placed among nine companies: 1500 each to the American Car & Foundry Co. and the Standard Steel Car Co.; 500 hopper cars each to the Buffalo Steel Car Co. and the Youngstown Steel Car Co., and 500 box cars to each of the following: Illinois Car & Mfg. Co., the Ryan Car Co., the Pressed Steel Car Co., the Streator Car Co. and the Haskell & Barker Car Co. The Lehigh Valley has reduced its inquiry from 5000 to 1000 box and hopper cars. The Illinois Central is inquiring on some 900 car repairs, and the Buffalo, Rochester & Pittsburgh is expected to place 500 to 1000 additional car repairs. The Pittsburgh & West Virginia has placed 250 to 300 car repairs with Koppel Car Repair Co. New fabricated steel work includes an office building in Philadelphia, 1000 tons; a hospital at Hackensack, N. J., 600 tons; a highway bridge in North Carolina, 550 tons; mine head frame, Providence, Pa., 400 tons, and a savings bank, Fifty-seventh Street, New York, 400 tons. The Florida East Coast Railroad has closed on 450 tons of bridge repair work, and the Porcupine Boiler Works, Bridgeport, Conn., will supply 300 tons for a telephone exchange at Stamford, Conn. The Turner Construction Co. will erect a large factory at Avenue A and Seventy-first Street, New York City, for P. Lorillard Co.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates, 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.23c.

Cast-Iron Pipe.—Due to the decline in the price of pig iron and other raw materials the market price of cast-iron pipe is approximately $5 a ton lower. The city of New York, which withdrew bids for 1500 tons of pipe, has again placed its specifications on the market, bids to be received Aug. 3. We now quote f.o.b., New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—There is a slight raise in prices in railroad wrought, clean cast borings and specification pipe, with no declines in prices apparent this week. It would seem as though the market were on the upturn. Feeling is better, though there is not much tangible evidence of improvement. Prices are more stable than they have been for many months. When lists of material to be scrapped are placed before brokers, there is a great uniformity of prices offered, usually not varying more than 25 cents.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.00 to $7.50
Rerolling rails	9.50 to 10.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	9.50 to 10.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.25 to 7.50
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	8.50 to 9.00
Light iron	2.00 to 2.50
Cast borings (clean)	4.00 to 4.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	8.50 to 9.00
Locomotive grate bars	8.50 to 9.00
Malleable cast (railroad)	7.00 to 7.50
Old car wheels	10.00 to 10.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	14.00 to 15.00
No. 1 heavy cast, not cupola size	13.00 to 14.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Belgian-American Coke Ovens Corporation

The Belgian-American Coke Ovens Corporation has been formed by a group of American and foreign capitalists to introduce and develop in this country the Piette by-product coke ovens. The company will have a capitalization of $10,000,000 of preferred stock and 200,000 shares of no par value common stock.

Included among the directors are Thomas F. Ryan, Emile Francqui, president of the Banque d'Outremer and director of the Societe Generale of Belgium; F. S. Landstreet, president, 25 Broad Street, New York; Hector Prud'homme of Brussels, vice-president; Herbert H. Vreeland, associate of Mr. Ryan; Olivier Piette, inventor of the oven; G. H. Walker, president W. A. Harriman & Co.; Adolphe Stoclet, representing Belgian interests; Lambert Jadot, director of the Banque d'Outremer, and William H. Page, general counsel.

Mr. Ryan and Mr. Francqui have been associated for many years in extensive developments in the Belgian Congo. Their attention was directed three years ago to the Piette coke ovens. Mr. Landstreet then went to Belgium and Mr. Piette with his associates visited this country, with the result that the company was formed.

Buffalo

BUFFALO, Aug. 2.

Pig Iron.—There is less movement with local producers than has been manifest this year. Talk of better feeling is general, but certainly orders do not justify any such sentiment. One producer blew in a furnace to accumulate a stock of iron for its own use and a subsidiary located outside Buffalo. Operation for four weeks is planned and conditions at the expiration of that period govern plans beyond that time. A decided dropping off in inquiry is noted—3000 tons with one producer and its sales but 200 tons. Its ruling price is $22 for silicon 2.25 to 2.75; $23 on silicon 3.25 to 3.75. Iron freely offered by a steel interest is now moving in carload lots only and $20 is the base price. Less than 1000 tons was moved by one maker whose prices range from $19 to $21 base. Inquiries are for small lots and furnace operation is determined from week to week only.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Coke.—Receipt of several inquiries for 500 ton lots has given rise to better feeling. Greater furnace operation is hinted at.

Old Material.—About 500 tons of heavy melting steel has been sold to a large mill interest; the price is understood to have been $10, with absolute insistence that the material be first grade. Dealers are not anxious for business at this price. With the exception of steel which has weakened through this purchase, prices generally are unchanged from last week.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Warehouse Business.—There is a decided increase in the number of orders and inquiries. Prices which have been reduced in conformity with mill announcements, seem to be in favor with the trade and a number of orders have been booked following the receipt of the new schedules. Road work and bridge construction have developed some new business. Structural orders are only fair.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.55c.; galvanized steel sheets, No. 28 gage, 5.55c.; black sheets, No. 28 gage, 4.55c.; cold rolled strip steel, 6.40c.

Finished Iron and Steel.—Improved mill operation marked the beginning of August. Generally orders are more frequent, but little improvement is noted in tonnages. Buyers fully believe drastic price cuts have all been made and that any price adjustments made from now on will be unimportant. Inquiry is on a more definite basis and none is too small to get attention. Buyers are, on the whole, satisfied with present prices. An accumulation of bar orders together with confidence in prospective business brought about the decision to start three open hearth furnaces this week. Demand is more evenly distributed for bars and shapes and a decided betterment is noted in the demand for cold-finished material. Pipe and wire business was better in July than the preceding month. Structural work is quiet. Bids for the J. N. Adam hospital at Perrysburg have been rejected and new ones called for the latter part of the month. A number of bridge jobs in Canada engage fabricators on this side of the border. The customs ruling explained in previous issues of THE IRON AGE is accepted willingly by domestic shippers and the customs officials are understood to be liberal in their interpretation of regulatons which threatened for a time to interfere with Canadian business. A filtration plant for Charlotte, N. Y., near Rochester, requiring 200 tons, is being figured.

Boston

Pig Iron.—Sales the past week were confined to perhaps half a dozen cars of eastern Pennsylvania and Northern furnace and resale iron at prices well above those quoted on round tonnages, and one car of lake charcoal iron at $35 furnace base. General inquiries include one for 500 tons No. 1 X and 200 tons No. 2 plain, August delivery, from the Saco-Lowell Shops, Boston; 200 tons No. 1 X, August and September delivery, from the Framingham Foundries, Framingham, Mass., and 100 tons No. 2 plain, prompt shipment, from a Pawtucket, R. I., melter. Various brokers have under negotiation possibly an aggregate of 3000 tons. Foundries, however, are in no hurry to purchase because New England meltings during July dropped to small proportions. Eastern Pennsylvania iron is openly offered at less than $20 furnace for silicon 1.75 to 2.25, and buyers claim Buffalo has been offered on the same basis, although confirmation of actual sales is lacking. The available supply of Buffalo iron is smaller, the largest producer having withdrawn from the market until a time when selling prices are back on a profitable basis. Local Alabama and Virginia prices are purely nominal. Furnaces are unable to compete with eastern Pennsylvania and Buffalo irons due to the disparity in freight rates. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$24.56 to $27.56
East. Penn., silicon 1.75 to 2.25	24.06 to 27.06
Buffalo, silicon 2.25 to 2.75	25.96 to 28.96
Buffalo, silicon 1.75 to 2.25	25.46 to 28.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	32.16 to 32.66
Alabama, silicon 1.75 to 2.25	31.66 to 32.16

Finished Material.—The New England Structural Steel Co., Inc., is awarded 106 tons structural for a boiler shop, Cambridge, Mass., 450 tons for a Manchester, N. H., school, 100 tons for the Washington Mills, Lawrence, Mass., boiler house, and 150 tons for the India building, Boston. The Phoenix Bridge Co. will furnish 800 tons for the Manchester, N. H., Amoskeag bridge, and 250 tons for two Boston & Maine R. R. bridges at Inwood, Vt. The American Bridge Co. is awarded 300 tons for a Mystic, Conn., bridge, and the Boston Structural Steel Co., Inc., 400 tons for a Boston municipal building. Contracts uncovered include: Allston, Mass., theatre 300 tons; Pawtucket, R. I. theatre, 600 tons; Ford Co., Green Island, N. Y., plant, 300 tons; Berlin, Me., high school, 144 tons. The bottom price on sheared and boiler plates is 1.85c., f.o.b. Pittsburgh. Buying is confined to carload lots, but aggregate sales are increasing. One eastern Pennsylvania rolling mill, not rolling anything under ½-in., offers bars at 1.67½c. f.o.b. Pittsburgh, but all other mills are holding at 1.75c. and securing better business.

Coke.—Both the New England Coal & Coke Co. and the Providence Gas Co. have reduced their price on spot and contract foundry coke 25c. per ton, from $10.91 to $10.66, delivered, where the local freight rate does not exceed $3.40 a ton. Connellsville oven interests are more active in this market. A limited tonnage was placed early in the week with Connecticut foundries at $4.25 f.o.b. ovens, but, within the past few days good grade fuel has been offered at as low as $3.50 and $3.75 ovens.

Warehouse Business.—Local warehouse prices on refined iron have been lowered 15c. to 25c. per 100 lb., on cold rolled steel 20c., and on soft steel bars, flats, reinforced bars, structural, plates, bands and hoops 15c. Individual orders for iron and steel still run to small lots, but aggregate sales for the week show improvement. Galvanized sheets are 25c. per 100 lb. lower at $4.75 base for No. 28, and black at $4.75 base for No. 28, and blue annealed 10c. lower at $3.78 for No. 10. Demand for sheets is more active, but individual orders continue small. Wire nails are $3.85 per keg base, as against $4.10 heretofore, and standard cut nails $4.50 contrasted with $5. Hardened steel cut nail prices are

no lower. Standard horseshoes are 50c. per keg lower at $7 base, and fancy shoes are down as much. Most jobbers quote bolts on a basis of 50 and 10 per cent discount for ⅜ x 4-in. machine with H.P. nuts, but in some cases this price is shaded another 5 per cent. The market on chain is 25c. to 35c. per 100 lb. lower.

Jobbers now quote: Soft steel bars, $2.83 per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.10½; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.48 to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.98 to $3.13; plates, $2.83 to $2.93; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—A sale of 1000 tons No. 1 machinery cast to a Massachusetts foundry, delivery during August, September and October, at an indicated price of $16.50 delivered, and scattered sales aggregating possibly 300 tons No. 1 cast to Massachusetts melters at $16.50 to $17 delivered are noted. Otherwise the old material market the past week has been dull and firm. An order for 100 tons No. 1 cast at $16.90 delivered where the freight is $3, is going begging. Efforts to place heavy turnings at $2.50 f.o.b. Watertown, Mass., have been unavailing, the best price obtained by the shipper being $4 delivered. Important dealers report more sounding out of the scrap market by eastern Pennsylvania mills and actual orders are anticipated within the next week or ten days.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$16.50 to $17.00
No. 2 machinery cast	15.00 to 15.50
Stove plate	14.50 to 15.00
Railroad malleable	12.50 to 13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.00
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to 7.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.00 to 3.50
Cast iron borings, chemical	3.50 to 4.00
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.00
Rerolling rails	9.00 to 10.00

Steel Makers Will Urge Freight Rate Reduction

A conference of steel makers is to be held in New York early in August to formulate plans for a concerted move against existing freight rates. A general reduction in carrying charges on steel of at least 20 per cent is to be asked. Independent makers in a number of districts have come to the conclusion that they are being kept out of the market by reason of high freight rates and if the carriers expect business, they must lower the rates to a point where the delivered price of steel may be made such that it will attract buyers.

Cincinnati

CINCINNATI, Aug. 2.

Pig Iron.—While there is very little activity, there is apparent a disposition on the part of the furnaces not to go below the level of prices below quoted. This was shown during the week when a Chicago interest turned down a firm offer of $18 on 1000 tons, the operator stating that before selling iron below $18.50 he would close down. The same disposition is apparently held by operators in other districts, for some of them have been turning down business offered below present schedules. The largest sale reported during the week was one of 250 tons to a West Virginia melter, the iron coming from a Valley furnace. Another lot of 100 tons of malleable was taken by the same interest on the basis of $20.50, Ironton. A Michigan melter who recently inquired for 3000 to 5000 tons for delivery during the remainder of the year is reported to have bought 500 tons. It is said that he was unable to get a furnace to contract that far ahead at present prices. A sale of 300 tons of low phosphorus to a Michigan melter was made at an unnamed price. Several inquiries for ferro-alloys are before the trade, mostly from railroad equipment companies in the Chicago district. Prices are quotably lower. Jackson county silvery makers have reduced their prices on silvery irons $8 a ton, and on Bessemer ferro-silicons $8.50. Southern iron is available at $19, Birmingham, and southern Ohio makers are quoting $20 to $20.50. Chicago iron is quoted in this territory at $18.50, furnace, and Valley iron at $19 to $19.50. There are no inquiries of size and carload business continues as the customary activity.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—The lower prices in effect have apparently stimulated buying. Sales managers of practically all the steel mills, report business as 50% better during July than was the case in June. This applies to practically all finished products. The feature of the week was undoubtedly the placing of approximately 7000 tons of structural material by the Mt. Vernon Bridge Co. for various projects. The 4500 tons for the Ohio State University stadium has been placed with the Cambria Steel Co., and 1500 tons for the Licking River Bridge and 800 tons for bridge work on the K. & M. railway, are reported to have gone to the Steel Corporation. Fabricators are figuring on a number of small jobs and an addition to the plant of the Columbus Forge & Iron Co., Columbus, Ohio will involve 100 tons; while a bridge over the Little Miami River, to be built by the Hamilton County Commissioners, will take approximately 450 tons. Bids on this structure will close Aug. 23, with A. E. Mittendorf, chairman, Cincinnati. A hotel at Middletown, bids for which were opened some time ago, will probably be erected of reinforced concrete and bids are being taken for a structure of this kind. Bids closed on July 29 for a Union Station at Covington, Ky., involving 80 tons, but no award has yet been made. There has been some activity in the sheet market, and several 100-ton orders have been placed. Prices are holding at 2.25c. for blue annealed; 3c. for black, and 4c. for galvanized. It is reported that several carloads of nails have been placed at $2.50 per keg Pittsburgh, but confirmation is lacking. The Big Four will likely place orders for 2500 tons of tie plates within the next 10 days. A large number of bids have been received and these are now being tabulated. An inquiry for 900 tons of plates for a Louisville manufacturer is still pending.

Old Material.—Some dealers profess to see a better tone to the scrap market. Some small sales were reported during the week. It is beginning to be the general opinion that the bottom of the price situation has been reached, and that the up-turn will be in evidence in about 30 days. The Pennsylvania Lines West and The New York Central Lines will close lists this week. No price changes are noted.

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.00 to $5.00
Iron rails	11.00 to 12.00
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.00 to 11.00
Heavy melting steel	8.50 to 9.50
Steel rails for melting	9.00 to 10.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	2.00 to 2.50
Steel turnings	1.00 to 2.00
Railroad cast	11.00 to 12.00
No. 1 machinery	12.00 to 13.00
Burnt scrap	6.50 to 7.50
Iron axles	15.00 to 16.00
Locomotive tires (smooth inside)	8.50 to 9.50
Pipes and flues	4.00 to 5.00

Coke.—With the exception of an inquiry for 2200 tons from a western sugar maker, there is little activity in the coke market. Prices are, if anything, softer, Connellsville furnace being quoted at $2.75 to $3 and foundry $3.75 to $4.50. No changes have been made in the Wise County and New River schedules. By-product furnace coke is quoted at $5, and foundry at $6.50, Connellsville basis.

Warehouse Business.—Small orders for immediate shipment is the prevailing activity. Local warehouses will reduce their prices approximately $3 per ton to

correspond to the recent reduction made by the mills. This reduction is expected to be made on Wednesday of this week.

Iron and steel bars, 3.15c. base; hoops and bands, 3.85c. base; shapes, 3.25c. base; plates, 3.25c. base; reinforcing bars, 3.22½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.85c.; No. 28 black sheets, 4.92c.; No. 28 galvanized sheets, 5.92c.; wire nails, $3.50 per keg base; No. 9 annealed wire, $3.10 per 100 lb.

Birmingham

BIRMINGHAM, ALA., Aug. 2.

Pig Iron.—No large business developed in the Birmingham iron market the past week. Competition for the small lots for prompt shipment brought the market more clearly to a $19 base toward the close of the week. Some car lots are still bringing $20, but $19 can be done on 100 tons and up. One sale of 150 tons of 2.75 to 3.25 silicon at $19.50 was reported by well-informed operators. This is a base of $18.50 with accustomed silicon differentials. The latter have little remaining standing. The feature of the week was the announcement that the Woodward Iron Co. will blow in a second stack at Woodward before this week ends. President Crockard said: "We will blow in another stack because we have no iron on yards. There are not over 600 to 700 tons between blast furnace and yards. To remain in the iron business and accommodate our customers, we are forced to resume at a second stack. I believe we have turned the corner and that there will be a substantial outward movement of pig iron by the middle of September." The Woodward Iron Co. enjoys the distinction of having the only active merchant stacks in Alabama at this time. Undoubtedly yard stocks have decreased during the past month. In spite of the unsatisfactory volume of business, furnace operators are more optimistic than in many months. But for desire to realize cash, there would be no $19 iron. Last week inquiry was not notable and sales were confined to the noncompetitive South.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00 to $19.50
Basic	18.00 to 18.50
Charcoal	35.00

Finishing Mills.—The Tennessee company's operating schedule is the same as for the past six weeks with exception of doubling production at the tie-plate mill after receiving machinery and speeding up at the new car works. The rail mill is on normal turn and plate mills at Bessemer and Fairfield average two days a week apiece. The total of operations is about 40 per cent. The Gulf States Steel Co. is receiving more new business than in some time and will resume at its blooming mill on Aug. 15.

Coal and Coke.—Demand for coke is intermittent, but is always in car lots and for rush shipment. Prices rule from $6 to $6.50.

Cast Iron Pipe.—Little new business came in during the week, but several large lettings are expected in the near future by the high pressure pipe makers. The level is $40. The sanitary pipe shops are enjoying a fair business at $40 base. Some pipe is going to the Pacific Coast, the Hammond-Byrd Iron Co. and Bessemer Soil Pipe Co. being the shippers. The movement is by ship out of Mobile. National Cast Iron Pipe Co. and American Cast Iron Pipe Co. have shipped about 1500 tons of high pressure pipe to the Pacific Coast by the same route in the past week.

Old Material.—The scrap market is absolutely stagnant. Consumers are most conspicuous by their absence. A fair amount of cast scrap is moving. The price list is nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

St. Louis

ST. LOUIS, Aug. 2.

Pig Iron.—The sale was reported this week of 200 tons of Northern foundry iron to a stove factory at Quincy, Ill., for prompt shipment, the price not being divulged. Several lots of 100 tons each were purchased by St. Louis melters. Another local concern that had out an inquiry for 100 tons decided to wait before placing the order. A few orders for carloads were placed during the week. The Commonwealth Steel Co. has an inquiry out for two carloads of ferromanganese.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$21.30 to $21.80
Northern malleable	21.30 to 21.80
Basic	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25	24.74 to 25.74

Finished Iron and Steel.—The first inquiry of importance from the railroads for some time was brought forth this week. It was from the Missouri Pacific for 500,000 tie plates for prompt delivery. For a hotel at Grand and Lindell avenues, St. Louis, an order for 232 tons of reinforcing bars was placed with the Laclede Steel Co. The Terminal Railroad Association placed an order for 350 kegs of track spikes at a price said to be better than 3c., Pittsburgh. The recent declines have not resulted in any increase in inquiries or orders. However, there seems to be a better feeling among the trade. A number of projects requiring structural steel are in process of development. The warehouse business is very light, and recent mill reductions have been met.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Old Material.—Consumers still decline to entertain any proposition and some of the dealers are trying to get mills interested in buying old material to lay down at the prevailing low levels, but without success. It is reported that one of the large consumers recently purchased 1500 tons of heavy melting steel, but this has not been confirmed. The following railroad lists are before the market this week: Pennsylvania System, 4500 tons; G. C. C. & St. Louis, 3000 tons; St. Louis Southwestern, 300 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.50 to $13.00
Steel rails, rerolling	12.00 to 12.50
Steel rails, less than 3 ft.	10.00 to 10.50
Relaying rails, standard section	28.00 to 30.00
Cast iron car wheels	11.00 to 11.50
No. 1 railroad heavy melting steel	9.50 to 10.00
No. 1 heavy shoveling steel	9.00 to 9.50
Ordinary shoveling steel	8.50 to 9.00
Frogs, switches and guards, cut apart	9.50 to 10.00
Ordinary bundled sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	$5.00 to $5.50
Iron angle bars	10.50 to 11.00
Steel angle bars	8.00 to 8.50
Iron car axles	17.00 to 17.50
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	9.50 to 10.00
Steel couplers and knuckles	9.50 to 10.00
Locomotive tires, 42 in. and over, smooth inside	8.00 to 8.50
No. 1 dealers' forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.00 to 9.50
No. 1 boilers cut in sheets and rings	5.50 to 6.00
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agriculture malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	7.50 to 8.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	6.00 to 6.50
Uncut railroad mixed	7.00 to 7.50
Horseshoes	9.00 to 9.50
Railroad brake shoes	7.50 to 8.00

Coke.—A few carload orders for coke are being received, but there is very little business being placed on contracts. There is enough local foundry and home con-

sumption to take care of the output of the Granite City by-product plant. Standard Connellsville beehive foundry is quoted at $5 ovens, or $10.04 delivered St. Louis, Granite City by-products meeting this price, while Laclede by-product foundry is quoted at $11.50 ovens, or $11.70 delivered in the St. Louis industrial district.

Cleveland

CLEVELAND, Aug. 2.

Iron Ore.—No sales were reported during the week and no new inquiry came out. A Buffalo district consumer released 250,000 tons for shipment, but this did not involve any new buying, as the ore will come from the consumer's own mines and from other mining companies with which it had long-time contracts.

Following the 10 per cent wage reduction made by the Oliver Iron Mining Co. August 1, some of the other mining companies plan further wage reductions this week. With the last reduction, wages of common labor employed in the Steel Corporation's mines have been reduced from $4.25 to $3.80 per day. Some independent companies are paying $4 per day for common labor, but uniform wage scales have about disappeared among the independent mining companies in the Lake Superior district. There was 30,000,000 tons of Lake Superior ore on docks and in furnace yards July 1, according to figures just compiled. This is an increase of over 2,000,000 tons over June 1, in spite of the light shipments of ore and reflects the further decrease in consumption. The gain in the amount of ore on hand July 1 compares with an increase of 240,000 tons June 1 as compared with May 1. The amount consumed in June was approximately 1,470,000 tons, a decrease of over 250,000 tons as compared with May. The June consumption was less than one-third of the amount consumed during June, 1920, consumption during that month being over 4,500,000 tons.

Lake Superior shipments of iron ore during July were 4,047,687 gross tons as compared with 3,600,989 tons during June. The movement to Aug. 1 was 10,418,914 tons as compared with 26,079,111 tons during the same period last year.

We quote delivered lower lake ports: O'd range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market continues very dull. Shipping orders are light and indicate little improvement in the August consumption, although one interest reports a better volume of shipping orders than a month ago. Sales are still limited to small lots. One interest reports orders taken during the week aggregating 1100 tons of foundry iron, mostly in carloads, and other producers sold only a few car lots. Most of the sales were made at $20 for No. 2, but some of the business was booked at $20.50. One or two producers are holding firmly to $20 as the minimum, but others seem more inclined to meet the Valley district price of $19.50. There are reports of quotations as low as $19 and if this price has not already been named, it is believed that a round lot inquiry would bring out a $19 quotation. The only new inquiries reported are one from the American Radiator Co. for 200 tons of foundry iron for its Springfield plant and another for a like amount from a Barnesville, Ohio, consumer. As a result of the long shutdown of many furnaces, a scarcity of certain grades of iron has appeared in some sections. However, other producing centers still have large stocks that include iron of all specifications. Jackson County producers have made another sharp price cut on silvery iron and Bessemer ferrosilicon, reducing the former $8 a ton and the latter $8.50 a ton and making some changes in the differentials, particularly in the reduction of differentials on silvery iron.

New quotations f.o.b. furnace are as follows: Silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. Bessemer ferrosilicon, 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.46 to $20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	28.92
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Coke.—There is very little activity in the market. A few car lot sales of standard Connellsville foundry coke are reported at $4.50 to $5 per ton. Quotations on other grades range down to $4.

Bolts, Nuts and Rivets.—The improvement previously noted in the bolt and nut market is holding up, this being largely due to small lot buying by the railroads. The New York Central Railroad took bids Monday on 9000 kegs of track bolts. The price situation is unchanged. While regular quotations are unchanged, these represent the top of the market, concessions of 5 to 10 per cent being made on desirable orders. Local makers continue to quote rivets at 2.75c. for structural and 2.86c. for boiler rivets, but quotations $2 a ton lower seem common. The rivet market is very dull.

Finished Iron and Steel.—The volume of orders and inquiries increased somewhat during the week and the sentiment in the trade is better. However, orders are only for small lots for immediate requirements. Some plants are operating a little better. The Bourne-Fuller Co. resumed operations in its Upson Steel plant, Cleveland, Tuesday, starting up two open-hearth furnaces. The market is still in a very unsettled condition regarding prices. Some mills seem inclined to adhere to the regular open prices, but desirable orders are still bringing out concessions. It is understood that the 6900 tons of steel bars, plates and structural material recently inquired for by the Mt. Vernon Bridge Co. for the Ohio State University stadium and other work has been divided between the leading interests and an independent mill. However, this business was not placed with the Cleveland sales offices and definite information as to the prices finally quoted is not available here. The price irregularity is most pronounced in plates, which are being freely quoted at 1.75c. with some mills going to 1.70c. A Cleveland mill took two lots of 600 tons each for oil refining work and the Ford Motor Co. has placed an additional 500 tons of light plates with a Valley mill. A moderate volume of steel bar business is coming out with 1.75c. as the generally prevailing price. Quotations on hard steel reinforcing bars are 1.75c., but a good inquiry would probably bring out a lower price. In a reduction of local warehouse prices a 2.40c. mill price has been taken as the basis on hoops, although mill prices on both hoops and bands are irregular. Hot-rolled strip steel is unchanged at 2.35c. to 2.40c. The structural market is quiet. The only new inquiry on which bids have been taken is for 225 tons for three school buildings in Elyria, Ohio.

Sheets.—The demand shows some improvement, but a wide range of prices is being quoted. New low prices of 2.90c. for black and 3.75c. for galvanized sheets have appeared, but the more common quotations are 3c. for black, 4c. for galvanized and 2.25c. for blue annealed. However, a large Valley producer is adhering to prices $5 a ton higher. One independent mill is quoting the low prices only for immediate delivery and is suggesting to its customers the restoration of the plan of allocating material for future shipment to be billed at prices prevailing at the time of delivery.

Warehouse Business.—Cleveland jobbers have reduced warehouse prices $3 a ton on steel bars, plates and structural material, following the recent $3 cut in regular mill prices. Similar warehouse reductions have been made on cold-rolled steel, hoops and bands.

Jobbers quote steel bars 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; No. 10 blue annealed sheets, 3.40c. to 3.55c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—There is a little demand for small lots of scrap from mills for early requirements, but consumers are not inclined to buy material to lay down in their yards. Prices show no change and some of the dealers are inclined to believe that the bottom

has been reached. A Canton mill during the week purchased 2000 tons of heavy melting steel and a Weirton plant some shoveling turnings, the latter at $8.75. Local dealers report offers of $7.25 for machine shop turnings for Brackenridge delivery.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$10.50 to $11.00
Steel rails, under 3 ft	11.50 to 12.00
Steel rails, rerolling	13.00 to 14.00
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.50 to 7.00
Machine shop turnings	4.50 to 4.75
Mixed borings and short turnings	6.50 to 7.00
Compressed steel	6.00 to 6.50
Railroad wrought	10.00 to 10.50
Railroad malleable	11.00 to 12.00
Light bundled sheet stampings	3.50 to 4.00
Steel axle turnings	8.00 to 8.50
No. 1 cast	15.00 to 15.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in	5.50 to 6.00
Drop forge flashings, under 10 in	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Philadelphia

PHILADELPHIA, Aug. 2.

It is more difficult to secure pig iron under $20 base and it would seem that price tendency is upward. Considerable pig iron has changed hands, one seller reporting that the last two weeks in July has resulted in more sales than for any entire month in a year past. A seller who made a price of $19.50 for No. 2 X late last week has raised his asking price to $21 for this grade. Buying of a considerable tonnage by a pipe maker who usually senses the bottom of the market has had the effect of halting the downward trend.

More mills are starting up, such as the Phoenix Iron Co. and the Schuylkill Iron Works of the Alan Wood Iron & Steel Co. Two blast furnaces are still contemplating blowing out, in which case the market will be stiffened.

Higher prices are prevailing in the old material trade and mills are finding it more difficult to cover at the lower prices of a few weeks past. The Lehigh Valley railroad is asking for steel for repairing about 5000 steel hopper cars. Promising business in plates for oil storage tanks has not materialized and the market is weaker. The lack of transactions in finished material makes difficult the gaging of market values.

Pig Iron.—There are some indications that not only has the bottom been reached, but that prices are stiffening. For instance, one furnace, which late last week sold some No. 2 X iron for $19.50, furnace, is now asking $21 for the same grade. It is stated that if but one more furnace went out of blast, the shortage would be keen and prices tend to rise. Consumption is now probably greater than production. Another factor which stiffened prices was the purchase by a large pipe company of at least 5000 tons in this district, divided among four furnaces, three of them getting 1000 tons each, the fourth securing 2000 tons. Optimism generally prevails, being based for some on a fair volume of actual orders, and for others on sentiment. One seller reports officially: "Sales for the last half of July were heavier than for any previous entire month for a year past." One seller has disposed of 7000 tons in two weeks, chiefly to foundries and pipe makers. Another seller disposed of 800 tons in four lots on Monday, the largest being of 300 tons. Haines, Jones & Cadbury, Inc., Norristown, Pa., has bought 200 tons of 1.75 to 2.25 sil. iron and 100 tons of No. 2 X. A sale of grey forge iron was made at $20.50, furnace, with freight of $1.82; copper-bearing low phos sells at $35.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.35 to $20.75
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.35 to 22.25
Virginia No. 2 plain, 1.75 to 2.25 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	21.25 to 22.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	38.00
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—The rumor persists that a sale of ferromanganese was made at $68, though this may have been resale material. Scarcity of sales prevents a real test of the market. Some domestic furnaces, however, name $70 delivered and British material is to be had at $70 seaboard, though others still quote $75. Spiegeleisen is quoted at $26 or $27.

Semi-fiinished Steel.—Sheet bars have dropped $3 per ton to $32, Pittsburgh, along with the decline to $30 for rerolling billets and $35 for forging billets and $31 for slabs, as mentioned last week. Very few sales have been made in these materials.

Plates.—Plates are soft and sellers freely admit that lower than the 1.85c. price can be done. Inquiries for oil storage tanks have not resulted in orders and many have been withdrawn. Railroad car repair work will demand some. The Lehigh Valley railroad is asking for material for repairing from 4000 to 5000 steel cars, chiefly hopper cars. The Chesapeake & Ohio asks for over 50 tons of plates. New warehouses on the river at Wilmington, Del., will require a small tonnage.

Structural Material.—Prices are not being shaded as extensively as on plates. The price of 1.85c., Pittsburgh, is being named, but attractive tonnages could be purchased for less. About 1000 tons will be required for warehouses on the Delaware River at Wilmington, Del., the Du Pont Engineering Co. having been awarded the contract by the Board of Harbor commissioners at $1,372,570 for the total construction involved. Of this, $90,000 will be spent for the fabricated steel. Bids will be opened this week for a bank at Chelsea, Atlantic City, requiring 200 tons of structural steel. The Chesapeake & Ohio railroad asks for 75,000 lb. of angles.

Bars.—The C. & O. asks for 50,000 lb. of steel bars for repair work. There is a present seasonal demand for deformed bars for concrete work. The price of 1.75c., Pittsburgh, is quoted uniformly for both iron bars and steel bars.

Bolts, Nuts and Spikes.—Large bolts are quoted at list less 70 per cent; small bolts at list less 70 and 10 per cent, but it is understood that the Belmont Iron Works recently bought 2500 bolts at a concession from these discounts. The Philadelphia & Reading has been a buyer of a fair amount of material, including bolts, nuts, rivets and spikes.

Sheets.—Blue annealed sheets are quoted openly at 2.40c. and black sheets at 3.00c., which is a slight decline from recent prices. The Alan Wood Iron & Steel Co. started up its sheet mills at fair capacity this week.

Old Material.—Prices are apparently on the upward swing and a much better feeling exists. Mills are being required to pay more for heavy melting steel. One steel plant is now offering $11 for this grade but is not finding many sellers at this figure, though a few weeks ago would have had no difficulty in obtaining plenty of material. A fair volume of pipe has been sold to a plant in the Lebanon Valley for $13, delivered. A railroad supply builder has been inquiring for stove plate for three plants, but has found little response at the prices it offers. Both stove plate and borings are scarce. We quote per gross ton, delivered to consumers in the Philadelphia district as follows:

No. 1 heavy melting steel	$11.00 to $12.00
Scrap rail	11.00 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8 50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	7.50 to 8.00
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (no specifications)	12 [illegible] 00
Iron car axles	No market
Steel car axles	No market

Warehouse Business.—A cut in all lines became effective last week, bars being reduced from 2.90c. to 2.75c., other changes having been made proportionately.

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.65c.; round edge iron, 2.95c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage, 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ¼-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 6.50c.; toe steel, 4.50c.

San Francisco

SAN FRANCISCO, July 27.

Pig Iron.—Dullness prevails in this market on the Coast, with actual sales confined to small lots for the most part. No very conspicuous transactions have been reported lately, but a few carlot quantities of good Belgian material changed hands at prices ranging from about $30 to as high as $33.50, ex ship, San Francisco. Poorer grades are quite freely offered, without takers. Foundry operations at present are extremely small. Those that are not completely shut down are operating on a very much restricted schedule. Demand for castings is almost negligible.

Coke.—Two inquiries worthy of mention have been made during the past few days, one involving 400 tons of sacked coke for the account of the Mare Island Naval Base. The other is for approximately 200 tons. Beyond these evidences of life, business in coke in this market is very quiet, as might be expected when foundry activity is on such a small scale.

Old Material.—Holders of heavy melting steel are asking about $9 a gross ton, delivered, but buyers are not disposed to take much active interest. Cast iron scrap similarly is very dull at around $20 a net ton, delivered, and some foundries are offering at a much lower price.

Cast Iron Pipe.—This market has displayed a softening tendency of late, and prices are being quoted at around $40, against the former market of $45. There has been some business in pipe, principally from municipal sources, since private inquiries are sporadic and involve small quantities. Santa Barbara was asking for bids on 200 tons of 6-, 8- and 12-in. pipe. Los Angeles was in the market for 329 tons of 24-in., and Santa Cruz will open bids on Aug. 2 for 93 tons of 8- and 10-in. pipe.

Finished Iron and Steel.—In San Francisco and environs the situation is one of general disruption and inactivity. Labor troubles are still unsettled, especially in the building trade circle. At present, moreover, there is a good deal of talk of a general sympathetic strike tieing up all industries, but the probability of its becoming operative is questioned. The marine strike is practically dissolved, and coastwise shipping once more is being resumed, making possible the movement of steel products to various Coast points. This has had the effect of relieving congestion somewhat. But the actual steel market is at this time chaotic. There have been several inquiries and a few sales, but there is no stability to prices. Underbidding has been prevalent. Plates are now around 2c., tidewater, and galvanized sheets 4c., base, Pittsburgh, but these prices can hardly be called a market. Last week 300 tons of sheets were placed for a Los Angeles firm's credit, and an inquiry from the South for 1000 tons of shapes is now pending. A small railroad is understood to be in the market for 2000 tons of each of the sizes 45-, 60- and 70-lb. rails and complete accessories. There is also an inquiry for 100 tons of alloy steel forging billets for S. A. E. specifications, together with some interest shown in concrete reinforcing bars.

The Worth Brothers Steel Co., Claymont, Del., is operating at about one-half of normal capacity, or at the rate of approximately 11,000 tons of finished steel plate a month. Both open-hearth mill and rolling mill are in service.

WORKMEN'S ADAPTABILITY

German Engineers Discuss Qualifications for Blast Furnace, Open Hearth and Other Work

In discussing the processes developed by Dr. Moede, of the Technical High School, of Charlottenburg, Germany, for testing the vocational fitness of industrial workers, especially in the steel industry, Dr. Huettenhain, and engineers Roser and Daiber of the Verein Deutscher Eisenhuttenleute made further pertinent comment, according to *Stahl und Eisen*, in which the following was emphasized:

"The application of vocational fitness tests will undoubtedly be of importance to steel and iron works. As in the machine industry, the plants require highly qualified and expert labor, the choice of men for which should be made with care, especially as the work is difficult and involves a frequent change of personnel. On account of the attendant heat and dust and other unfavorable sanitary conditions, physical fitness is of greater importance than even in the machine industry. The necessary tests are therefore to be conducted by a physician familiar with industrial conditions in their plants.

"Physical fitness ranks with good physique in importance. The melter at the blast furnace must judge pig iron and slag by appearance and from the manner in which it acts; he therefore requires a sensitive eye for color changes and spark formation. His hearing must be keen as he must judge of the proper conditions by the sound of the cooling water in the tuyeres and also that of the hot blast. In the interests of safety both for workmen and the plant, alertness is requisite, even under the soporific influence of the heat; it requires, furthermore, that he have presence of mind, be free from fear and have the ability to act with speed and directness in the face of danger.

"The requirements are similar for melters at the open-hearth furnaces and converters. The open-hearth furnace operator must judge the temperature by the eye and regulate fuel and air pressure; the operators at the converter judge progress that the metal is making by the gases given off. They also require keen hearing, alertness and presence of mind. The engineer in charge of the blowing engines must be able to judge the condition of the machinery by sound. He must have good eyesight to note signals, also good color sense, coupled with alertness and the ability to act with presence of mind at unexpected alarm.

"The roller in rolling slabs and sheets judges the requisite pressure by the glow of the billet, requiring sensitive eyes for color. In addition alertness and quick reaction to danger alarms are necessary. The latter qualities must be emphasized in wire mills, where the operators must be adept at changing from groove to groove on the rolls. The test here includes manual dexterity.

"Crane operators require above all ears sensitive to sound; also color sense, presence of mind, quick reaction in case of danger. Dexterity is also required in manipulation of control levers. Practical tests for machinists, lathe operators and locomotive engineers are already in use, but for steel workers are still in the empirical stages. In these tests moral development and constructive thinking receive considerable attention."

Engineer Roser shows practical application of tests and points for which applicant for position is marked. For eye test and ability to judge measurement, the following are given: Counting screw threads and gear teeth; distinguishing between right and left threads, judging sizes of drill holes and centering, selecting master keys, selecting taps, bolts, dividing angles and estimating degree, plumbing rods and drawing parallels. Similar tests are made for hearing, functioning of the arms and other members, sense of touch, memory, judgment, fatigue, etc. Engineer Daiber discussed some tests made on applicants at Dortmund.

The Mary furnace, Sharon Steel Hoop Co., Lowellville, Ohio, went into blast July 30, after having been out since the first of the year.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.65
Large boiler rivets.....$2.75
Small rivets.....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads.....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads.....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts.....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head.....60 and 5 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜-in. x 4-in.:
Smaller and shorter.....60 and 5 per cent off list
Longer and larger sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 off list
Hot pressed nuts, tapped.....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank.....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped.....$4.25 off list
Semi-finished hex. nuts:
¼ to 9/16 in. inclusive U. S. S..80, 10 and 10 per cent off list
Same sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70,10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....4c. base

Square and Hex. Head Cap Screws

½ in. and under.....70 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Set Screws

½ in. and under.....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.75 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $3 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $4 base per 100 lb. Tie plates, $2 to $2.05 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c. to 2.40c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1⅞ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.30–2.40	Nos. 11 and 12	2.50–2.60
Nos. 9 and 10 (base)	2.40–2.50	Nos. 13 and 14	2.60–2.70
		Nos. 15 and 16	2.70–2.80

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.70–2.95	No. 28 (base)	3.00–3.25
Nos. 22 to 24	2.75–3.00	No. 29	3.10–3.35
Nos. 25 and 26	2.90–3.15	No. 30	3.20–3.45
No. 27	2.95–3.20		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00–3.25	Nos. 25 and 26	3.70–3.95
Nos. 12 to 14	3.10–3.35	No. 27	3.85–4.10
Nos. 15 and 16	3.25–3.50	No. 28 (base)	4.00–4.25
Nos. 17 to 21	3.40–3.65	No. 29	4.25–4.50
Nos. 22 to 24	3.55–3.80	No. 30	4.50–4.75

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80–3.05	No. 28 (base)	3.00–3.25
Nos. 17 to 21	2.85–3.10	No. 29	3.05–3.30
Nos. 22 to 24	2.90–3.15	No. 30	3.05–3.30
Nos. 25 to 27	2.95–3.20	Nos. 30½ and 31	3.10–3.40

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
July	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
27	12.37½	12.12½	26.25	4.40	4.35	4.75	4.25
28	12.00	12.00	26.50	4.40	4.30	4.75	4.25
29	12.00	11.87½	26.50	4.40	4.25	4.70	4.20
30	12.00	11.75	.....	4.40	4.25	4.70	4.20
Aug.							
1	12.00	11.75	26.75	4.40	4.20	4.70	4.20
2	12.00	11.75	26.50	4.40	4.20	4.70	4.20

New York

NEW YORK, Aug. 2.

There is no activity in any of the markets and prices, except those for copper, are fairly steady. Demand for copper is extremely light and prices are lower. The tin market is only moderately active at intervals. The lead market continues quiet and firm. Demand for zinc is still very small and prices are little easier.

Copper.—The sale of speculative and other lots of electrolytic copper in the latter part of July resulted in bringing the whole market down to the lowest level in weeks. A few of the small producers are meeting the market which may be quoted at 12c., delivered, or 11.75c., New York, for August delivery, but the amount of metal sold at these prices is exceedingly small, most consumers having no need to purchase and the volume of exchange holding back most of the foreign demand. Some of the large producers will not entertain business at less than 12.50c., delivered. Some sellers report a slightly firmer market to-day, due to the inauguration of the new month and elimination of a large part of the copper held in weak or speculative hands. Most of the producers of Lake copper are out of the market and it is difficult to quote values, an appraisal being 12c., New York, or 12.25c., delivered, nominal, for early delivery. It is interesting to note that official statistics of exports of refined copper show that with the 11 months ended with May, this year, Germany took about 27 per cent, which compares with 33 per cent of her share of the exports in 1913. Germany now ranks as the largest foreign buyer of American copper and it is also a fact that, of the total taken in the last 11 months, 70 per cent was purchased in the first five months of this year.

Copper Averages.—The average price of Lake copper for the month of July, based on daily quotations in THE IRON AGE, was 12.59½c. The average price of electrolytic copper was 12.46c.

Tin.—For the most part the market has been exceedingly quiet, with the exception of July 27, when a fair business in future shipment of Straits tin was done, amounting to 200 to 250 tons. Consumers were fairly heavy buyers. Because of the bank holiday in London yesterday the market here was quiet and has continued so to-day, with quotations largely nominal. Straits tin is quoted to-day at 26.50c., New York. London quotations to-day are practically the same as those of a week ago, spot standard being quoted at £158 10s., future standard at £160 10s. and spot Straits at £159 per ton. Deliveries into consumption for July are reported as 1525 tons with 1721 tons in stocks on July 31 and 800 tons being landed. Imports for the first seven months of this year are returned at 10,418 tons against 31,613 tons for the first seven months of 1920.

Lead.—There appears to be more disposition on the part of independent sellers to offer lead and the result is that more metal has been offered than current inquiries call for. While the leading interest continues to quote 4.40c., both New York and St. Louis, the outside market is quiet at 4.40c., New York, and 4.20c., St. Louis.

Zinc.—Some prime Western zinc is being offered at 4.20c., St. Louis, or 4.70c., New York, which we quote as the market for early delivery. Demand continues spasmodic and confined to small lots on which most producers in this market quote 4.25c., St. Louis, or 4.75c., New York.

Antimony.—The market is lifeless with wholesale lots for early delivery obtainable as low as 4.60c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is quoted by the leading interest at 24.50c., f.o.b. plant, in wholesale lots for early delivery, while the same grade from foreign sources can be procured as low as 21c., New York.

Old Metals.—The market is sluggish and values are slightly off. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	10.00
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	8.00
No. 1 yellow rod brass turnings	4.75
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

AUG. 2.—Copper, lead and spelter are lower. There is almost no demand. We quote Lake copper at 12.75c. in carload lots; tin, 28c. to 28.50c.; lead, 4.30c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 1.—Consumers of non-ferrous metals are doing virtually nothing and the markets are extremely dull. Lead is quoted at 4.20c. and zinc at 4.20c., car lots. We quote Lake copper car lots at 12.73c. to 12.98½c.; tin, 27.36c., and antimony, 5.38½c. On old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. aluminum, 9c.

GREAT OUTPUT

Allegheny County Industries Made a New Record in 1920

PITTSBURGH, Aug. 1.—Allegheny county industries in 1920 produced manufactures having a value of $2,580,915,800, approximately $680,000,000 more than the value of 1919 products and $250,000,000 greater than in 1918, when a county record was established, according to figures made public recently by Secretary of Internal Affairs Woodward following completion of a survey of industrial Allegheny by the Bureau of Statistics and Information of the Pennsylvania Department of Internal Affairs. The figures show that there were employed in the county last year 243,333 persons. In 1919 there were 221,621 employed and in 1918 282,458.

Metal production in Allegheny county last year was the greatest in the country, the value being $1,995,619,300, of which $1,526,293,900 represented primary metal products. Secondary products were worth $469,325,400. Iron and steel ingots were worth $317,653,300. The metal trades last year gave employment to 146,324 persons, who were paid an aggregate of $279,304,100. Capital invested in metal plants was $701,083,300. In 1919 metal production was worth $1,448,495,400. In that year there were 126,479 persons employed who were paid $202,914,500. Capital invested in 1919 was $515,624,600.

BELGIAN MARKET DULL

Economic Union with Luxemburg Opposed—Prices Continue to Slump—French and German Competition

(By Aerial Mail to London)

CHARLEROI, BELGIUM, July 19.—Although the Comité Paritaire appointed by the Belgian and Luxemburg governments has been studying the proposed economic and customs union between Luxemburg and Belgium for more than six weeks very little headway seems to have been made. It is realized that the opening of frontiers would doubtless result in cut-price competition, as the present duty averages 30 fr. per ton on finished steel. Moreover, the danger of increased German competition presents a grave aspect. Should the union come about, it is argued, there is nothing to hinder German capital from moving to Luxemburg and establishing works there, where, under the cloak of Luxemburg enterprises, the Belgian market could be swamped with cheap material.

The recent establishment of the Société Luxemburgeoise pour Enterprises Electriques, a branch establishment of the German Allgemeine Elektrizitaets Gesellschaft, clearly shows that German industry is considering Luxemburg as a field for regaining her position in the world's markets. This would, of course, provide a method for circumventing the 26 per cent export levy on German goods by the Entente.

More Plants Close

The general situation seems to be drifting from bad to worse, with no improvement in sight. More plants have had to close down lately, including the basic steel works of the Cockerill concern, while the Espérance-Longdoz Co. is also contemplating a shutdown of its steel works. A faint ray of hope for a revival of the international iron market is offered by the conclusion of the miners' strike in the United Kingdom. German competition has, for the time being at least, become somewhat less formidable as German mills are stipulating longer terms of delivery, but in prices Belgian producers are still struggling to hold their own.

More and more the conviction is gaining ground that improvement must come from a considerable wage reduction. Industrial circles are estimating that a 50 per cent wage cut will be necessary, but in face of the stubborn opposition of labor, opinion as to the possibility of carrying through a reduction on that scale is somewhat divided. It appears that labor would eventually consent to a substantial reduction provided the Government guarantees a liberal unemployment benefit.

Pig Iron Continues to Slump

The first effects of the removal of control from French pig iron and semi-finished products found expression in desperate efforts by producers to get as much British business as possible before French competition appeared. Quotations for foundry iron were cut to £5 per ton, while £7 was asked a few weeks ago. These low prices were apparently quoted by overstocked producers, since the average prices ruling throughout the past week were £5.10 c.i.f. United Kingdom port.

Blast furnace coke has been reduced to 110 fr., screened coke, to 145 fr. and special grades to 150 fr. Foundry iron No. 3 has receded to 205 fr., basic, to 175 to 190 fr., at furnace. Against these, Luxemburg foundry iron is offered at 195 fr. per ton, f.o.b. Belgian frontier, and Lorraine iron as low as 180 to 185 fr. As a matter of fact, plants are accepting almost any price consumers feel disposed to pay. Germany is offering spiegeleisen, 10 to 12 per cent, at 1825 to 1850 m. per ton. British hematite prices are hardening, latest quotations being £7.5 to £7.10, c.i.f. Antwerp.

Semi-Finished Material Stationary

The change in prices compared with quotations during the last weeks is not considerable. Average quotations on basic Bessemer steel during the past 10 days were as follows:

	Fr. per Metric Ton
Ingots	270 to 280
Blooms	300 to 310
Billets	315 to 320
Sheet bars	330 to 345

Lorraine producers are actively pushing cogged blooms at about 275 fr. per ton.

Finished Material Drops

The slump in prices proceeds almost automatically week by week, bar iron now having passed the 400-fr. level; 385 to 395 fr. is named for No. 2 wrought iron, 385 to 415 fr. for No. 3, and 400 to 405 fr. for soft steel. The latter is offered as low as 379 to 390 fr. for export, f.o.b. Antwerp, while the export quotations for Nos. 2 and 3 wrought iron are 380 to 395 fr. and 385 to 410 fr., respectively. Hoops have slightly recovered from the heavy drop of last week from 625 fr. to 550 fr., a slightly better demand bringing the price to 575 fr. again. The sheet market under the pressure of French and Luxemburg offers showed a weaker tone. We quote basic sheets No. 6. U. S. standard gage for export at 485 to 495 fr., but Lorraine and Luxemburg mills are naming 450 to 460 fr. and 455 to 470 fr., f.o.b. Antwerp, respectively.

Exports of boiler plates to the United Kingdom developed favorably, but are now meeting keen German competition, the Germans cutting Belgian quotations of £13.10 to £14, c.i.f. Glasgow, by 30 to 40s. per ton.

Rail Market Slightly Active

The La Providence company was awarded an Argentine rail order for 8000 tons at a price of 469 fr. per ton and another works is just reported to have booked an order for 10,000 tons of rails at 460 fr., c.i.f. Brazilian port. Generally rail export quotations are from 460 to 475 fr. per ton. The Chilean Government is inquiring for about 1200 tons of tool and spring steel, plates, etc., and other material for its railroads. In the beam market, orders for heavy shapes are particularly sought and mills are accepting offers as low as 380 fr. per ton compared with the ruling price of 400 to 410 fr. There are indications that the wire market may also be affected by the general depression, though prices for nails are maintained at 15s. per cwt., f.o.b. Antwerp, plain bright wire bringing £1.

The Belgian Congo Katanga Railroads have placed an order with inland works for 90 cars of 40 tons each, totaling in value about 3,000,000 fr.

Increased Activity at Youngstown

YOUNGSTOWN, OHIO, Aug. 2.—Valley iron and steel plants are on the heaviest production schedule this week since January, reflecting improved demand. While some manufacturers are inclined to believe the current movement is simply a spurt and will recede, others express the hope that it may be the beginning of the upturn that shall carry the industry back to normal. After being idle since May 24 Mary blast furnace at Lowellville, Ohio, of the Sharon Steel Hoop Co., Sharon, Pa., has been started. The stack made its first cast on Monday of this week. All Bessemer departments of independent interests and the Carnegie Steel Co. are active, 26 of 66 open-hearth furnaces are melting, while 60 of 105 sheet mills in the Mahoning Valley are under power, the largest number since early in the year. Bar mills of the Republic Iron & Steel Co. are being operated after a long suspension. Hoop, band and strip steel production shows an improvement this week.

With the relighting of Mary furnace, seven of 46 stacks in the Mahoning and Shenango Valleys are in blast, two being operated in the Ohio Works battery of the Carnegie Steel Co., two in the East Youngstown group of the Youngstown Sheet & Tube Co. and one each of the Republic company and the Brier Hill Steel Co., The Sharon company has 160,000 tons of ore on hand which is to be worked off. Since the furnace has been suspended the company has purchased its pig iron requirements from Valley steelworks interests. An inquiry which it had put out for 2000 tons of basic has been withdrawn in view of the operation of its own furnace.

PERSONAL

Charles J. Hunter, vice-president and treasurer Wheeling Steel & Iron Co., has been named to succeed John Duncan as president of the company. Mr. Hunter has been associated with the Wheeling Steel & Iron Co. for many years, and has served in practically every capacity from clerk to the highest executive office in the company. Mr. Duncan was tendered a farewell reception at the Wheeling Company Club, Wheeling, W. Va., on July 29, by the former associates and was presented a diamond stickpin. He is to become president of the Illinois Co., a holding corporation with headquarters in St. Louis, controlling coal lands, iron ore mines and railroad lines.

George E. Harris has resigned as general manager of sales of the Falcon Steel Co., Niles, Ohio, in order to engage in the steel business for himself in Detroit, and has made connections with some important producers covering practically all lines of steel. He will specialize on strip steel, sheets, tubing, steels of special analysis of carbon and alloy steels. Mr. Harris has spent 30 years in the steel industry, starting as water boy in the Pacific Rolling Mills in San Francisco, of which his father was one of the organizers. A large portion of this time was spent in the operating end of the industry. His last operative job was division superintendent of the Nova Scotia Steel & Coal Co., New Glasgow, Nova Scotia, where he had charge of the company's forge and axle shop and bar mill. He also served as superintendent of A. Finkle Sons, Chicago, and was associated with other mills in their operating departments. In the sales end of the steel business, he spent several years with the Peter A. Frasse Co., Buffalo, in charge of its steel department and was also director of sales of the Hawkridge Brothers Co., Boston, resigning that position to become associated with the Falcon Steel Co., During the war, he was an approval officer in the finance department of the air service.

GEORGE E. HARRIS

Alfred J. Eichler, vice-president Walworth International Co., sailed July 26 on the Aquitania for England and the important cities on the Continent. Early in September he plans to leave England for Buenos Ayres, returning to New York by way of other East Coast cities, arriving in New York late in November.

R. K. Swift has resigned from the Ingersoll-Rand Co. after eight and a half years as manager of the New England sales branch office and a previous 10 years as a salesman for that company. He will take a much-needed rest at his camp at East Weymouth, Mass.

J. P. Keene, president and general manager of the Youngstown Tank & Boiler Co., Youngstown, Ohio, has assumed the duties of W. H. Heywood, who has resigned as vice-president and treasurer. A successor will not be elected to Mr. Heywood until the first of next year. Prior to becoming identified with the Youngstown Tank & Boiler Co. 18 months ago, the latter was in the sales department of the Youngstown Sheet & Tube Co.

Joseph G. Butler, Jr., is slowly convalescing from the effects of an accident over a year ago when he was struck by a motor truck near his home in Youngstown, Ohio. For the past three months he has not been at his office in the Stambaugh Building, Youngstown. His condition has improved, however, to such an extent that he left on Monday of this week for Atlantic City, where he will stop at the Traymore Hotel during August and possibly longer.

Joseph Wolf, president Cincinnati Electrical Tool Co., arrived in New York July 30, having completed a trip through England, Belgium, France and Holland where he visited his selling connections. He found business extremely quiet in his line because of the severe German competition.

Roy Davey, who has been manager of the Detroit branch for the American Bosch Magneto Corporation, has been given larger responsibilities at the main office of the corporation at Springfield, Mass. He is now acting as manager of the manufacturers' trade department.

A. W. L. Gilpin, who has been manager of the Milwaukee branch and assembling plant of the Ford Motor Co., has been promoted to district manager, in charge of branches at Detroit, Milwaukee, Chicago, Cleveland, Cincinnati, Columbus, Indianapolis and Louisville.

Floyd E. Meeks, for the past four years Pittsburgh district manager of the Shepard Electric Crane & Hoist Co., has been transferred from the sales to the service department of the company, with headquarters at Montour Falls, N. Y. Mr. Meeks will have charge of service, erection and repairs. His successor in the Pittsburgh office is W. C. Minier, formerly connected with the Pittsburgh office and who for the past few years has been in charge of the Cleveland office of the company. It is the intention of the company to combine the Cleveland and Pittsburgh offices, with Mr. Minier in charge.

Frank S. Spencer, 1265 Boylston Street, Boston, has been appointed representative of the Witherow Steel Co., Pittsburgh, for the sale of variable section rolled products in the New England district.

H. Voges, Jr., has resigned as vice-president and general manager of the Webster & Perks Machine Tool Co., Springfield, Ohio.

Percy Tetlow has been appointed director of industrial relations of Ohio, being made a member of the cabinet of Gov. Harry L. Davis, a recently enacted State law providing for a governor's cabinet. Mr. Tetlow is a native of Washingtonville, Ohio, and has been very active in labor union affairs.

I. W. Hawes, New Britain Machine Co., New Britain, Conn., automatic screw machines, has returned from a nine months' trip to Europe.

O. K. Carpenter, superintendent New England Steel Castings Co., Springfield, Mass., has resigned to accept a position as salesman for the Electric Steel Products Co., Turners Falls, Mass., steel castings and tools.

Charles E. Hildreth, who recently resigned from the Morgan Grinder Co., Worcester, Mass., has been appointed receiver for the Springfield Screw Machinery Corporation, Fitchburg, Mass.

H. F. Boersma, of The Hague, Holland, sailed from New York July 30 on the *Rotterdam*. He has just completed a trip around the world during which he studied the latest developments in steel building construction. He is prominent in building contracting in Europe, among other things, having built the Peace Palace at The Hague.

Henry Dreses, Dreses Machine Tool Co., Cincinnati, left New York July 30 for a visit to Europe to be gone until early in October.

W. N. Dickinson, for some years identified with the elevator business, including the Otis and Standard Plunger companies, and during the war attached to the Ordnance Department of the U. S. Army, has opened an engineering office in the Aeolian Building, New York, to specialize in the handling of materials.

Appointed Head of Heavy Machinery Industrial Division

WASHINGTON, Aug. 2.—Walter H. Rastall, of Dayton, O., a mechanical engineer and marine draftsman, who has had extensive experience with iron and steel and machinery manufacturing interests and has served in different capacities for the Government, took up his duties last Friday as chief of the heavy machinery division of the Department of Commerce. This is one of the new divisions provided for by Congress recently under the export industries act, and Mr. Rastall was selected for his new position by Secretary of Commerce Herbert Hoover because of the practical experience and broad knowledge Mr. Rastall has in the machinery line.

Born in Burlingame, Kan., Mr. Rastall is 41 years of age, and obtained his primary and preparatory school training in Chicago and at Hebron Academy, Hebron, Me. This was followed by a course of three years in civil engineering with electrical electives at the University of Maine and a course of two years in mechanical engineering with electrical electives at Cornell University. He was given the degree of mechanical engineer in 1904. He also took a course in naval architecture.

WALTER H. RASTALL

Previous to graduation, Mr. Rastall was engaged as a marine draftsman with the Bath Iron Works, Bath, Me., and the Eastern Shipbuilding Co., New London, Conn., and as chief draftsman with the Latrobe Steel & Coupler Co., Melrose Park, Ill. He is a member of the American Society of Mechanical Engineers. His first foreign experience covered the period from 1904 to 1911, inclusive. As resident engineer of the American Trading Co. at Kobe, Japan, Mr. Rastall was responsible for the engineering and commercial features of a business involving the sale of American industrial machinery to Japanese buyers and increased that company's business from practically nothing to $500,000 annually. The concern represented about 20 American machinery manufacturers, including the Allis-Chalmers Co., the Ingersoll-Rand Co., Henry R. Worthington, Erie City Iron Works and the Jewel Export Filter Co. In this work, Mr. Rastall handled a large variety of equipment, mining machinery, pumping machinery, power plant equipment, gas engines, ice plants, water works, paper mills, cement making machinery, railroad and shipyard supplies, steam engines and boilers and many other lines. He is credited with having installed the first mechanical filter plants used for municipal supplies in China, Korea and Japan, the plant at Kyoto, Japan, being an unusually important undertaking. The largest single contract Mr. Rastall ever took included the building and completely equipping of a plant at Formosa requiring 500 tons daily of sugar cane whose juices were converted into white sugar. This involved the delivery of about 2000 tons of machinery.

In addition to miscellaneous engineering work in the United States, Mr. Rastall was sales engineer for the Worthington Pump & Machinery Corporation from 1913 to 1917. As a war measure, he joined the Bureau of Aircraft Production in March, 1917, as aeronautical mechanical engineer and was given charge of production in the Dayton district, extending from Buffalo to Kansas City.

In October, 1918, the Department of Commerce requested Mr. Rastall to leave the Bureau of Aircraft Production to investigate the markets for industrial machinery in the Far East. This was started at once and has involved visits to practically every port in Asia from Karachi and Bombay to Yokohama, including Ceylon, the Dutch East Indies and the Philippine Islands. The trip recently was completed and the report on the investigation is in course of preparation.

Mr. Rastall will study especially the problems connected with the marketing of American heavy machinery throughout the world. It is the view of department officials that the situation in this respect is unusually attractive at this time, owing to the strong nationalistic spirit which the experiences of the war have created in many countries. This spirit, it is pointed out, is manifesting itself particularly in Latin-America and the Far East where the business men have learned the dangers of complete dependence on outside sources for essential industrial supplies. As a result, department officials believe that the potential market for American heavy machinery is promising and the hope is expressed that the work of this new division may be instrumental in the sale of much American equipment of this character in industrializing the less developed countries of the world.

OBITUARY

WILLIAM ROBERT PARK, consulting engineer Hancock Inspirator Co., Boston, died July 29 at the Morton Hospital, Taunton, Mass., following an operation. Mr. Park was born in Brooklyn, Aug. 19, 1831. An orphan at the age of ten, he became a helper in a machine shop at North Scituate, Mass. While in his twenties Mr. Park was made superintendent of the Grover & Baker Sewing Machine Co. plant, Boston, and remained with the firm until it dissolved in 1876, when he was made manager Hancock Inspirator Co., Boston. The Government presented him a gold medal for his mechanical achievements. He was a member of the A. S. M. E. He is survived by a daughter and two sons, Charles F. Park, professor engineering department Massachusetts Institute Technology, and W. R. Park, Jr., engaged in conducting a business established at Taunton by his father.

WILSON L. FENN, president Fenn Mfg. Co., Hartford, Conn., special machinery, and one of the incorporators of Taylor & Fenn Co., that city, machine tools, died July 26 at the Charter Oak Private Hospital, Hartford, after a short illness, in his sixty-third year. Mr. Fenn was born at Plainville, Conn. As a young man he was employed by the Pratt & Whitney Co., Hartford. Later he was superintendent Woodward & Rogers, that city, and in 1900 established the Fenn Machinery Co. In 1907, the Phoenix Iron Works and the Fenn Machinery Co. combined under the firm name of Taylor & Fenn Co. In 1914 Mr. Fenn severed his connection with that company and the next year, with his son, formed the Fenn Mfg. Co. He is survived by this son, Wilson A. and a daughter, Mrs. Stephen G. Pierce, Hartford.

WILLIAM PAUL SIEBERT, Jr., Eastern sales manager, the Weirton Steel Co., Weirton, W. Va., died July 29, in Roswell, N. M., where he had gone for his health. He was the oldest son of William P. Siebert, assistant general manager of sales, the Carnegie Steel Co., Pittsburgh, and was born in Pittsburgh about 31 years ago. Prior to assuming the position of Eastern sales manager for the Weirton Steel Co., he had been attached to the Clarksburg and Weirton plants of that company. He had a wide acquaintance in steel and tin plate trade circles.

WILLIAM T. HOFSESS, New York sales representative of the Wallace Barnes Co., Bristol, Conn., spring manufacturer, met death by drowning Monday night, July 25, while in swimming at Lake Compounce, Conn. Mr. Hofsess was born in New York July 25, 1885, and on moving to Bristol entered the employ of the Bristol Brass Co. in 1900, holding the position of assistant superintendent when he left there. In 1916, he entered the sales force of the Wallace Barnes Co., and made many friends among manufacturers with whom he came in contact.

JAPANESE BUYING CONTINUES

Small Orders for Sheets, Structural Material and Rails—German Quality Is Improved—Welded Steel Ship Launched

NEW YORK, Aug. 2.—Purchases from foreign markets, although small, are beginning to be steady and would probably be more numerous if prices were sufficiently lower to compete with European material, c.i.f. foreign ports. German quotations are but slightly affected by the special import barriers against German material erected by various of the allied nations, as such taxes are paid by the German Government instead of the manufacturer or exporter.

Japanese buyers continue to place small orders in the United States, but considerable purchasing of German material is reported, the Japanese claiming that the quality and workmanship is improving. Sheet buying continues, but although the total of recent purchases by Japan in this country is fairly large, practically all purchases have been of black sheets, Nos. 28 to 31 gage, the heavier sheets being placed with British makers, which are not in a position to quote as advantageously on the lighter gages as the American mills. Low prices are insisted upon by Japanese buyers.

One exporter in New York, who recently quoted a price to Japan, based on $43 per ton, Pittsburgh, for a tonnage of 35-lb. rails, including splice bars, bolts and plates, was informed that a quotation about 15 per cent lower had been received. A bid of 1.65c. per lb., Pittsburgh, on an inquiry for 800 tons of bars to be rolled to specifications was also turned down by a Japanese buyer, who stated that the price was too high. An inquiry is now in the market from Japan for about 430 tons of structural steel for a bridge which will probably be awarded some time this month. One Japanese exporter recently booked an order for about 630 tons of 80-lb. rails for the South Manchurian Railroad.

An inquiry calling for mild steel, wrought iron and wire for use in the construction of a wharf in New Zealand has been received by the Marchand Export & Import Co., 220 West Forty-second Street, New York. All material supplied, however, must be of Canadian manufacture. The Strong & Trowbridge Co., 17 Battery Place, New York, is handling a small order for hollow stay steel.

Electric Welded Ship Launched

An entirely electrically welded ship was recently launched from the yards of the Electric Welding Co., Goteborg, Sweden. The ship, which is 52 ft. 6 in. long with a beam of 13 ft. 1½ in. and a draft of 3 ft. 6 in., is built of steel plates 0.28 in. thick on the bottom and 0.25 in. thick on the sides. Some of the plates are overlapped, while others, particularly those on the sides, are welded edge to edge. It is reported that the welded sides were found stronger and lighter than riveted connections and less plating was required.

New Chinese Iron Mining Company

It is reported from Japan that a bridge, largest in the Orient, is projected across the Sumida River, connecting the Ryogoku railroad station with the Manseibashi elevated railroad station. Actual work on the bridge will not be started until 1925. Arrangements are being made in Shantung for the incorporation of the Yu Tung Mining Co. with an initial capital of $20,000. The head office of the company will be at Tsinanfu. It is intended to operate deposits of 70 per cent iron ore at Chinkiang. Although the capital stock of the company is small, the recently organized Lishan Coal Mining Co., near Fuchow, formed with a capital of $50,000, was later increased to $250,000.

A meeting of the stockholders of the Central Steel Co., National Pressed Steel Co. and Massillon Rolling Mill Co. to consider the proposed consolidation of the three companies will be held Aug. 4, having again been postponed to secure the assent of a greater number of stockholders. The management is desirous of having as nearly as possible a 100 per cent approval of the merger.

STEEL CORPORATION PRICES

Chairman Gary Says Reductions Were Made to Meet Those of Independents

When his attention was called to an article which appeared in the *Wall Street Journal* of Aug. 2, and he was asked to make comment, Judge Gary replied:

"The statement published in the *Wall Street Journal* Aug. 2 concerning prices of steel products is substantially correct, with the modification that our subsidiaries have not made any reductions except to meet the prices of leading independent manufacturers. Prices generally would seem to have reached the low point, as many, if not most, of the manufacturers are at present selling below the cost of production."

The article published by the *Wall Street Journal* is as follows:

The United States Steel Corporation, although making no official announcement of a new price schedule, is meeting the new low prices quoted by independent producers on steel products and appears to be setting the pace in at least one product. Reports of this have been contained in news dispatches for some time and, in the past week, the corporation has sent letters to its customers quoting prices on various products from $3 to $10 a ton below the official prices of July 5.

In most cases, the new prices meet the late prices of the independents, but tin plate, which is now quoted at $5.25 a 100-lb. box (coke), went below the independent level of $5.50 a box and has forced several of the independents to reduce their quotations. The Steel Corporation's price on tin plate as of July 5 was $5.75 a box.

Other reductions were in steel bars to $1.75 per 100 lb. from the July 5 price of $1.90, in plates to $1.85 per 100 lb. from $2, in black sheets to $3.25 per 100 lb. from $3.50, and in galvanized sheets to $4.25 per 100 lb. from $4.50. These prices, of course, have been quoted by a number of the independents for several weeks.

It may be added that these prices are only for orders involving fairly large tonnages. But it is reported that if orders are sufficiently attractive, an even better price might be made.

Following table gives a comparison of some of the new prices with the prices officially quoted on July 5, on April 13, and with the Industrial Board prices:

	New Prices	July 5	April 13	Industrial Board Prices
Tin plate	$5.25	$5.75	$6.25	$7.00
Bars	1.75	1.90	2.10	2.35
Plates	1.85	2.00	2.20	2.65
Galvanized sheets	4.25	4.50	5.00	5.70
Black sheets	3.25	3.50	4.00	4.35

This lowering of prices bears out predictions made by observers of the steel trade that, after July 5, there would probably be no further official cutting of prices, but that prices would be made, as time went on, that would take business.

Reports from various trade centers for the past ten days have pointed out an increase in inquiry for steel products. To take this new business, it is only natural at the present time that lower prices would be made.

Will Help Employees

The McKinney Steel Co., Cleveland, has decided to relieve its employees at the Lake Superior mines of some of their living expenses during their present period of unemployment owing to the shutting down of the mines. No rent will be charged to employees living in company houses, if no work is available for them, and men working on half time will be charged half rent. Doctors' fees, which have been deducted from the men's pay in the past, will be paid by the company. In addition the company will pay charges for water supplied to employees occupying houses that have water piped from the city lines. Where possible, the company is providing a little work for men cleaning up around the mines.

Valley Wages Not to Be Reduced

YOUNGSTOWN, OHIO, Aug. 2.—Valley steel interests plan no wage reduction at present, to follow the reported action of the Cambria Steel Co. in cutting the day labor rate to 25 cents. Independent mills are paying 30 cents for common labor and the Steel Corporation units 37 cents. Johnstown and Eastern centers have uniformly paid less than Youngstown and Pittsburgh districts.

MORE HOPEFUL SIGNS

Youngstown Pleased with Developments—Increased Demand for Some Products

YOUNGSTOWN, OHIO, Aug. 2.—Cumulative evidences strengthen the growing conviction that the steel industry has "turned the corner" and is headed toward more prosperous days. One of the leading independents reports that the volume of inquiries has appreciably increased within the past week for a miscellaneous variety of finished products, and emanating from all parts of the country. Large jobbing interests which have bought cautiously for a number of months are seeking larger tonnages, while manufacturing consumers of steel are more active in the market. Specifications against contracts and new buying have shown considerable new life, resulting in improved mill operations. Following three months of inactivity, the industry enters August with more hopeful signs than have been evident since the first of the year.

Recent sheet business placed in the Valley aggregates in excess of 3000 tons. At its Western Reserve works, near Warren, the Brier Hill Steel Co. has been working off an order for special blue annealed sheets for the Ford Motor Co., under rigid inspection of the buyer's representatives. Rod and wire business placed within the past week with a district maker has enabled the enlargement of production in affected units. A tank and boiler interest has received enough business in the past ten days to increase production to 100 per cent. An inquiry being figured by Valley interests calls for 6800 tons of plates and has been put forth by oil interests at Shreveport, La.

Claiming that ferromanganese is cheaper and may therefore be used more advantageously than spiegeleisen, a steelworks interest operating blast furnaces is in the market for 50 tons of ferromanganese. In view of quotations ranging from $28 to $31, furnace, on 20 per cent spiegeleisen, as compared with 80 per cent ferromanganese quoted at $70 or less delivered, the latter may be substituted.

Prices Still Uncertain

While prices are generally uncertain, it is felt that the bottom has either been reached or is being approached on many finished products, at least until freight charges are revised. While plates, for instance, are generally quotable in the Valley from 1.80c. to 1.85c., a consuming interest states that they are purchasable in the Chicago district at 1.50c. or less, and that Valley makers stand ready to offer substantial concessions to release tonnage. Most of the current buying is for car repair material and for tank building.

More activity is being shown in the sheet market than at any time this year, the product to be used for a variety of purposes. Galvanized for car roofing is in specially strong demand. A producer of full finished has sheets in warehouse for delivery to a large number of automobile makers besides Ford. This particular maker has produced a highly polished sheet that has proved especially successful for auto body stock. Concessions are being accepted on production tonnage from the 4.70c. quotation for No. 22 gage material.

Prices of 3c for No. 28 black and 4c for No. 28 galvanized more fully represent the trend of the market at the present time and it is authoritatively stated that galvanized has been offered by makers in a nearby district at less. While some mills are not openly quoting these prices, they will meet them under the stress of current competitive conditions. An encouraging feature is that consumers in widely scattered sections, some of whom have been out of the market for months, are sending out inquiries.

Bars More Active

Steel bars are displaying more activity, the bulk of the inquiry coming from the automobile trade. A number of 1000-ton inquiries have elicited bids and 1.75c. base has been offered on attractive tonnage. Various motor companies have been negotiating for a total of 9000 tons of bars.

Better tin plate business has been stimulated by the $5.50 base price, though this market is still far from normal. Increase in the production rate of American Sheet and Tin Plate Co. mills in the Shenango Valley indicates the placement of larger orders with that interest.

For the time being, pipe is not sharing in the upward movement, though new buying of butt weld sizes for construction is holding its own. One interest is rolling lap weld sizes on an export order.

Foundries are buying pig iron in larger quantities than formerly, though large tonnages of basic are piled in independent yards. The market remains at $18.50 to $19, with further liquidation expected to bring lower quotations.

Buying of plain wire and wire rods is showing more strength for the time being and operations are well sustained at 30 per cent. Plain wire at the 2.50c. base is one of the commodities which has apparently escaped the general movement to a lower price level. Wire rods are selling at the $42 basis of the leading interest.

In the semi-finished market, it is reported that orders impend for an aggregate of 10,000 tons of sheet bars at the quoted price of $32.

Steel Bridges for Alaska

SEATTLE, July 26.—The Washington Sales Engineering Co. of this city has been awarded the contract for furnishing steel to be used in the construction of five bridges in Alaska to be erected by the Alaska Road Commission. The commission maintains head offices at Juneau, Alaska, although communications can be addressed to and business transacted with local headquarters in the United States Engineers' office here.

Four of the bridges to be erected by the commission will be 100-ft. spans, the other 120 ft. One will be located at Ruby, one at Fairbanks and three at Chitina.

Recently the Washington company furnished steel for two similar spans for the Road Commission which are now under erection at Juneau, and also supplied the steel for a 100-ft. steel bridge at Le Grade, Ore., by the Union Bridge Co.

Belgian bars are offering here at $1.75 per 100 lb. f.o.b. shipside, but it is reported that there is little interest. Buyers declare that the domestic market has fallen to such an extent that imports will have to be quoted lower to invite any trading.

Jobbers here report that the unsettlement of the steel market is grave. Inquiring from an Eastern mill this week for a car of sheets, the mill replied, "Let conscience be your guide," According to the tenor of the replies from the mills on sheets and plates, it is practically a buyers' market.

Rates for Special Purpose Machines

"Setting Machine Rates for Special Purpose Machines" is discussed in a five-page bulletin, published by the National Association of Cost Accountants, 130 West Forty-second Street, New York. According to the bulletin, "The rate of the regular purpose machine is based upon the hours that the machine has run during a period of normal business activity. When an attempt is made to set a machine rate for the special purpose machine on the same basis, the rate seems too high." The questions then asked are: "Should the question be solved by arbitrarily assigning to the special purpose machine a standard monthly operating time equivalent to the standard monthly time used in connection with the machine rate for the regular purpose machine? Would this procedure penalize the costs of the product made by the special purpose machine, or would it demonstrate that the special purpose machine does not pay for itself?"

Six "answers" to the above questions follow. Concluding, "The consensus of opinion in the answers given is that the cost per hour of running the special service machine should be based on the normal hours that this machine is supposed to run for the special purpose intended, even though it runs only two or three hours a week. Since this machine is purchased for a specific purpose, it would seem logical that the carrying out of this purpose should stand the cost."

IRON AND INDUSTRIAL STOCKS

Prices Irregular but Generally Slightly Higher During the Past Week

In a few instances stocks displayed weakness the past week due to certain conditions surrounding the individual issues. Iron and industrial securities in general, however, have ruled slightly higher because of broader constructive developments. For instance, the omission of the $2 quarterly dividend on Pressed Steel Car Co. common stock caused some holders to sell out, and certain owners of Railway Steel Spring shares unloaded in sympathy, yet the equipments as a group held closely in view of indicated improved business. General Electric was sold freely on reports of comparatively poor business, people evidently forgetting the strong financial condition of the company. On the other hand, the quarterly earnings statement of the United States Steel Corporation stimulated a demand for the common shares, investors feeling the bottom in the steel industry depression practically has been reached and that gradually improving conditions are before the steel industry as a whole.

At best the market has been irregular, yet mostly higher. The better feeling in banking and business circles to a large extent is based on money market conditions. Money for the first time in two years really is plentiful as loaning rates indicate. Commercial paper is moving in larger volume than it has before in many months. Bond issues are absorbed as fast as appearing on the market, regardless of size. General industry has liquidated, although in particular instances it is not completed. Manufacturing plants have remained idle or have operated on reduced schedules sufficiently long to have created a real demand for certain products, at least.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	31 - 32	Nat.-Acme	14½ - 15¼
Allis-chalm. pf.	.. - 73	Nat. E. & S. com.	46 - 48
Am. Can com.	26¼ - 28⅛	N. Y. Air Brake.	55 - 57
Am. Can pf.	81⅛ - 82	Nova Scotia Steel	.. - 23
Am. C. & F. com.	122⅛ - 127½	Pittsb'gh Stl. pf.	79⅞ - 80
Am. Loco. com.	79½ - 85	Pressed Stl. com.	56 - 74⅛
Am. Rad'tor com.	68⅝ - 69	Pressed Stl. pf.	.. - 85
Am. Stl. Fy. com.	25½ - 26⅞	Ry. Stl. Spg. com.	67 - 83¼
Am. Stl. Fy. pf.	80½ - 80⅝	Ry. Stl. Spg. pf.	.. -100
Bald. Loco. com.	77 - 80½	Replogle Stl.	.. - 20½
Bethl. Stl. com.	.. - 47	Republic com.	45⅜ - 47
Beth. Stl. Cl. B.	47⅜ - 50½	Republic pf.	.. - 84
Beth. Stl. 8% pf.	98½ - 99	Sloss com.	35 - ..
Chi. Pneu. Tool.	50 - 50¼	Superior Stl.	.. - 30
Colo. Fuel	22 - 26	Transue-Williams.	31½ - 32½
Cruc. Steel com.	54⅜ - 56¼	Un. Alloy Stl.	25 - 25⅞
Gen. Electric.	116 -123½	U. S. Pipe com.	14⅞ - 15
Gt. No. Ore Cert.	27¼ - 27⅝	U. S. Pipe pf.	.. - 44½
Gulf States Stl.	.. - 32½	U. S. Steel com.	73 - 74⅞
Int. Har. com.	70¾ - 75	U. S. Steel pf.	109¼ - 109½
Int. Har. pf.	99¾ - 100¾	Vanadium Steel.	28 - 29¼
Lackawanna Stl.	37½ - 39	Westingh'se Elec.	41¾ - 44¼
Midvale Stl.	23¼ - 23½		

Industrial Finances

The Holyoke Valve and Hydrant Co., Holyoke, Mass. has increased its capitalization from $50,000 to $100,000 and declared a 100 per cent stock dividend to apply to undivided surplus earnings.

The Otis Steel Co. stockholders are being asked to approve a $15,000,000 mortgage bearing not more than 8 per cent interest, of which $5,000,000 will be issued within the near future to refund outstanding obligations, to provide working capital, etc.

The Six Wheel Truck Co., Fox Lake, Wis., recently incorporated, is now floating a loan for $50,000 for the erection of a building for assembly work, and expects to be in the market for equipment about the first of the year.

The Standard Pulley Co., Cincinnati, manufacturer of pulleys, and operating a foundry and machine shop, has been placed in the hands of a receiver through an application of its president, J. H. Jewett. The company is financially sound, but, on account of the present business depression, is having difficulty collecting its outstanding accounts. The property will be operated by Mr. Jewett, who has been named as the receiver.

For the year ended Dec. 31 the Sharon Steel Hoop Co. reported net profits, after charges and Federal taxes, of $693,861, equivalent to $2.61 a share at $50 par value, earned on the 265,746 shares of outstanding capital stock. Net earnings from operation amounted to $2,115,395.

An involuntary petition in bankruptcy has been filed against the Pfau Motor Pump Co., 829 Forest Home Avenue, Milwaukee, Wis., by the M. J. Walsh Machinery Co., F. R. Dengel Mfg. Co. and the Western Iron Stores Co., all of Milwaukee. Oscar C. Schwemer, Pereles Building, has been appointed receiver.

Directors of the Pressed Steel Car Co. have deferred action on the regular quarterly dividend of 2 per cent on the common stock due at this time. The regular quarterly dividend of 1¾ per cent was declared on the preferred stock, payable Aug. 30, to stock of record Aug. 9. It was stated after the dividend meeting that the common stock disbursement was deferred on account of business conditions and uncertainty as to the future.

Bethlehem Business Improves

New business taken by the Bethlehem Steel Corporation in the second quarter of the year showed a great improvement over the first quarter, according to Eugene G. Grace, president, in a statement issued July 28 after the quarterly meeting of the board of directors.

The directors declared the usual quarterly dividends of 1¼ per cent on both classes of common stock, payable October 1 to stockholders of record September 15. The dividend on the common was more than earned for the entire six months' period, Mr. Grace said.

"The value of orders on the corporation's books as of June 30," he said, "is $84,000,000, compared with $110,000,000 March 31. Although the amount of new business booked during the quarter was $26,000,000 less than the billings, it showed a marked increase over the first quarter. This would indicate that the low point had not only been reached, but actually turned, and that a gradual increase in the volume of business is to be expected. Railroad and railroad supply and equipment company buying is estimated to represent anywhere from 35 to 50 per cent of the demand of the steel industry. It is, therefore, believed that just so soon as the railroads are in position to enter the market a definite and substantial improvement will be noted in the steel business.

"With steel prices relatively at the lowest point in 20 years, it is evident that the steel interests have done their full share in liquidating values to a point where business should go forward, provided other conditions are similarly adjusted."

Standard Parts Co. Finances

Frank A. Scott, receiver of the Standard Parts Co., Cleveland, has issued a report of the company's operations and finances for the period from March 1 to June 30, in which he states that he has a cash balance of $1,538,219, out of which he made application for authority to pay a dividend of 10 per cent upon the indebtedness of the company. The receiver's report shows that during the four month period gross sales were $3,321,087 and that the loss for the four months, after all allowances for depreciation, etc., amounted to $129,521. Disregarding the item of depreciation the company's plants were operated at a profit of $126,447 during the period. The receiver stated that it was felt that the company had gone through its worst and that while the future may be uncertain, there will be business enough to admit of successful operation. During the four month period, business was booked by different units of the company in the following amounts: Standard Welding division, $1,500,000; Perfection Spring division, $600,000; Eaton Axle division, $1,565,000; Pontiac Spring division, $1,400,000.

Plans of New Companies

The Marcy Tool Works, Putnam, Conn., recently incorporated, has taken over the business established and conducted by A. W. Marcy, under the name of the Marcy Tool Works. Its intention is to enlarge the line of production and provide additional equipment and working capital as increasing business may require, although no new buildings or equipment are contemplated immediately. Wood turning equipment may later be installed to manufacture tool handles. The company is now and has been continually operating full time during the present business depression, and believes that the benefits of incorporation will materially strengthen its position to take care of the increased demand of normal times. The personnel of the corporation is as follows: A. W. Marcy, president and treasurer; M. C. Marcy, vice-president and secretary, and Helen E. Devine, assistant secretary and treasurer.

The Koffee Saver Mfg. Co., 18 West 18th Street, New York, recently incorporated with a capital of $100,000 to manufacture metal coffee urns and kindred products, does not expect to start manufacturing until fall.

The Dow Co., Louisville, Ky., formerly the Dow Wire & Iron Works, recently increased its paid-up capital from $100,000 to $300,000. It is spending about $30,000 putting in a new Grinnell sprinkler system and other improvements.

The Fairfield Metals Co., Inc., 342 Madison Avenue, New York, recently organized to manufacture iron, steel and other metal castings, will have its work done by contract and is not in the market for equipment.

Machinery Markets and News of the Works

REDUCTIONS MADE

Prices Cut from 20 to 35 Per Cent on Attractive Business

Considerable Activity in New England, But Chiefly in Used Tools

The price reductions made when attractive business is in sight are the feature of the week. Prices were cut from 20 to 35 per cent last week when the Illinois Central purchased about 50 machines for about $150,000, dividing up the orders among several houses. The McKinley School, Canton, Ohio, received bids July 29 for about 25 tools, discounts of as high as 20 per cent having been offered, whereas the usual discount to schools is about 5 per cent.

The Central Railway of Georgia has bought about 10 machines. The contemplated purchases of the Rock Island and Santa Fe have been postponed until probably fall. The most optimistic reports come from New England where more tools have been sold than in many weeks, though these were mostly used tools. Here there is an improved demand for cylindrical grinding equipment from the automotive interests. The first export business for some time from this district was the sale of about six tools to a machine shop in Cuba. One New England house is about to close for $25,000 worth of machine tools.

July proved to be practically no better than June. A few builders in Cincinnati closed their plants July 30 for an indefinite period, though several of the larger ones still operate. An auction sale of about 100 tools will be held Aug. 4 at the plant of the Industrial Research Corporation, New Haven, Conn.

The Jones & Lamson Machine Co. has reduced prices on lathes about 15 per cent.

The United States exported the greatest value of metal-working machinery in June to Japan, according to a report of the Department of Commerce. This totaled $599,419. France was second, with $161,900, while British India was third with $115,519.

New York

NEW YORK, Aug. 1.

The Central of Georgia Railway Co. has purchased about 10 tools, including a shaper, boring mill, radial drill, car wheel lathe and drive wheel lathe. The Brunswick Refrigerating Co., New Brunswick, N. J., has bought some tools, including grinders, and will buy more, its equipment consisting of engine lathes, turret lathes, boring mills and grinders, etc. A sale of two turret lathes was made to a manufacturer of automobile locks in New Jersey.

One current inquiry includes a 42-in. lathe and a 48-in. planer. It is rumored that the machine tools in a large plant in Long Island City, engaged in making airplane motors during the war, will be sold. More demand is noted for used tools than for new. Business is at a low ebb, with no immediate prospects of improvement.

The Jones & Lamson Machine Co. has reduced its quotations on lathes 15 per cent.

From the standpoint of inquiries there is some activity in the crane market, but sales still continue few. Quotations are as a rule low and competition keen. Among current inquiries is one from the Virginian Railway, Norfolk, Va., for a 10-ton, 73-ft. span overhead traveling crane for an engine house at Elmore, Va. The Centre Iron Works, 608 East 137th Street, New York, is receiving quotations on a 5-ton, 50-ft. span overhead traveling crane and the New Haven Boiler Works, New Haven, Conn., is in the market for a 10-ton overhead traveling crane.

Bids on the 12-ton hand power crane for the Government of Porto Rico were opened in New York, but will be passed upon in Porto Rico. The lowest quotation was submitted by the New Jersey Foundry & Machine Co. through Fox Brothers, New York. The Armington Engineering Co. quoted $1,320 and Manning, Maxwell & Moore $1,338 on a Shaw crane.

Among recent sales are: Shepard Electric Crane & Hoist Co., eight 3-ton, stationary type electric hoists to the York Mfg. Co., York, Pa., and a 3-ton, 23-ft. 3-in. span, single I beam crane to Weil McLain, Michigan City, Ind.; the Pawling & Harnischfeger Co., a 10-ton, 51-ft. span and a 5-ton, 21-ft. 9½-in. span overhead traveling crane to the Hendricks Mfg. Co., Carbondale, Pa.

M. Cohn & Co., Inc., manufacturer of corset steels, 218 West Twenty-sixth Street, New York, has awarded contract to the White Construction Co., Inc., 95 Madison Avenue, New York, for a new three-story and basement factory, 100 x 160 ft., at Evergreen Avenue and Cook Street, Brooklyn, at a cost of about $200,000. Russell G. Cory, engineer, prepared the plans.

The H. W. Sweet Shipyard & Machine Works, Inc., Greenport, N. Y., has been incorporated with a capital of $75,000 by H. W. Sweet, F. B. Corey and C. W. Thorn to operate a shipbuilding plant and general machine construction and repair works. It is represented by H. L. Fordham, 111 Broadway, New York.

The United States Sand Blast Mfg. Co., New York, has been chartered under State laws to manufacture sand blast equipment. The incorporators are W. Danzelsen, W. Fischer and H. Greenblatt. It is represented by P. E. Jackson, 302 Broadway.

The Hoffman Enameling Corporation, Brooklyn, has been incorporated with a capital of $25,000 by P. H. Hoffman, B. C. Sprague and A. V. Maday, to manufacture enamelware. It is represented by Murray, Hollaman and Lockwood, 66 Broadway.

The Handy Machine Tool & Engineering Co., New York, has been chartered under State laws to manufacture tools and other mechanical products. The incorporators are A. and R. Friedman and H. Rubin, 302 Broadway.

J. Charles Teepe, Inc., 15 Wilbur Avenue, Long Island City, has leased the four-story building at Nott and Vernon avenues, totaling about 40,000 sq. ft. of space, for the manufacture of woodenware specialties. Considerable machinery will be installed, in addition to the equipment now at the present works and which will be removed to the new plant. The company has an option to purchase the structure. L. J. Viehmann is head.

The Faspray Corporation, New York, has been incorporated in Delaware with a capital of $200,000 by John D. Wholey, C. B. Kunldsen and George E. Hite, Jr., Brooklyn, to manufacture washing, polishing and kindred machinery and parts. It is represented by the United States Corporation Co., 65 Cedar Street.

Charles E. Campbell, Inc., Elmhurst, L. I., has been incorporated with a capital of $50,000 by Charles E. Campbell, K. K. Hillabrant and I. G. Wolf, Elmhurst, to manufacture rubber products. It is represented by Bauchler & Ganty, 51 Chambers Street, New York.

The United States High Speed Steel & Tool Corporation, 489 Fifth Avenue, New York, has filed notice of organization to operate with an active capital of $2,600,000.

The Improved Metal Weather Strip Co., New York, has been chartered under State laws by L. Lipson and M. Rothenberg, 5 Beekman Street, to manufacture metal weather strips and kindred metal goods.

The Loop Lock Corporation, New York, has been incorporated with a capital of $50,000 by T. Resnik, L. Herold and M. Schenkman, 56 Pine Street, to manufacture locks and other hardware products.

The American Engineer Factories, Inc., New York, has been incorporated under Delaware laws, with capital of $500,000 to manufacture machinery and parts. It is represented by Samuel B. Howard, 65 Cedar Street.

Bear Tractors, Inc., New York, has been incorporated with a capital of $500,000 by W. J. Greacen, P. Sawyer and E. Conway, 233 Broadway, to manufacture tractors and parts, automobile engines, etc.

Durant Motors, Inc., 1819 Broadway, New York, is organizing the Durant Motor Car Co. of Indiana to take over the plant of the Sheridan Motor Car Co., a division of the General Motors Corporation at Muncie, Ind. Possession will be taken early in August. The new company will be capitalized at $3,000,000, and will use the works for the manufacture of a new six-cylinder automobile.

The Raven Screen Corporation, New York, has been chartered under State laws to manufacture metal screens and kindred metal goods. The incorporators are F. A. and A. L. Raven and E. O. Friedman. It is represented by A. P. Hawkins, 165 Broadway.

The Atlas Elevator Devices Corporation, Brooklyn, has been incorporated with a capital of $100,000 by W. H. Dinspel, E. Weigele and E. R. Gippert, Brooklyn, to manufacture elevator equipment and other mechanical apparatus. It is represented by Pennie, Davis, Marvin & Edmonds, 165 Broadway.

The Brooklyn Edison Co., 360 Pearl Street, New York, has arranged for a bond issue of $3,000,000 for extensions, improvements, general operations, etc. M. S. Sloan is president.

Mooney, Douglas & Pearson, Inc., New York, has been incorporated with a capital of $100,000 to manufacture electrical equipment and hardware specialties. E. I. Cullen, 250 Ninety-third Street, Brooklyn, is the principal incorporator.

Fire, July 23, destroyed a portion of the machine shop and marine repair works of A. J. Wolcott & Son, Vernon Avenue, Long Island City, with loss estimated at about $12,000. The adjoining plant of the Doncaster Planing Mill Co. was also partially destroyed, with loss of about $25,000, including equipment.

The Titan Power Hammer Corporation, New York, has been incorporated under Delaware laws with capital of $750,000 by J. P. Caylis, George Ayles and M. L. Savarese, Brooklyn, to manufacture power hammers and other heavy equipment. It is represented by the Capital Trust Co., Dover, Del.

The Bureau of Yards and Docks, Navy Department, Washington, has completed plans for a new power plant at Iona Island, N. Y., estimated to cost about $27,000.

M. Thompson, 189 Montague Street, Brooklyn, has filed plans for the construction of a two-story automobile service and repair works, 112 x 200 ft., on Avenue A, between Sixtieth and Sixty-first streets, New York, to cost about $135,000.

The Burroughs Adding Machine Co., 217 Broadway, New York, has leased about 17,500 sq. ft. of space in the building at 801-805 Broadway. A portion of the property will be used as an assembling department.

The Everhold Brake Appliance Co., Gloversville, N. Y., recently incorporated to manufacture brake equipment for automotive service, is planning for the erection of new works. Emanuel Zannetti is president and H. S. Cromwell, general manager.

The Comfort Safety Razor & Novelty Co., West Hoboken, N. J., has been chartered under State laws to manufacture safety razors and other cutlery. The incorporators are Vaclaz Abraham and Frederick Kulhawk, 588 Central Avenue.

The Tungsten Steel Mfg. Co., Boonton, N. J., has been chartered under State laws to manufacture tools, saws, knives and kindred products. The incorporators are Theodore L. Harrison, 198 Teaneck Road, Ridgefield Park, N. J.; Patrick M. Kelly, 343 Fairmount Avenue, Jersey City, N. J.; and William F. McDermott, 165 Broadway, New York. The company is represented by Parker W. Sweet, Boonton.

Fire, July 27, destroyed the saw mill at the plant of the Empire Steel & Iron Co., Oxford, N. J., with loss including power department, sawing machinery, engine, boilers, etc. The structure will be rebuilt.

The New Jersey Storage Battery Mfg. Co., Jersey City, N. J., has been chartered under State laws to manufacture storage batteries and other electrical equipment. The incorporators are Daniel E. Lenthe and Andrew J. Weger, 26 Tyson Place.

The State Highway Department, Trenton, N. J., has construction under way on a one-story building at Hammonton, N. J., 80 x 100 ft., to be equipped as an automobile service and repair works for county motor trucks and cars.

The Electro-Magnetic Wave-Bath Corporation, Newark, N. J., has been chartered under State laws to manufacture electrical instruments and equipment. The incorporators are William S. Benson, Frank B. Schanne and James B. Reilly, 31 Clinton Street.

The General Sheet Metal Works, 150 Broome Street, Newark, has been organized to manufacture sheet metal goods and similar products. It is headed by Samuel Kinland, address noted.

The Safety Auto Lock Co., 31 Clinton Street, Newark, has filed notice of organization to manufacture locks and locking devices for automobiles. Warren J. MacCroy, 7 North Tenth Street, heads the company.

The Uglay Mfg. Co., 10 Johnson Avenue, Newark, N. J., has filed notice of organization to manufacture precision instruments and other equipment. Stephen Uglay, 128 South Seventh Street, heads the company.

R. Neumann & Co., Willow Avenue, Hoboken, N. J., have completed plans for the erection of a one-story power house, 40 x 100 ft., at their leather manufacturing plant.

New England

BOSTON, Aug. 1.

More machine-tools have been sold the past week than in many preceding weeks. Business, however, is largely confined to used equipment, quotations on which are so far below those on new tools as to attract buyers. Certain kinds of machines, however, such as used 20-in. upright drills, appear to be scarce.

Sales the past week include six No. 2 Consolidated, one Standard bench and 17 Standard foot presses, to a Boston concern. The Naumkeag Steam Cotton Co., Salem, Mass., bought a new 18-in. motor-driven engine lathe and a 3-ft. motor-driven radial drill, while the Yates Machine Co., Salem, metal specialties, purchased a used upright drill, shaper and a miscellaneous lot of small shop equipment. A Greater Boston rubber goods manufacturer closed on a new No. 1 B Milwaukee universal milling machine; a Boston concern a used Dreses radial drill; a South Boston manufacturer, two used bench presses, and a Fall River interest, a used Lincoln milling machine. The city of Boston took a new Le Blond cutter and reamer grinder for its normal art school, while Laconia, N. H., purchased a new No. 2 universal milling machine, two 13-in. and two 11-in. tool room lathes.

A Massachusetts manufacturer of valves bought two new Pratt & Whitney 16-in. lathes with complete equipment, while a Greater Boston firm covered on 9-ft., 5-ft. and 4-ft. used plate bending rolls, and a large punch and shear. An improved demand for cylindrical regrinding equipment from automobile interests is noted. One local house is about to close on an order for approximately $25,000 worth of machine tools for one concern. David Beal & Co., Boston, report the sale to a Havana machine shop of an 8-ft. lathe, 6-ft. high-speed lathe, 20-in. back geared drill, and a 4-ft. planer, all used tools, as well as two indexing heads, miscellaneous new small tools and a large marine engine. This export business is the first in this market for some months.

The following companies are reported in the market for equipment: Warren D. Letchell, Dexter, Me., a used 18-in. x 10-ft. engine lathe, 20-in. upright drill, No. 2 Universal milling machine, small shaper, small planer and a wet tool grinder; city of Boston, a new No. 2 Universal milling machine with geared head and miscellaneous tools for schools; Weed Engineering Works, Bridgeport, Conn., used semi-automatic radial drill; American Bosch Magneto Corporation, Springfield, Mass., machine for grinding small cams; Federal Supply Co., Bridgeport, Conn., used pipe machine for cutting threads 4-in. to 10-in.; Boston Navy Yard, miscellaneous machine shop equipment.

Considerable interest is shown in the auction sale Aug. 4, by J. E. Conant & Co., Lowell, Mass., of approximately 100 machine tools at the plant of the Industrial Research Corporation, New Haven, Conn.

Activity among machine-tool builders is on a lower scale than at any time this year. The Pratt & Whitney Co., Hartford, Conn., machinery and small tool departments closed Aug. 1 for two weeks.

The Greenfield Tap & Die Corporation, Greenfield, Mass., has issued a new discount on taps and dies, showing a reduction in prices. The Norton Co., Worcester, Mass., has made a slight reduction in prices on bench grinders and floor stands. The Skinner Chuck Co., New Britain, Conn., has lowered quotations eight points on drill chucks. The market for Flynn micrometer boring heads is 5 per cent lower at 25 per cent discount. In common with companies making a similar line of goods, the Carborundum Co., Niagara Falls, has made a reduction in prices on Carborundum and Aloxete wheels.

The International Silver Co., Wallingford, Conn., has let a contract for an addition to factory L.

The Malden Electric Co., Malden, Mass., will erect an addition 68 x 70 ft., to its power station at Broadway and Oakland Avenue, Everett, Mass.

The Optical Abrasive Co., Southbridge, Mass., emery and other products used for lens grinding and polishing, has purchased property at Phillipsdale, Mass., which will be remodeled to meet its requirements. John J. Hogan, Jr., 60 Everett Street, Southbridge, and John E. Lowe, Coombs Street, are interested.

The Washington Mills, Lawrence, Mass., contemplates the erection of a new boiler shop within the next two months.

The R. P. Hazard Co., Gardner, Me., is planning the erection of a six-story and basement plant, 50 x 112 ft.

The Chandler Machine Co., Ayer, Mass., has awarded contract for a two-story plant, 60 x 120 ft.

F. A. Robinson will erect a boiler shop at the corner of Second and Binney streets, Cambridge, Mass. The New England Structural Steel Co., Inc., is the engineer.

The Sterling Roofing Co., New Bedford, Mass., has started the erection of a one-story plant, 75 x 150 ft.

The Apex Tire & Rubber Co., Providence, R. I., has been incorporated with a capital of 250 shares of stock, without par value, to manufacture automobile tires and other rubber products. The incorporators are John M. Franklin, Charles H. Sprague and David W. Smith, 104 Franklin Street.

Fire, July 28, destroyed the handle manufacturing plant of J. H. Tatem & Sons, Putnam, Conn., with loss estimated at about $35,000, including equipment.

The Peerless Mfg. Co., Providence, R. I., manufacturer of machinery and precision equipment, has removed its works from 175 Potter Avenue to 268 Rugby Avenue, where increased facilities will be provided. Lewis A. Hagan is head of the company.

O. P. Thompson, 145 State Street, Springfield, Mass., has abandoned plans for the construction of a new eight-story automobile service and repair works on Dwight Street, estimated to cost about $600,000.

George F. Spooner, Quincy, Mass., has filed plans for a new one-story machine shop on Cherry Avenue.

The City Council, Springfield, Mass., is planning for the erection of a new two-story automobile service and repair works for municipal trucks and cars on Summer Street, estimated to cost about $75,000. F. H. Clark, city engineer, is in charge.

The David Brown Co., Lawrence, Mass., manufacturer of shuttles, bobbins and other textile machine equipment, has filed plans for its two-story addition, 40 x 100 ft., estimated to cost about $40,000.

The Yankee Carbon Monoxide Burner Co., 9 Homer Street, Providence, R. I., has filed notice of organization to manufacture carbon burners, etc. James W. Craig, 1397 Broad Street, heads the company.

Chicago

CHICAGO, Aug. 1.

Distribution of the Illinois Central Railroad machine-tool orders was made last week, the total being close to $150,000. The tools bought include a driving wheel lathe, car wheel lathe, boring mill, large planer, several engine lathes, a radial drill, bending rolls, shapers, 13 motor-driven grinding machines and some small upright drills, in all about 50 tools. It is admitted by sellers that, with the exception of two or three tools, prices were cut from 20 to 35 per cent. Orders were distributed among several sellers. Other contemplated railroad purchases by the Rock Island and Santa Fe railroads have been postponed, probably until fall.

Otherwise the local market continues dull, with few inquiries or sales. However, one dealer reports the sale last week of two machines from his floor stock, sales of this character having been very rare of late.

The G. A. Roth Mfg. Co., Hastings, Neb., has issued the following list:

One turret lathe, 1½-in.
One plain milling machine.
One universal grinding machine.
One screw machine.
One multiple spindle drilling machine with two or three spindles.
One geometric threading machine.
One 16-in. engine lathe, 8-ft. bed.

The Ajax Forge Co., 2503 Blue Island Avenue, Chicago, has purchased one or two machines and is expected to buy the remainder on its recent list within a few weeks.

The Economy Machine Products Co., manufacturer of air brushes, 4755 London Avenue, Chicago, has let contract for a one-story factory on Lawrence Avenue near Milwaukee Avenue at a cost of $20,000. August Kopinski is president.

The Reedy Foundry Co., 4600 Iowa Street, Chicago, has increased its capital stock from $75,000 to $150,000 preparatory to engaging in the oil refining business. Its foundry equipment is being offered for sale.

The John M. Ryan Foundry Co., 506 Forty-first Street, Rock Island, Ill., announces the purchase of exclusive manufacturing rights of Ackerman metal for bearings for automobiles and tractors. A new company will be organized and the plans contemplate the construction of a manufacturing building.

G. E. Long, for many years president Ottawa Mfg. Co., Ottawa, Kan., manufacturer of oil engines, has sold his interest in that company and has purchased an interest in the Cherryvale iron foundry, Cherryvale, Kan. He has also organized the Long Mfg. Co. to manufacture gasoline engines and wood saws.

The Illinois Steel Co. has taken out a building permit for the construction of a three-story brick and steel electric power station at its South Chicago works. The cost will be about $250,000.

The Waterway Paper Co., Kedzie Avenue and Thirty-second Street, Chicago, is completing plans for the construction of a new one-story plant, 80 x 180 ft., with one-story power plant, 33 x 60 ft., estimated to cost $175,000, with machinery. Frank D. Chase, Inc., 645 North Michigan Avenue, is architect and engineer.

The Badger Concrete Mixer Co., 221 Grand Avenue, Milwaukee, has completed plans and will soon break ground for the construction of the initial unit of its new plant at Winthrop Harbor, Ill., for the manufacture of concrete mixing machinery. It will be one-story, 80 x 260 ft., and is estimated to cost about $60,000. E. McVicker is manager.

The Johnson Automotive Service Co. of America, 1201 Plymouth Building, Minneapolis, Minn., has preliminary plans under way for its three-story and basement automobile service and repair building, estimated to cost about $90,000. Albert A. Johnson is president.

The Board of Water Trustees, Des Moines, Iowa, is completing plans for the construction of a new electrically operated pumping plant, to cost about $150,000, with machinery. Alvord & Burdick, room 1418, 8 South Dearborn Street, Chicago, are engineers.

Philadelphia

PHILADELPHIA, Aug. 1.

The Board of Directors, Philadelphia General Hospital, Philadelphia, has filed plans for a new powerhouse, estimated to cost about $20,000.

E. P. Alexander & Son, Inc., Philadelphia, has been incorporated with a capital of $60,000 to manufacture mechanical belting. V. H. Alexander, 3417 Race Street, is treasurer.

The General Motors Products Co., Philadelphia, has been incorporated under Delaware laws, with capital of $1,000,000, to manufacture automobiles and parts. F. R. Hansell, Land Title Building, represents the company.

The Keystone Automotive Corporation, Philadelphia, is being organized by Louis Kumpf, A. J. Shinn and Eugene L. Ellwanger to manufacture mechanical and electrical equipment for automobiles. It is represented by J. Rech Guckes, Real Estate Trust Building.

Hoisting and conveying equipment and other mechanical apparatus will be installed on the two new piers to be constructed by the Department of Wharves, Docks & Ferries, Philadelphia, Director Sproul in charge.

The Pennsylvania Power & Light Co., Allentown, Pa., has had plans prepared for the erection of a large central machine shop and repair works at its electric generating plant at Hauto, Pa. It will be built by the Phoenix Construction Co., an affiliated organization. Both companies are operated by the Electric Bond & Share Co., 71 Broadway, New York.

The Pharo Mfg. Co., Detroit, has removed its business to a plant recently acquired at Bethlehem, Pa., and will continue operations for the manufacture of automobile equipment. The plant at Detroit will be discontinued. R. P. Hutchinson is president.

The Lancaster Concrete Tile Co., Lancaster, Pa., has been incorporated with a capital of $150,000 to manufacture concrete tile and kindred products. Edwin Rutter, Lancaster, is treasurer.

The Floyd-Wells Co., Royersford, Pa., manufacturer of stoves, ranges, heaters, etc., has taken bids for a two-story addition, 32 x 120 ft. A. S. Kepner, 121 Hanover Street, Pottstown, Pa., is architect. Russell Wells is head of the company.

F. A. Sieberling, Akron, Ohio, formerly head of the Goodyear Tire & Rubber Co., and associates, have acquired the plant and business of the New Castle Rubber Co., New Castle, Pa. The name of the company will be changed to the Lehigh Tire & Rubber Co. A number of improvements will be made and the plant placed in service at an early date. It is proposed to develop an initial output of 500 tires and 50 tubes per day.

The New Boston Coal Co., Hazleton, Pa., will electrify its local colliery, with service to be furnished by the Pennsylvania Power & Light Co. Motors, controlling devices and other equipment will be installed at once.

The plant of the Standard Process Steel Corporation, North Broad Street, Phillipsburg, N. J., has been sold by the liquidating committee to Col. W. P. Barba, Thirteenth and Cherry streets, Philadelphia, for about $50,000. A company is being formed, represented by Colonel Barba, to take over the works and establish a plant for the manufacture of steel products. It is expected to begin operations at an early date.

The American Chemical Machinery Co., Philadelphia, has been incorporated under Delaware laws, with capital of $500,000, to manufacture special machinery and parts. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Regal Spring Bed Co., Philadelphia, has been incorporated with a capital of $30,000 to manufacture metal bedsteads, springs, etc. A. Charnofsky, 5742 Pine Street, is treasurer.

The Standard Carrier Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Samuel C. Adams, Joseph Smyth and Charles T. Rouss, Philadelphia, to manufacture metal frames and carriers. The company is represented by the Capital Trust Co., Dover, Del.

The Trenton Chilled Die & Casting Co., Trenton, N. J., recently organized, has established a plant at the foot of Houghton Avenue, for the manufacture of dies, castings and other mechanical products. John H. Conover is president and R. B. Newton, treasurer.

Reorganization plans are under way by Hare's Motors, Inc., Trenton, N. J., for the separation of its three manufacturing units and the dissolution of the parent organization. The plant and business of the Mercer Motor Co., Trenton, will revert to the control of those formerly in charge, with T. E. A. Barthel as vice-president and William A. Smith, general sales manager. Reorganization of the Locomobile Co. of America, Bridgeport, Conn., is now being arranged, as are the plans for similar action at the works of the Simplex Automobile Co., New Brunswick, N. J., another operating unit of the organization.

Plans for a new two-story ice-manufacturing plant, 80 x 80 ft., estimated to cost about $75,000 with machinery, are being prepared by the Germania Brewery, 1808 Ninth Avenue, Altoona, Pa. Bids will soon be asked by Miller & Rider, 1510 Eighteenth Street, architects.

The Board of Public Grounds and Buildings, Harrisburg, Pa., is perfecting plans for the immediate rebuilding of the six industrial structures at the Western Penitentiary, recently destroyed by fire, with loss estimated at $133,000, of which $80,000 represents machinery and equipment. The Prison Board will advertise for bids for machine shop and other equipment at an early date.

The Allen Typewriter Co., Tenth and Turner streets, Allentown, Pa., has acquired the plant of the Allen Chemical Co., between Fourteenth and Fifteenth streets, for about $26,000. It will be used by the new owner for the manufacture of typewriter parts and machinery will be installed at an early date. Assembling operations will be conducted as heretofore at the Tenth Street plant. James K. Bowen is head.

The State Highway Department, Harrisburg, Pa., has plans under way for a two-story machine and repair works and automobile service building at North and State streets, 100 x 200 ft., to be used for county motor trucks and automobiles. Samuel B. Rambo, deputy superintendent, will be in charge of the work.

Pittsburgh

PITTSBURGH, Aug. 1.

The demand for machinery and equipment in this market is still very limited. About the only encouraging feature is that when a purchase is made, shipping instructions are immediately given. It seems to be the tendency of buyers to delay replacements until the last minute, and to place orders only where assured of immediate delivery. The crane market is inactive, with as many inquiries being withdrawn as are coming out. The Wheeling Steel Corporation has yet to place three cranes for its new galvanizing plant at Beech Bottom, W. Va. This inquiry calls for one 5-ton, 3-motor overhead of 71-ft. span, one 5-ton, 3-motor, overhead of 54-ft. span, and one 5-ton, 4-motor revolving jib crane. The city of Pittsburgh recently opened bids for ash-handling equipment, on which R. H. Beaumont & Co., Pittsburgh, were low bidders.

The American Laundry Machinery Co. has placed through the Pittsburgh office of the Northern Engineering Works, Detroit, an order for two 3-ton, 2-motor electric traveling cranes.

The Pittsburgh Screw & Bolt Co., Preble Avenue, Pittsburgh, Pa., manufacturer of bolts, rivets, nuts, etc., has filed plans for a one-story addition, estimated to cost about $89,000.

The Tarentum Boiler Works, Inc., Tarentum, Pa., has been incorporated with a capital of $75,000 by Frederick and L. A. Scharf and F. V. Cooper, Tarentum, to manufacture boilers, tanks and other plate products.

The Oberndorf Mfg. Co., 7509 Thomas Boulevard, Pittsburgh, manufacturer of pipe, steam fittings, etc., is taking bids for a one-story addition, 160 x 200 ft., estimated to cost about $90,000. The W. G. Wilkens Co., Westinghouse Building, is architect. Edward Oberndorf is president.

The Brown Puncture-Proof Tube Co., Pittsburgh, has been chartered under State laws to manufacture automobile tubes and other rubber products. C. E. Johnson, 2112 Wightman Street, is treasurer.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, has taken an order for electrical equipment totaling $1,200,000 from the Midi Railway, operating from Bordeaux to Cette, France. It will be used on the line from Pau to Toulouse, and consists of generating apparatus, substation machinery, etc.

The Point Spring Co., Pittsburgh, has been chartered under State laws to manufacture steel springs, iron products, etc. F. G. Darlington, Jr., Sewickley, Pa., is treasurer.

Roscoe-McGrath, Inc., Pittsburgh, has been incorporated under Delaware laws, with capital of $50,000, to manufacture automobile parts and equipment. The incorporators are B. M. Roscoe, R. J. McGrath and A. M. Barron. The company is represented by the Corporation Trust Co., duPont Building, Wilmington, Del.

Machine-shop equipment and other mechanical apparatus will be installed in the new building now being erected at Liberty Avenue and Fancourt Street, Pittsburgh, for the Pittsburgh School of Auto Engineering. The structure will be eight stories, of reinforced concrete, and space not occupied by the Pittsburgh school at the present time will be used by the Liberty Battery Co. as a battery and electrical works.

The Huntington Coal Mining Co., 601½ Ninth Street, Huntington, W. Va., recently organized with a capital of $600,000, has plans under way for the development of extensive properties at Ferguson, W. Va. The work will include the erection of three tipples and the installation of motors, cars and other mechanical equipment, estimated to cost about $150,000. Bids for equipment will be asked late in August. Paul A. Boothe & Co., Huntington, W. Va., are engineers for the work. C. N. Morrison is president.

The Universal Building Supply Co., Huntington, W. Va., manufacturer of concrete blocks, etc., has plans under way for plant enlargements to double, approximately, the present capacity. The company was recently organized with a capital of $50,000. H. H. Tetrick is head.

The Akka Cement Products Co., Inc., New Kensington, Pa., has been incorporated under Delaware laws to manufacture concrete and cement products. The incorporators are James L. Thompson, Harry A. Rawlinson and Malcolm Stepp, New Kensington. The company is represented by the Capital Trust Co., Dover, Del.

Detroit

DETROIT, Aug. 1.

A group of Detroit men have organized the Rickenbacker Motor Co., with a capitalization of $5,000,000, to manufacture a popular-priced car. B. F. Everitt, at one time connected with the former E-M-F Co., which later became a part of the Studebaker Corporation, will be president and general manager; Capt. Rickenbacker, vice-president and sales manager, and Harry L. Cunningham, secretary-treasurer. Walter E. Flanders, also formerly connected with the E-M-F Co., will head the board of directors. Other directors include Carl Tichnor, Roy Hood and E. R. Evans. Mr. Hood will be purchasing agent. Application for a State charter has been made and negotiations are under way for a factory in Detroit.

The Stokes Mfg. Co., Owosso, Mich., care of the local

Chamber of Commerce, has awarded contract to Malisky & Sons, First Street, for the construction of its new plant for the manufacture of automobile parts and other mechanical equipment. It will be one-story and basement, 50 x 100 ft., estimated to cost about $14,000, exclusive of equipment.

The Peterson Spring Co., Detroit, has been chartered under State laws, to manufacture metal springs, and other wire and steel products. August Peterson, 4762 Townsend Avenue, Detroit, heads the company.

The Peninsula Paper Can Co., Detroit, has preliminary plans under way for the construction of a new plant at Monroe, Mich., for the manufacture of paper containers, cans, etc. The company is being organized with a capital of $500,000, and is headed by R. P. Adams, sales manager of the Detroit Heating & Lighting Co., Detroit.

Officials of the Bissell Carpet Sweeper Co., Grand Rapids, Mich., have organized the Grand Rapids Sweeper Co., to manufacture carpet sweepers and parts, to be operated as an affiliated interest. It is headed by Melville and A. Bissell, 112 College Avenue, S. E.; and C. E. Shanahan.

The Transue-Williams Steel Forge Corporation, Alliance, Ohio, is completing plans for its proposed new plant at Marysville, Mich., and, it is said, will call for bids at an early date. The new works are estimated to cost about $45,000.

The Photo-Electric Bean Grader Co., Ithaca, Mich., has been incorporated with a capital of $150,000 by D. J. Lynch, Ray F. McWilliams, and Henry McCormack, Ithaca, to manufacture grading machinery for agricultural and other service.

Buffalo

BUFFALO, Aug. 1.

The South Buffalo Terminals, Inc., Buffalo, has made application to the City Council to erect a new one-story factory terminal building, 90 x 100 ft., at 310 South Park Avenue, to be equipped with freight handling and conveying machinery, etc. E. C. Randall is president.

The La Falce Safety Turn Motor Lock, Inc., Buffalo, has been incorporated in Delaware with a capital of $50,000 by Palmerino La Falce, Melmoth D. Martin and Edward E. Nelson, Buffalo, to manufacture automatic locks and locking devices. It is represented by Woodburn Martin, Georgetown, Del.

The Iroquois Utilities, Inc., City Bank Building, Syracuse, N. Y., has plans under way for a new electric power plant at Concord, Erie County.

The National Windshield Co., Buffalo, has been incorporated with a capital of $25,000 by W. B. and R. R. Frear and C. Harris, Buffalo, to manufacture windshields and other automobile specialties. It is represented by Botsford, Lytle, Mitchell & Albro, Fidelity Building.

The Stanard-Snyder Co., Syracuse, N. Y., has been chartered under State laws to manufacture automobile equipment. The incorporators are C. H. Stanard, G. Snyder and T. H. Dohm, Syracuse. It is represented by Gannon, Spencer & Mitchell, O. C. S. B. Building.

The Common Council, Old Forge, N. Y., is perfecting plans for the erection of its new municipal electric power plant. H. C. Weller, Old Forge, is engineer. Walter D. Marks is president of the council.

Baltimore

BALTIMORE, Aug. 1.

The Hancock Steel Co., Martinsburg, W. Va., is completing preliminary plans for the erection of the initial unit of its new plant at Hancock, Md., one story, 130 x 200 ft., to be equipped as a foundry and machine shop. It is estimated to cost in excess of $100,000. Ernest McGeorge, 1900 Euclid Building, Cleveland, is engineer. F. Vernon Aken heads the company.

The Union Shipbuilding Co., Fairfield, Baltimore, is planning for enlargements in its plant to cost about $350,000. The work, for the most part, will consist of additional construction and repair buildings and equipment, including a marine railroad line.

The Floatless Carburetor Co., 916 Munsey Building, Baltimore, has been incorporated with a capital of $100,000 by Claude R. Hays, F. Strattner Orem and R. Contee Rose to manufacture carburetors and similar equipment for automotive service.

The Planters' Mfg. Co., Port Norfolk, Va., is planning to rebuild its barrel and crate manufacturing plant, recently destroyed by fire, with loss estimated at about $200,000, including machinery.

The Universal Ice Machine Co., Wilmington, Del., has been incorporated with a capital of $1,200,000 by William T. Morris, Edward W. Couch and Leonard E. Wales, Equitable Building, to manufacture ice and refrigerating machinery.

The Enterprise Foundry Co., Bristol, Va., will remodel the local plant formerly owned by the Virginia Iron, Coal and Coke Co., which it recently acquired. The work is estimated to cost close to $50,000.

The Hickory Power Co., Hickory, N. C., has been incorporated with a capital of $200,000 to equip and operate an electric light and power plant. The incorporators are B. M. Spratt, L. F. Abermathy and J. A. Moretz, all of Hickory.

The Monarch Tractors, Inc., Wilmington, Del., has been incorporated under State laws, with capital of $1,000,000, to manufacture tractors, parts and other automotive equipment. It is represented by the Corporation Trust Co., du Pont Building.

The Superior Anthracite Coal Corporation, American National Bank Building, Roanoke, Va. recently organized with a capital of $200,000, is planning for the installation of new hoisting machinery and other mechanical equipment at its properties at McCoy, Va. Clyde E. Smith is president and general manager and R. L. Keger, secretary and treasurer.

The Carolina Metal Culvert Co., Salisbury, N. C., recently incorporated, will operate a plant for the manufacture of metal culverts, with size ranging from 12 to 50-in. Leo C. Wallace is president and Ernest L. Hardin, secretary and general manager. The company is capitalized at $200,000.

Ohio

A somewhat better feeling has developed in the Cleveland machinery market and manufacturers and dealers seem more hopeful regarding the outlook for orders. Inquiries have improved slightly but the volume of business placed the past week shows little change, with but very few orders except for single tools. July business on the whole was probably as light as during June, and one manufacturer states that his July sales were less than any previous month this year. The largest order reported was for five or six used machines placed by the Reynolds Spring Co., Jackson, Mich.

Interest during the week centered on an inquiry for 25 machines for the McKinley school, Canton, for which bids were received July 29. This business resulted in keen competition and brought out some low prices. It had been the practice of the trade to allow a discount of 5 per cent on machines sold to schools, but on this inquiry discounts as high as 20 per cent were quoted on some tools. The Big Four Railroad the past week asked for quotations on a boring mill, which is supplementary to machines for which it had previously sent out inquiries. Dealers have no information as to when this business will be placed.

Manufacturers report an improvement in inquiries for electric motors and generators in small units. Preliminary inquiries have come out for 5 or 6 hydroelectric installations ranging from 100,000 to 300,000-hp. The city of Nashville has taken bids for a 20-ton electric traveling crane.

In Cincinnati some scattered inquiries are being received but orders are still running very light. A few more machine-tool plants which had been running on short time, closed July 30 for an indefinite period. Some of the larger shops are still operating, however, and expect to continue for several weeks at least. Local dealers report the market very quiet both for new and old tools. A better tone is evidenced, however, and improvement is looked for with the coming of cooler weather. No lists have made their appearance and while a few purchases have been made on some of those now out, the bulk of the business still remains to be placed.

The Edwards Mfg. Co., Cincinnati, sheet metal manufacturer, has purchased property adjacent to its plant on Eggleston Avenue, and is contemplating additions. Preliminary plans are under way for extensions aggregating over $1,000,000. E. W. Edwards, is president.

The Great Western Lathe & Tool Co., Cincinnati, has been incorporated with a capitalization of $25,000 to manufacture precision and bench lathes. Definite arrangements regarding the location for a plant will probably be announced within the next week. Henry Aeberle, 128 Opera Place, is one of the prime movers in the organization of the company.

G. P. Young, formerly associated with the Hadfield-Penfield Steel Co. and A. W. Wheeler, previously with the Allen Motor Co., will open a machine shop in Bucyrus, Ohio, in a portion of the plant formerly occupied by the Bucyrus Machine Tool Co., and will engage in general repair work.

The London Motor Plow Co., London, Ohio, manufacturer of tractor plows, has been incorporated with a capital stock of $50,000. E. H. Daniels is president and general manager; P. J. Kirwin, first vice-president; H. Emerick, second vice-president; R. Dunham, secretary, and H. Plimell, treasurer.

The Apex Spring Cover Co., 6508 St. Clair Avenue, Cleveland, has placed a contract for a one-story factory, 30 x 38 ft.

The Wellman-Seaver-Morgan Co., Cleveland, has taken an order for a 325-hp. hydraulic turbine with 200 ft. head and operating at 900 r.p.m. for the city of Cookeville, Tenn.

The Heltzel Steel Form & Iron Co., Warren, Ohio, recently placed an order with Bertsch & Co., Cambridge City, Ind., for one ½-in. x 144-in. squaring and splitting shear.

Indiana

INDIANAPOLIS, Aug. 1.

The Knox & Sullivan County Light & Power Co., Carlisle, Ind., has been incorporated with a capital of $75,000 to operate a local electric light and power plant. It is headed by Murray Owen, J. D. Boswell and N. S. McGillivray, all of Carlisle.

The Frankfort Ice & Coal Co., Frankfort, Ind., has awarded a contract to John Paden, Frankfort for rebuilding the portion of its ice manufacturing plant at 300-306 West Ohio Street, recently damaged by fire. It will be one-story, and is estimated to cost about $60,000.

The United States Gravitation Mail Post Co., Sullivan, Ind., has been incorporated under State laws to manufacture metal mail chutes and kindred products. It is headed by Jacob Nicholson, Thomas Bickel and Solon Shepherd, all of Sullivan.

The Board of Directors, St. Elizabeth Hospital, Lafayette, Ind., will soon break ground for a new power house in connection with the erection of a hospital extension at the institution, estimated to cost about $150,000. D. X. Murphy, Louisville Trust Building, Louisville, is architect.

The Shrader Battery Co., New Albany, Ind., has been chartered under State laws to manufacture electric storage batteries and affiliated equipment. The incorporators are Daniel and W. A. Shrader and Julius Maier, New Albany.

The Common Council, Linton, Ind., has commissioned Shrouds, Stone & McCormick, 510 Tribune Building, Terre Haute, Ind., architects and engineers, to prepare plans for the new municipal electric light and power plant, one-story, 75 x 95 ft.

Milwaukee

MILWAUKEE, Aug. 1.

A small volume of orders for new machine tools is coming from scattered sources, making a fair aggregate in view of the restricted business recently placed. Business in July showed a small percentage of increase over June, which was the dullest month this year. The automotive industries have again become a principal factor, although so far their needs have been limited. Orders consist largely of single tools, which are wanted for immediate shipment.

The General Industrial X-ray Co., Milwaukee, a new corporation with $100,000 capital, on Aug. 1 began manufacturing operations at 246 West Water Street, in a two-story addition to the factory and warehouse of the E. H. Karrer Co., manufacturer of surgical instruments and appliances. Officers of the new company are: President, E. H. Karrer; secretary, William Gilliaume; treasurer, Otto Herrmann.

The Board of Education, Durand, Wis., is taking bids until Aug. 30 for the erection and equipment of a junior high and vocational training school the cost not to exceed $100,000. The architects are Oppenhamer & Obel, Wausau, Wis. H. A. Miles is secretary of the board.

The Standard Steel Corporation, 1251 Thirtieth Street, Milwaukee, has increased its capitalization from $300,000 to $750,000, consisting of $600,000 of common and $150,000 of preferred shares. It manufactures steel barn, stable and toilet equipment and recently completed a new plant.

The Industrial Heating & Engineering Co., 143 Oneida Street, Milwaukee, has incorporated with a capital stock of $75,000, consisting of $40,000 common and $35,000 of preferred shares. The incorporators are A. F. Bowers, H. S. Bowers and E. W. Spencer, attorney.

The Lux Typewriter Co., Luxemburg, Wis., has been organized with an initial capitalization of $20,000 to manufacture writing machines and similar devices. The incorporators are Anton C. Svoboda, Joseph M. Ramesh and Louis A. Karel.

The Marathon Rubber Products Co., Wausau, Wis., has awarded contracts for a one-story brick and steel factory, 60 x 120 ft., to the Wisconsin Engineering & Construction Co., local, which sublet the steel work to the Worden-Allen Co., Milwaukee. It will purchase equipment and motors.

The Wisconsin Battery & Ignition Co., Green Bay, Wis., has been incorporated with a capital stock of $25,000 and will establish a shop for manufacturing and repairing storage batteries and electrical equipment for passenger and commercial automobiles. The incorporators are Ernest J. and Anton J. Balza and Ralph R. Ramey, all of Green Bay.

The General Motors Corporation, Detroit, has completed the transfer of its Samson motor truck manufacturing operation from Flint, Mich., to the main works of the Samson Tractor Co., Janesville, Wis., where production was resumed Aug. 1. For the present the principal parts will be manufactured at Flint and shipped to Janesville for assembling.

The Peerless Electric Co., 2028 Fond du Lac Avenue, Milwaukee, will award contracts Aug. 6 or 8 for a brick and concrete machine and repair shop building, 45 x 120 ft., at Eighteenth Street and North Avenue.

The Soloun-Stuchlek Specialty Co., Milwaukee, has been incorporated with a capital stock of $80,000 to manufacture machinery, machines, devices, implements, etc. The incorporators are Martin V. Soloun, John M. Stuchlek and Arthur A. Glanz, 820 Tenth Street, Milwaukee.

The Central South

ST. LOUIS, Aug. 1.

The Grandfield Refining Co., Kansas City, Mo., has plans under way for the construction of a new refinery at Little Rock, Ark., to cost about $250,000, including machinery.

The Southern Refrigeration Co., Johnson City, Tenn., recently organized with a capital of $400,000, has plans under way for a new ice manufacturing and cold storage plant, estimated to cost in excess of $100,000.

The Board of Directors, University of Missouri, Columbia, Mo., L. Cowan, secretary, is completing plans for a new one-story and basement power plant to cost about $150,000.

The H. F. Wilcox Oil & Gas Co., Bristow, Okla., is planning for the construction of a new refinery, with initial daily output of about 500 bbl. H. F. Wilcox is head.

Mechanical equipment and machinery, including hoisting apparatus, conveyors, and general mining machinery to cost about $300,000, will be installed by the Central Coal & Lumber Co., Vinia, Okla., at its properties. The company is a subsidiary of the Central Coal & Coke Co., Kansas City, Mo.

The Ricberger Light & Specialty Co., 126 South Second Street, Memphis, Tenn., is planning for the organization of a subsidiary company to establish a plant for the manufacture of kerosene oil burners and burner parts.

The Commercial Coal Mining Co., Lexington, Ky., recently organized, is planning for the installation of mechanical and electrical equipment at its properties. J. H. Hall heads the company.

The City Council, Osborne, Kan., will break ground at once for its proposed one-story municipal electric light and power plant, estimated to cost about $75,000. E. T. Archer & Co., 609 New England Building, Kansas City, Mo., are architects.

The Gulf States

BIRMINGHAM, Aug. 1.

The Jaffe Iron & Metal Co., Birmingham, Ala., has plans under way for the erection of a new building at its works to replace a structure recently destroyed by fire, with loss reported in excess of $100,000, including equipment.

The American Motors Export Co., Jacksonville, Fla., has awarded a contract to the O. P. Woodcock Co., Jacksonville, for the initial unit of its new plant for the manufacture of automobiles and parts. It is estimated to cost about $150,000 with equipment. The company recently acquired a large tract of land for the new works. Henry L. Innes is president.

The City Council, Webster, Fla., will call for bids this month for the construction of a new municipal electric light and power plant. A bond issue to cover the work recently has been sold.

The Monroe Oil & Refining Corporation, Fort Worth, Tex., recently incorporated with a capital of $1,000,000, has preliminary plans under way for the construction of a new refinery, estimated to cost about $500,000. The company is headed by V. S. Monroe, Fort Worth, and R. W. Perry, Polytechnic, Tex.

The Navajo Sanatorium Co., Sarasota, Fla., recently organized, has plans in preparation for a plant to manufacture surgical instruments. Dr. Y. Nabona is treasurer and general manager.

A hydroelectric power plant will be constructed by the Planters & Merchants Mill Co., Austin, Tex., in connection with a new cotton mill at New Braunfels, Tex. The company is now being organized with a capital of $1,000,000. Lockwood, Greene & Co., 101 Park Avenue,

New York, and Boston, Mass., architects and engineers, will prepare plans for the project. S. M. Ransopher, director of industrial education, University of Texas, Austin, heads the new company.

The Hercules Brick Co., Dallas, Tex., has preliminary plans under way for new works with a daily output of about 150,000 brick. It has acquired about 16 acres on the Trinity River, and the new plant is estimated to cost about $75,000, with equipment. A. B. Salam is general manager.

The Burnwell Coal Mining Co., Burnwell, Ala., is planning for the installation of electrically operated hoisting and haulage equipment at its properties.

The Nu-Tex Brick Co., Tampa, Fla., has completed plans for a new works with a daily capacity of about 30,000 bricks. Erection will begin at once.

California

SAN FRANCISCO, July 27.

After the little activity in the machinery market, business again has become quiet. Inquiry for new machine tools has been very light, with a few scattering sales of small types. The second-hand market is moderately active, and is attracting most of the buyers.

The Richardson Welding & Mfg. Co., Oakland, Cal., has arranged for the removal of its plant to the buildings recently occupied by the Pacific Coast Shipbuilding Co., lately acquired. The new works will be developed for considerable increase in production.

The Pacific Machine Shop, 112 East Seventeenth Street, Los Angeles, has filed notice of organization to operate a machine and repair works. Charles H. Husk, 1424 Vermont Avenue, heads the company.

The Western Automatic Sprinkler Co., Los Angeles, has been incorporated with a capital of $25,000 by Charles E. Felt, S. F. Martin, and C. L. Chandler, 434 Investment Building, to manufacture sprinkler devices, spraying systems, etc.

The California Car Co., 496 Twelfth Street, Oakland, Cal., manufacturer of automobiles and automotive equipment, has plans under way for a new one-story plant. C. R. Manbert, address noted, is architect.

The Republic Steel Package Co., 7930 Jones Road, Cleveland, has commissioned L. F. Hyde, architect, Oakland, Cal., to prepare plans for its proposed Pacific Coast plant, to be one-story, 60 x 300 ft.

The Belcher Aerial Mfg. Co., Los Angeles, has been incorporated with a capital of $200,000 by O. T. Belcher, F. P. Snow, and C. F. Holland, 1022 Citizens National Bank Building, to manufacture aircraft, motors, and parts.

The Sierra Oil & Refining Co., Oxnard, Cal., is considering plans for the construction of a new refinery. It is proposed to break ground at an early date.

The Miller Auto Electric Mfg. Co., Los Angeles, has been incorporated with a capital of $100,000 by Robert C. Camp, J. F. Nelson, and L. T. Mayhew, 338 Byrne Building, to manufacture electrical equipment for automotive service.

Canada

TORONTO, Aug. 1.

Only a small demand exists for machine tools in this market. Inquiries have been coming in larger numbers, but have in no way stimulated the demand for equipment, which is principally for single tools. Canadian railroads have made no move to enter the market and until makers of railroad equipment are in a position to resume operations dealers do not look for much buying from this source. The plant of the Canadian Car & Foundry Co., has started work on the construction of tank cars for the Russian Government and it is expected that this order will keep the works operating at capacity for three or four months. The demand for small tools is very light and wood-working equipment is also quiet. No change in prices has been announced this week, although a reduction of 10 per cent was made last week on twist stock carbon and wood-boring drills, the new discount being 42½ per cent.

Peters, 43 Yonge Street, Toronto, are in the market for an 18 to 24-in. gap lathe, drill, keyway machine, emery stand and buffer.

The Lorne Tractors, Ltd., will establish a plant at Chatham, Ont. A site has been secured in the west end of the city and the company proposes to start building operations within a month. It will specialize in the manufacture of gasoline tractors for farm work.

The Vancouver Rolling Mills Co., Eburne, B. C., is in the market for the following equipment, new or used, if in good condition: A 16 or 18-in. two stand mill with roughing and flat finishing rolls; scrap alligator shears, 30-in. blade, capable of cutting up to 5 or 6-in. cold square steel, prefer style No. 5 or 6 United Engineering or equal, must have steel head.

The Administrative Commission, Montreal, will receive bids until Aug. 20, for the construction of an electric pumping station to cost $500,000. Plans are with A. E. Doucet, engineer.

The City Council, Toronto, Ont., plans harbor drainage work to cost $691,000, including the construction of a pump house, pumping equipment, etc. T. L. Church is chairman of the Board of Control.

The Oro Cement Products, Ltd., Barrie, Ont., recently organized with a capital stock of $40,000, has secured a building which it will equip for the manufacture of brick and cement products, etc.

The lumber mill owned by Gilroy McKay, Port Alberni, B. C., was destroyed by fire with a loss of $75,000. It will be rebuilt and new equipment purchased.

The Great West Farm Machines, Ltd., Milverton, Ont., has been incorporated with a capital stock of $300,000 by Henry C. Mohr, John Boshart, Enos Nafziger and others to manufacture farm implements, tools, etc.

Trade and Office Changes

The grinding and polishing stand and accessory department of the Webster & Perks Tool Co., manufacturer of machine tools, Springfield, Ohio, has been sold to the Hill-Curtis Co., Kalamazoo, Mich., the latter company having acquired all drawings, patterns, jigs and tools, raw and finished materials, finished machines, engineering, production and sales records and data. The Hill-Curtis Co. is an old concern operating a foundry, forge and machine shop, etc. The Webster & Perks Company will devote all attention to the manufacture and sale of universal and plain cylindrical grinding machinery.

The partnership of Cann & Saul, 516 Commerce Street, Philadelphia, has been consolidated with the Cann & Saul Steel Co., Inc., with works at Royersford, Pa., and hereafter will trade under the name of Cann & Saul Steel Co., Inc., maintaining the Philadelphia office. The officers are: David S. Cann, president and general manager; George E. Saul, treasurer; Henry D. Rutter, secretary and sales manager.

The Allied Machinery Co. of America, 51 Chambers Street, New York, has been appointed foreign representative in all countries, except the United States and Canada, for the Universal Crane Co., Cleveland.

The Iron Trade Products Co., Farmers Bank Building, Pittsburgh, has been appointed exclusive sales agent for the Donley mine, shipping station of which is Johnetta, Pa., Allegheny Valley Railroad. Operation has an output of five cars of coal a day.

The Continental Can Co., Inc., New York, has removed to its new plant, Sixteenth and Coles streets, Jersey City, N. J. The Eastern general line sales office, formerly at 616 West Forty-third Street, New York, is now located at the above address, phone, Montgomery 4701.

The Cochrane Steam Specialty Co. of Massachusetts has been organized to represent in New England a number of well-known manufacturers of power plant equipment, including the H.S.B.W.—Cochrane Corporation, manufacturer of feed water heaters, steam and oil separators, V-notch meters and metering heaters, hot and cold process water softeners, flow meters, precision meters, weighing meters, multiport valves and multiport drainers; also the Steam Motors Co., Inc., manufacturer of steam turbines for driving generators, pumps, fans, etc., and the D. Connelly Boiler Co., builder of water tube steam boilers. The office is in charge of Elliott Green, who has long been connected with the several lines mentioned, and is located at 1045 Oliver Building, Boston.

M. M. Wyckoff, formerly engineer, construction superintendent and general purchasing agent for T. A. Gillespie Co., announces the formation of the Wycoff Engineering Corporation for the general practice of engineering, contracting, building; purchasing, sales and efficiency engineering; reports, appraisals and investigations. Offices are at 233 Broadway, Woolworth Building, New York.

Clarence H. Landsittel has been appointed sales engineer for the Climax Motor Devices at Chagrin Falls, Ohio (near Cleveland). For several years the Climax company has manufactured a complete line of magnet and generator couplings and is now ready to put on the market a single cord disk universal. Mr. Landsittel served as purchasing agent for the Templar Motors for three years and prior to that in the same capacity for the Haynes at Kokomo.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c. to 3.68c.
No. 12	3.58c. to 3.73c.
No. 14	3.63c. to 3.78c.
No. 16	3.73c. to 3.88c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.25c.
No. 16	4.50c.
Nos. 18 and 20	4.65c.
Nos. 22 and 24	4.80c.
No. 26	4.95c.
No. 27	5.10c.
No. 28	5.25c.
No. 30	5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c. to 23 c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23¾c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin Grade "AAA" Charcoal 14x20	Bright Tin Grade "A" Charcoal 14x20	Coke—14x20	Primes	Wasters
		80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC..	$10.60	$9.50	IC... 7.20	6.95
IX..	11.80	10.75	IX... 8.10	7.85
IXX..	13.60	12.25	IXX... 9.10	8.85
IXXX..	15.60	14.25	IXXX...10.50	10.25
IXXXX..	17.20	16.00	IXXXX...11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	16c.
Electrolytic	16c.
Casting	16c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....30c. to 32c.

Old Metals

Values are a little lower in sympathy with the new copper market. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.75
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	8.00
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.50
Lead, tea	2.25
Zinc	2.50

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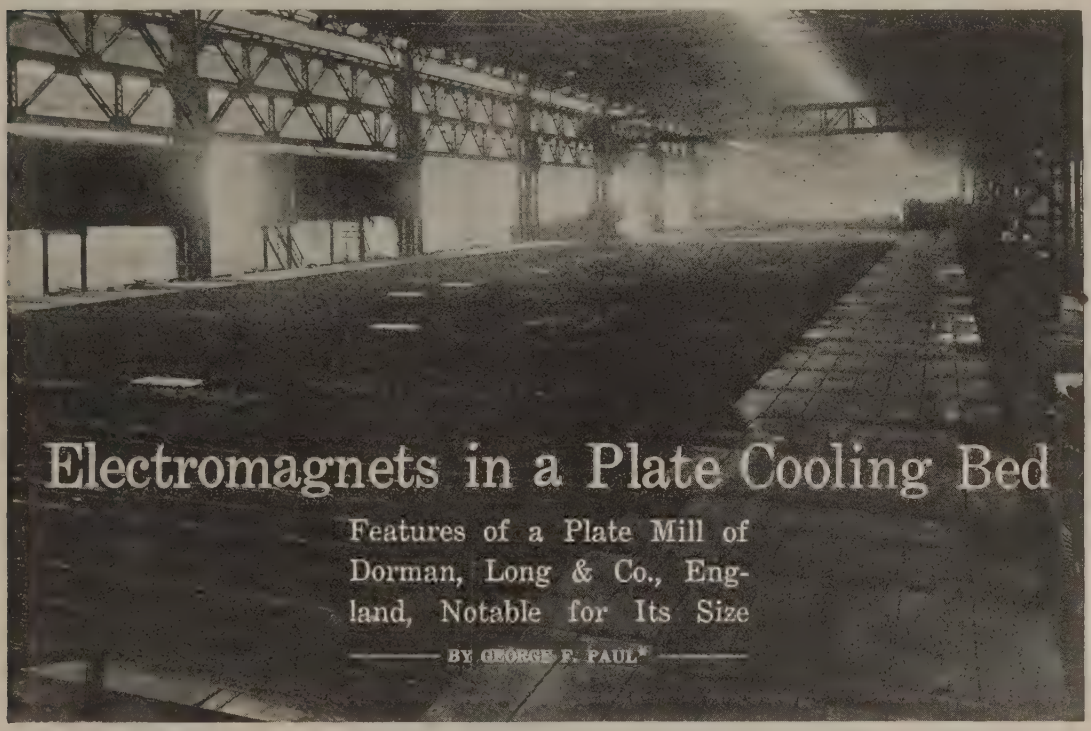


Electromagnets in a Plate Cooling Bed

Features of a Plate Mill of Dorman, Long & Co., England, Notable for Its Size

BY GEORGE F. PAUL*

A UNIQUE method of handling the plates on the cooling bed, which is done by means of electro-magnetic skids is a feature of an electrically driven rolling mill at Redcar, England, notable otherwise for its size. The improved means for transferring and handling rolled steel plates on cooling banks is a patent obtained by an official of the company, L. Ennis, general manager for Dorman, Long & Co., Middlesborough, England.

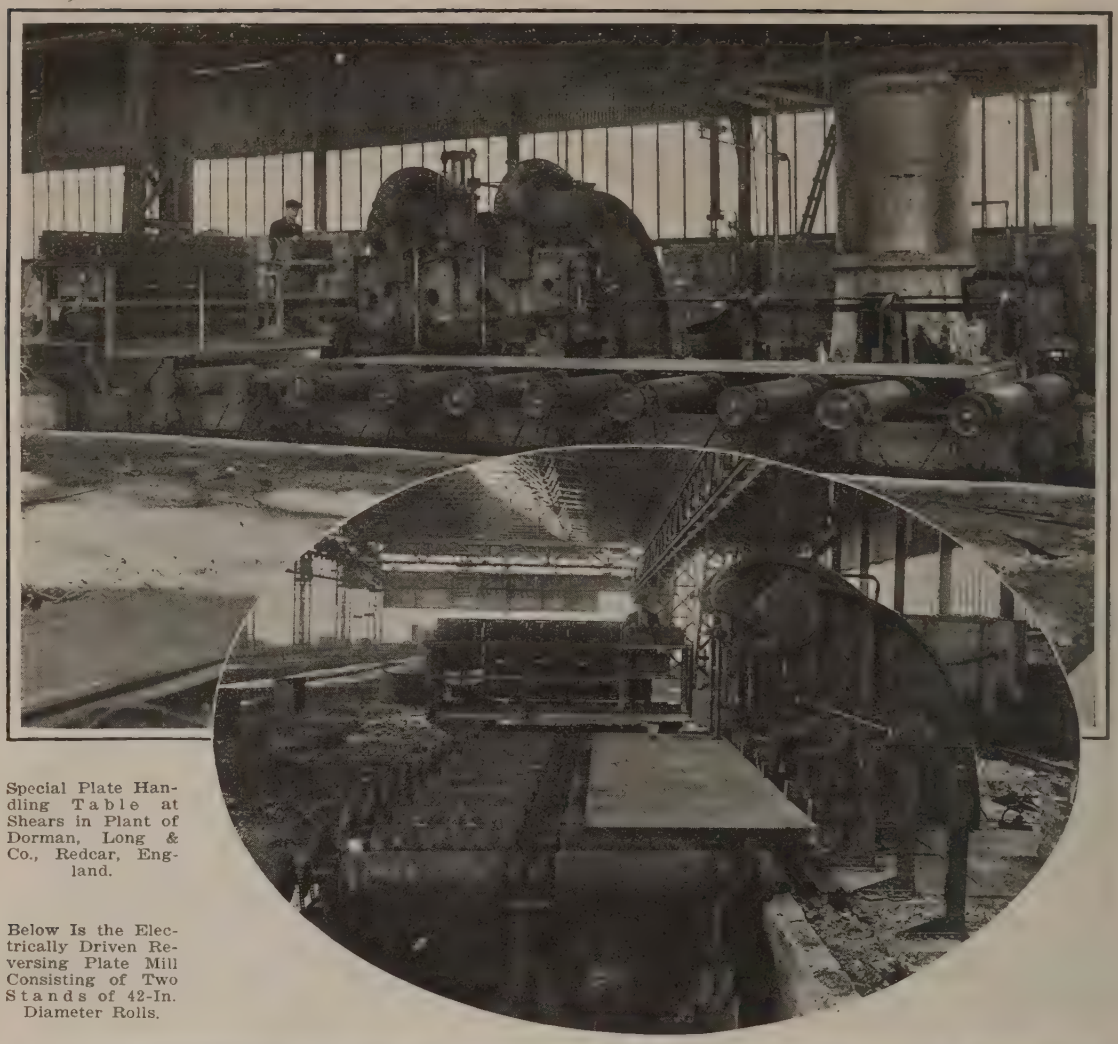
The plates are delivered by live rolls to this plate-handling table at the end of the cooling banks and delivered for side shearing to side shears. The table installed in the Dorman-Long mills, is the first of its kind to be built and is giving highly satisfactory results. In a single shaft of 8 hr., 145 tons of sheared plates have been handled by the machine.

The method is as follows: After the plates leave the finishing rolls they are conveyed by roller track to shears for end shearing and cutting to length. The side shearing of the plates is carried out at two sets of shears, part of the output being dealt with by a set of shears having castors, while the rest of the output is delivered to shears fitted with the plate operating table, and the plates for the latter are conveyed in a straight line from the end shears by roller gear to the end of the cooling banks where they are received by the operating table. The rolls on the operating table are on the same level as the mill roller track. The plate is then adjusted by means of the electro magnets fitted between the rollers on the table and put up to the side shears. The alinement is quickly and accurately carried out by the table operator from the switchboard during the actual operations of shearing. The plate is held in correct alinement by the magnets under the plate. One side of the plate is thus sheared.

Then the plate is turned for the shearing of the other side. The machine is fitted with two sets of separately driven rollers. The plate is rotated by revolving the rollers in opposite directions; this is a very simple operation, the plate being kept under perfect control by means of the magnets, and without the slightest difficulty the unsheared side of the plate is thus presented to the shears and the shearing is completed by a repetition of the first operation already described. By this means a great saving in labor is effected. With the use of the table only three persons are needed; namely, one man on the table, another to operate the shears and a third to remove the shearings.

The 9 ft. 6 in. electrically driven reversing plate mill consists of two stands of 42-in. diameter rolls. This mill is capable of rolling plate from ¼ in. to 2 in. thick and up to 9 ft. in width and any length up to 100 ft. A special feature of this mill is the motor for driving, which has a maximum peak load of 20,500 h.p. when running at 40 r.p.m. The speed can be increased up to 70 r.p.m. by weakening the motor field. The machine is designed to be reversed from 40 r.p.m. in one direction to 40 revolutions in the opposite direction in less than 3 sec.

*904 Ellsworth Building, Chicago.



Special Plate Handling Table at Shears in Plant of Dorman, Long & Co., Redcar, England.

Below Is the Electrically Driven Reversing Plate Mill Consisting of Two Stands of 42-In. Diameter Rolls.

The flywheel of the motor generator is composed of two separate 30-ton wheels mounted side by side on the same shaft. Each of the wheels is built in three parts consisting of a central disk and two rims that are riveted to the central disk. The stored energy in the flywheel when running at 600 r.p.m. is 46,900 ft.-tons and the available energy that the flywheel is capable of giving out while decreasing in speed from 600 to 500 revolutions is approximately 85,000 hp.-sec.

Trent Process for Cleaning Powdered Coal

Agitation Method of Producing an Amalgam and Eliminating Ash from Low-Grade Fuels

BY O. P. HOOD*

DURING the war certain suggestions concerning power production were made by Walter E. Trent to the War Inventions Board and, at the request of the War Department, facilities for experimental work were provided on the grounds of the Bureau of Standards. The experiments were along the line of controlling the conditions of combustion in a closed space. In order to reduce slag troubles, experiments were carried out for removing ash from powdered coal. After the war, work along this line was continued, resulting in the Trent process, which agitates or beats together powdered coal, water and oil.

A new technology had previously been given to ore preparation by the use of small quantities of oil in water with froth flotation, and although the methods, results and mixtures of the Trent process were quite different, yet the same physical phenomena of differential wetting was used, and the possibility of there being interesting results in fuel technology was evident. A co-operative agreement was entered into, whereby the Bureau of Mines was to investigate the underlying physical and chemical facts and make them public, and the Trent Corporation was to pay the cost of the investigation.

The several reports as made have been available to any one interested, and are now to be published. While the Bureau of Mines felt justified in investigating the physical phenomena so far as might be done in a laboratory, and so far as public interest might reach, no attempt was made to discover the commercial possibilities which development might bring. The question of commercial possibilities must be left for commercial enterprise to answer.

What the Process Is and Does

Briefly, the process consists in agitating together powdered coal, water and oil. This produces a partly de-ashed plastic fuel, called an amalgam, the oil selecting the coal particles and largely excluding the water and ash. The amalgam can be freed from water mechanically held by working, much the same as butter is worked. The amalgam can be burned in several ways; for example, it may be shoveled, or forced through pipes by pressure; it can also be stored, under water if desired.

The laboratory results immediately suggest many interesting possible applications. For pulverizing fuel, wet grinding presents many advantages over dry grinding, provided the water can be eliminated afterwards. To be able to reduce the ash in coal may make available great quantities of low-grade coals and material now considered as waste at the mines.

If an oil is used which can be distilled at a temperature below the distilling temperature of the coal, powdered fuel is reclaimed from the amalgam and the oil may be reused. If a heavy oil be used and distilled to dryness, a coke product may be recovered, although the coal used may have had no coking quality. If the distillation proceed only to a heavy pitch, a mass suitable for briquetting may be made. In distilling oil mixed with a finely powdered material, the distillates are similar to those obtained by distilling under pressure, so that the distillation of an amalgam of coal and oil gives quantities often more favorable than the sum of the separate distillations of the coal and the oil.

The amalgam can be used for a gas-making fuel, and gas-house tar emulsions can be dehydrated by mixing with powdered coal, the amalgam being retorted for further gas making. Graphite ore can be separated from its gangue, and coke can be separated from flue dust, by using the Trent process. Clean coal in anthracite sludge will make an amalgam if oil is added.

A paper by G. St. J. Perrott and S. P. Kinney, of the Bureau of Mines, has presented the results of the laboratory-scale tests of the efficiency of the Trent process in cleaning coal. A noteworthy feature of the operation of the process is the cleanness of separation of mineral matter from combustible matter. Combustible recovery has averaged better than 95 per cent. High ash reduction has been obtained with the bituminous coals and anthracites. Sulphur reduction has been good in the case of anthracites but poor with the bituminous coals.

It has not been found feasible to treat the lignites without preliminary carbonization, due to the difficulty of forming a coherent agglomerate of the raw lignite and oil. Finer pulverization than 200 mesh does not give a sufficient increase in ash reduction with most coals to warrant the added expense of the longer period of grinding. Any oil whose viscosity is not too great may be employed in the process. Oil losses in the refuse or water are apparently negligible.

This brief sketch of possibilities revealed by small-scale laboratory work shows that the field for investigation and development is large. The general results show that real benefits are physically possible by treating coal in this manner. The Bureau has interested itself more particularly in the ash separation phenomena or the cleaning of coal, and in the distillation of the amalgam, which will be discussed in a future article.

*Chief mechanical engineer, Bureau of Mines.

Apply for Charter for Temple Furnace Co.

Noteholders of the Seaboard Steel & Manganese Co., who recently bid in the furnace of that company at Temple, Pa., have applied for a Pennsylvania charter under the name of Temple Furnace Co. This action was taken in order that there may be a formal corporate body to which title to the furnace may pass in the event of the confirmation by the United States Court of the receivers' sale.

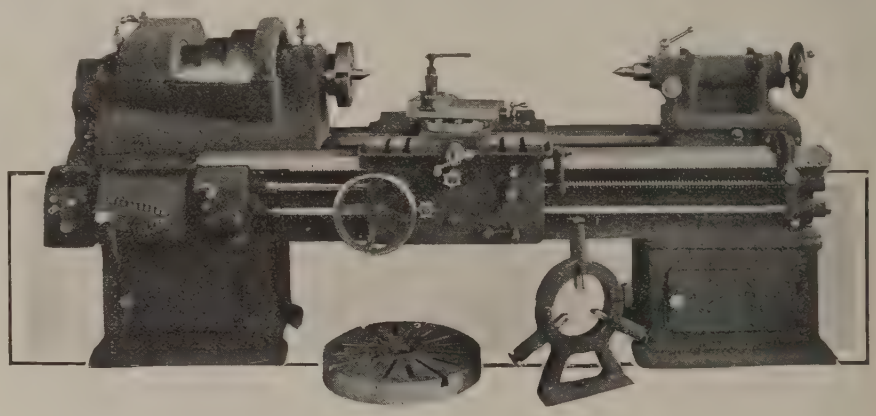
First steps to stage a large exhibition of steel products and those of allied industries in the Pittsburgh district were taken at a recent meeting of the general committee of the Pittsburgh Chapter, American Steel Treating Society. The exposition, the only one of its kind in America, will be held in Motor Square Garden, Pittsburgh, in August or September, 1922, when the national convention of the association will convene in Pittsburgh. Dr. C. M. Johnson, president of the Pittsburgh chapter, M. B. Hoffman and D. W. McDowell were chosen delegates to the 1921 national convention at Indianapolis, Sept. 19 to 26.

Double Back-Geared Engine Lathe

A 22-in. and a 24-in., 3-step cone, double back-geared engine lathe have been added to the line of the Lehmann Machine Co., St. Louis. The makers state that in design the aim has been to include liberality of dimension without exaggeration and to include the most approved features, using best materials in every detail.

The bed has chilled ways and is deep and wide. The cross section at end of bed is cut away to permit overhang to the tailstock or placing the steady rest at the extreme end. The inside front way is flat and a rack is cast in the center of the bed for engaging the pawl on the tailstock. The headstock casting is carried from front to rear boxes on a line with center of the spindle, tieing the bearings rigidly together and protecting the operator from the belt. Nine spindle speeds are provided.

The tailstock is clamped to the bed by four bolts brought up to the top of the barrel. The spindle is provided with a new and improved device for locking consisting of a heavy floating plug set in a bearing below the spindle. The plug is concaved to match the spindle and rests at one end on a shoulder of larger diameter, the other end extending beyond the back of the tailstock casting and fitting into an eyebolt suspended by an overhanging lug. The locking handle sets above this and is threaded to the eyebolt. Movement of the handle draws the plug against the bottom of the spindle, a very light pressure securely locking the spindle. A handle is provided for moving the tailstock on the bed by a pinion engaging a feed rack.



In the Quick Change Mechanism the Range Is Doubled with the Addition of Only Two Gears

The apron has a central oiling system and is tongued and grooved to the carriage. The front plate is removable leaving the mechanism easily accessible. The lead screw and feed rod have bearings in the apron to prevent sagging and undue wear on the half nut and reverse gears. A safety device prevents engagements of feed rod and lead screw at the same time and link connections are provided to the parts of the half nut. The half nut operating the handle has an easy motion, its leverage being slight at the beginning, preventing injury on the top or edges of the thread. As the nut is thrown in further the leverage increases till at the finish the two halves of the nut are locked in position and cannot be spread apart by any internal pressure. The compound rest is graduated up to 90 deg. and is held to the bottom side by bolts placed at a large radius from the center.

The quick change mechanism is designed for simplicity and doubles the range with the addition of only two gears. A cone of gears with sliding rocker arm is employed, the rocker having two central driving gears of different ratios, each with an intermediate which engage the cone of gears. By dropping the rocker arm and sliding it on the rocker shaft one of the intermediates is thrown into mesh and by raising the rocker the other intermediate is thrown into use and the next progressive set of changes are obtained. Thus all changes commonly used are made by a movement of the rocker arm alone. For uncommonly fine or coarse threads or feeds another handle is used. For cutting odd threads and worms a swinging quadrant permits the use of special and compound gears. A central oiling system lubricates the bearings in the quick-change gear box and rocker.

The feed rod does not run when thread cutting and the lead screw is inoperative when the feed rod is employed. The lead screw is of high carbon steel with a 2 pitch Acme thread and has ball thrust bearings at both ends. A thread indicator attached to the carriage can be disengaged when not in use and a micometer carriage stop can be furnished when desired. The steady rest has alloy steel plugs and all adjustments and locking, except to the bed, are accomplished by means of star handles. It can be reversed on the bed. The weight on skids is given as 7500 lb. and 7800 lb. for the 22-in. and 24-in. sizes respectively.

Metal Trades Exhibition in Indianapolis

Metal trade manufacturers in Indianapolis are planning to take part in the Indianapolis Industrial Exposition to be held Oct. 10 to 15 at the Indiana State Fair Grounds, under the auspices of the Indianapolis Chamber of Commerce. The convention of the National Purchasing Agents' Association will be held the same week in Indianapolis.

Space has been taken by some 400 of the 781 different lines of manufacturing in Indianapolis. One of the features of the Exposition will be that the huge Manufacturers' Building will be laid out in replica of the retail district of Indianapolis, with the world-famed Soldiers' and Sailors' Monument towering in the center of the network of streets named after those in downtown Indianapolis.

Gain in Pittsburgh Industries

Pittsburgh in 1920 had 2253 industries reporting to the Pennsylvania Department of Internal Affairs. In 1919 reports were received from 1775. The industries last year gave employment to 118,954 persons and in 1919 to 90,254. The persons employed in the city last year in industry included 107,922 males and 11,032 females. There were paid a total wage of $210,224,110, as compared with $117,602,200 in 1919. The capital invested in the industries of the city last year amounted to $469,286,200, against $354,042,800 in 1919. Industrial products turned out in the city last year were valued at $889,531,900, an increase of 47.6 per cent over 1919, when the value was $602,582,800. Pittsburgh's metal products were worth $536,359,300.

New Standard Samples

A new standard sample of lead-base bearing metal No. 53 is now being issued by the Bureau of Standards with a provisional certificate. This sample has the approximate composition: lead 79 per cent, tin 11 per cent and antimony 10 per cent, and contains in addition small amounts of bismuth, copper, iron and arsenic. The price of this sample is $2 per 150 grams, prepaid or parcel post C.O.D.

Renewal No. 33a of nickel steel No. 33 is also ready for distribution at the price of $2.50 per 150 grams.

Analysis of Costs of Drop-Forging

Comparison of Steam and Board Drop Hammers —Rate of Production Studied as Well as Costs —Dividing Line Established Between Types

BY R. T. HERDEGEN*

IN every manufacturing line one finds differences of opinion regarding the relative merits of different machines or methods for accomplishing a given result. In the drop forging industry one of the most controversial points is the relative merits of steam drop hammers and board drop hammers. In considering the relative merits of these two types of machinery the main point in the final analysis is, which will produce forgings the more cheaply, assuming of course that satisfactory forgings will be produced in either case?

It is generally accepted that for very small work a board hammer is the more feasible unit, while for very large work the steam hammer is the better. The difficulty is to locate properly the dividing line between the two types. It is also true that certain jobs which can readily be made in a steam hammer cannot, due to their peculiar shape, be made satisfactorily in a board hammer; the converse is not true

Definite Sizes of Hammers Compared

In this paper we will consider a 1500-lb. steam hammer vs. a 1600-lb. board hammer. In a few instances a job which can be handled satisfactorily in a 1500-lb. steam hammer may require a 2000-lb. board hammer, but as the difference in the investment and running expenses between the 1600-lb. and the 2000-lb. board hammer equipment is not great we will use the former for comparison. Usually a job that requires a 2500-lb. steam hammer would require about a 4000-lb. board hammer. The problem is whether, for most of the 1500-lb. class of work—which is liable to be the bulk of the work of most forging companies—board hammers or steam hammers should be used.

Relative Hourly and Monthly Output of the Two Types

It is particularly difficult to convince the average shop man that the board hammer can produce as much work per hour as the steam hammer. The writer has found, however, after a very thorough study involving the forging of millions of pieces, such as connecting rods, pedals, gears, spring hangers, spindles and other common forgings, that the production results obtained from the two classes of equipment show the average output per hour in the steam hammer ran 70 pieces against an average of 80 pieces per hour in the case of the board hammer.

A comparison based on the production per month is even more favorable to the board hammer, due to the fact that shut-downs, necessitated by break-downs, are of much shorter duration in the case of the board hammer than they are in the case of the steam hammer. This means that one can expect more actual monthly hours of operation from a board hammer than from the corresponding steam hammer.

Average steam hammer shop men will not believe that the board hammer production will exceed the steam hammer production, due to the fact that if they have any board hammers they are usually tucked away somewhere in a corner. One may consider it axiomatic

COMPARATIVE HAMMER-HOUR RATES

			Hourly Rates—1500 Lb. Steam	Hourly Rates—1600 Lb. Board
A.	Charges based on weight of output. Basis, 275 lb. per hr.	1. Material handling—unloading and piling stock, shop trucking, shipping, scrap handling and overhead	$1.05	$1.05
		2. Inspection—Hot and cold	.35	.35
		3. Interest on rough stock inventory	.15	.15
B.	Charges involved in heating stock.	1. Fuel oil at 6c. per U. S. gal. delivered	.60	.60
		2. Furnace air—Steam turbine with proportionate coal, boiler charges and overhead	.30	.30
		3. Furnace repairs—Labor and material	.25	.25
C.	Charges involving number and wages of men on hammer.	1. Foremen and timekeepers	.20	.20
		2. Compensation insurance, safety and personnel	.20	.20
D.	Charges involving cost of steam to operate steam hammer and electric power to operate board hammer and presses.	1. Coal at $5.60 per ton delivered	1.30	
		2. Proportionate boiler room charges and overhead	1.70	
		3. Electric power at 2c. per kw. hr. and overhead	.05	.40
E.	Charges incurred in operation of machinery.	1. Upkeep, hammer and press—Labor charges	.60	.25
		2. Upkeep, hammer and press—Repair purchases	.70	.35
F.	Charges based on investment.	1. Upkeep buildings, grounds and equipment	.25	.15
		2. Depreciation buildings, equipment and machinery—Insurance and taxes	.70	.50
		3. Administrative, general office, sales and commercial expense	.60	.50
			$9.00	$5.25
G.	Die charges.	1. Die blocks, die labor and overhead	3.00	2.00
			$12.00	$7.25

board hammer. There would be no object in using a board hammer for most jobs of this size, for the investment would probably be about the same; and the production might very likely be less in the larger board hammer than in the smaller steam hammer.

It would appear, therefore, that for work requiring a 2500-lb. steam hammer or heavier, it is desirable to have steam hammers. For work requiring less than a 1500-lb. steam hammer it is admittedly desirable to have board hammers give satisfaction only when they are removed from the vicinity of the steam hammers, and when they have a separate foreman and a separate repair gang, and are otherwise completely segregated from the steam hammers. When this geographical separation is accomplished, then and then only will one obtain really comparable results.

Three Factors of Cost Involved in Study

In figuring the cost of a forging, there are three factors to be considered: viz: material, labor and overhead.

*Dominion Forge & Stamping Co., Walkerville, Ont. Paper presented before American Drop Forge Association at Chicago, June 22.

We will of course assume that the same weight of steel is required for a job, whether it is made in a steam hammer or in a board hammer. The same piece work rate should be paid for a given piece, whether it is run in a steam hammer or a board hammer. We will, therefore, assume that the productive or directly chargeable labor per piece is the same in both cases.

It is evident, inasmuch as the material and labor costs for a given forging are the same, whether it is made in a steam hammer or a board hammer, that the only difference will be in the overhead cost. The only method of computing this cost, which will give a correct basis for comparison, is the machine rate system. Any conclusion reached from a comparison of these overhead costs obtained by the percentage system would be incorrect and misleading.

Assumption of Equality in Hourly Productivity

Although results obtained from a test involving the making of ten million pieces clearly demonstrate the superiority of board hammers in production, we will assume the production per hour to be the same in both cases. If the machine rates were the same for both classes of equipment, the entire manufacturing cost of a forging would therefore be the same, whether it was made in a board hammer or a steam hammer. To solve the problem correctly it is therefore necessary to determine the hourly machine rate for each class of equipment.

In determining the machine rate, consider a production center consisting of the hammer with a press and furnace. The main units will be a 1500-lb. steam hammer in the one case and a 1600-lb. board hammer in the other. We will use a 55½ Toledo geared press and a furnace with a 36-in. opening, with each hammer. Due to the fact that a steam hammer is a unit requiring considerable heavy dismantling, it should be placed in a building equipped with an overhead crane, whereas, in the case of the board hammer, a building having proper arrangements for a chain fall is all that is necessary. This means that the cost of the building per sq. ft. is greater for the steam hammer than for the board hammer shop. A complete analysis of the comparative hammer-hour rates for these two production centers follows:

In tabulating these hammer-hour rates the various charges have been segregated into seven main groups. In the first three groups the hourly charges are the same for both types of production centers, because the production per hour is considered the same for both types of hammer and because it is customary to pay the same piece price for a forging, whether it is made under a steam hammer or a board hammer.

It will be noted in the above tabulation that the phrase "and overhead" has been added in several instances. This is possible, because the actual overhead has been determined for such non-productive departments as the material-handling department, the oil tanks and furnace equipment, the boiler room, and the electrical department. It is very necessary that this be done, particularly in the case of the boiler room, for if this department's depreciation and other overhead expenses are charged to the general plant account, instead of being segregated against the boiler room, machinery which has no connection whatsoever with the boiler room will be charged with a large overhead resulting from boiler operation.

Power Charges for the Two Hammers

Charges under group "D" represent the cost of producing steam for the steam hammer and electric power for the board hammer. The electric power charged to the steam hammer is the cost of the amount required to run the trimming press. It might appear that the boiler room overhead charges are heavy, but a careful analysis of any boiler plant will show that the investment is great, with a resultant large depreciation charge, and that such costs, together with items of repairs and labor, are much higher per hour of operation than is usually estimated, particularly when the plant is running only one shift.

Charges under group "E" are those incidental to keeping the equipment in operation. The cost of operating the steam hammer is much greater than the cost of operating the board hammer, due to the fact that the actual breakage and the cost of dismantling and reassembling hammers after break-downs are more in the case of the steam unit. These figures are based on data collected over several years, and should not vary much in different plants, providing that the equipment is kept in really first class operating condition at all times.

The charges under group "F" are based on the investment involved in the production center, and are naturally higher for the steam hammer than for the board hammer. Under the subdivision (3) has been grouped all administrative, general office, sales and commercial expense. In certain plants where this runs high it is customary to add this as a fixed percentage on the total manufacturing cost. It is assumed, however, that this is the average jobbing forge shop, where these expenses do not run very high, as they might in the plant which carries a standard line of goods such as wrenches, pliers, and other hand tools.

Final Rate Per Hour, With and Without Dies

The final analysis indicates that the hourly rate for the steam hammer production center, without dies, is $9 per hour against $5.25 per hour for the corresponding board hammer.

For the steam hammer the die charge is $3 per hour, against $2 per hour for the board hammer, which charge includes the cost of die blocks, the labor required in their sinking and the proportionate die room overhead. In other words, it represents the cost of dies, should a forging company be obliged to purchase them from an outside concern. The cost per hour is 50 per cent greater in the case of the steam hammer than for the board hammer, due to the fact that a steam hammer is harder on dies than a board hammer. An investigation was made involving about twenty pieces which were run in both classes of equipment. Data collected from this experiment indicated that in general the life of a die was at least 50 per cent longer under the board hammer than under the steam hammer. Adding the die expense to the other expenses brings the final overhead rate to $12 per hour in the case of the steam hammer, compared with $7.25 in the case of the board hammer.

As we have developed both machine rates, it is possible for us to determine the cost of making a certain forging in either type of equipment. An example of such a cost per 100 forgings is given below:

	1500-Lb. Steam	1600-Lb. Board
Material, 205 lb. at 3½c.	$7.18	$7.18
Direct labor	3.50	3.50
Overhead, 60 pieces per hr.	15.00	8.75
Die charges	5.00	3.33
Total forging cost	$30.68	$22.76

It will be noted that the material and direct labor charges are considered the same in both instances, in accordance with the conclusion developed early in this paper. The difference in the cost is due entirely to the difference in the overhead cost of producing the forgings in the two different types of equipment.

Profit in One Case; Loss in the Other

It is apparent from the above example that, whereas a manufacturer who was planning on forging this particular piece in a board hammer could satisfactorily sell it for 27c., the forge shop which attempted to make this piece in a steam hammer could certainly not sell it for this figure without suffering a severe loss.

Finally, the result of this investigation would indicate that in general it would not be desirable to install steam drop hammers smaller than 2500 lb. There are, of course, exceptions to this statement, but the exceptions are not so numerous as those unfamiliar with the excellent results obtainable on board hammers may think. Keep in mind the fact that the production obtained on board hammers, when they are installed in the same shop with a number of steam hammers, is never equal to the production which might be obtained on those hammers if they were installed in a separate shop removed from the vicinity of the steam hammers.

The Possibilities of Fusion Welding*

Conditions for This Type of Weld —Control of Welders—Test of Welds—Success with Alloy Steels

BY A. S. KINSEY

NO modern mechanical process possesses more encouraging possibilities than the welding of metals by fusion. The welded joint is not of modern conception, and the forge weld undoubtedly dates back to the earliest working of metals. However, the other kinds of welds have been in use less than 20 years. All welding is done by either one of two principles, plasticity or fusion. The forge, the electric resistance and the thermit compression welds depend upon plasticity, while the electric arc, the thermit cast and the oxyacetylene welds employ the principle of fusion. The respective merits of these two methods of making welds are rapidly becoming well understood. Welding by plasticity has accomplished much. We have but to consider the manufacture of ordinary wrought iron and steel pipe to appreciate the value of the forge plastic weld. The speed and non-oxidizing features of the electric resistance weld also have proved to the greatest advantage, as in the making of steel chain for example.

But the plastic weld is limited in its application and is confined almost entirely to mild steel. The fusion weld however has a broader range of usefulness among the metals. Especially is this true of the oxyacetylene weld which is applicable to mild steel, tool steel, high speed steel, the new alloy steels, cast iron, wrought iron, aluminum, copper, brass, bronze, lead, tin, zinc, in fact all of the commercial metals may be welded by the oxyacetylene torch.

Now the possibilities of a good fusion weld depend on high tensile strength, ductility, density, control of the welders, and a proper method of testing welds.

Tensile Strength

The tensile efficiency of a weld is based on its thickness being the same as that of the base metal. This efficiency is of first importance but it must not be obtained at the expense of ductility, that is the bending and stretching qualities of the metal. In the welding of steel, for example, the ductility is of much importance. Again to secure the proper tensile efficiency the welded metal must be thoroughly fused to the sides of the vee of the base metal. One of the best ways of securing a high tensile efficiency, say in mild steel, is to use a welding rod of nickel steel having a tensile strength nearly double that of the base metal. The result is likely to be a weld of higher tensile strength than its base metal. Of course the simple reinforcing of a weld is common practice.

Ductility

The ductility of a fusion weld, particularly of steel, must be considered, although there now are some who would argue that a weld does not need to have bending qualities. One of the best illustrations of the value of ductility in a steel weld is to be found in the manufacture of welded steel tubing, which can be made cheaper than the seamless drawn tubing. In order to obtain small size tubing the practice is to weld the steel in diameters of from 1 to 2 in. and then cold draw these tubes to the smaller sizes desired, some of them being as low as 5/32 in. outside diameter with 1/12 in. hole. It is to be noted that this tubing has an oxyacetylene fusion weld along its full length of many feet, which must be capable of withstanding the strain of repeated cold drawing as the large tube is reduced to the smallest diameter. The weld not only withstands this treatment but also is found to be ductile enough successfully to stand being flattened, crushed, knurled or bent. The welding of the larger size tube is done at the rate of from 3 to 5 ft. per minute with multiple tips in an automatic machine.

Porosity

One trouble with welds has been the lack of homogeneity of the welded metal, and usually the trouble is due to oxides. This applies to all methods of welding but probably less trouble is experienced with the oxyacetylene weld. In most cases the weld must be absolutely nonporous and the density of its metal should be equal to that of the base metal. A fine illustration of what may be accomplished in this direction may be found in some recent designs of electric sterilizing transformers. In this type of transformer a high voltage terminal is filled with a combination of helium and nitrogen gases held at a constant pressure of about 150 lb. to serve as a gaseous dielectric. Of course it is necessary for the pressure of the gas to be maintained constant and therefore the welded joints of the transformers must not allow the gas to leak away. Many attempts were made to weld these transformers, but the welds proved to be so porous that the gas pressure could not be maintained until the oxyacetylene process was brought into use.

Oxyacetylene welding in this case has proved highly satisfactory and the elimination of oxides has been so complete that the weld is absolutely nonporous so far as the use of gas at high pressures is concerned. Other evidences of the nonporosity of the fusion weld may be found in its use in refrigerating systems where anhydrous ammonia plays an important part. In this case the weld must withstand high pungent gas pressures and be absolutely tight. The oxyacetylene weld has been very successful in this regard.

Control of Welders

There must be a better control of welders. We must know more exactly what these men are doing in all of their work. Much attention is being given to this problem at the present time by the American Welding Society. One plan discussed is to require the shop foreman employing welders to have a thorough knowledge of the possibilities of the art so that he may be capable of inspecting the work of the welders from time to time just as he is familiar with and can pass on the work of other mechanics in his shop. The welders themselves should be trained thoroughly to understand the principles of their work by giving them say an evening course in the practical metallurgy of the subject. With these precautions, and assuming them to be of average intelligence and dependability, the danger of poor welds should be greatly diminished. Many oxyacetylene welding schools are springing up over the country and they will undoubtedly accomplish much good in this direction. There is another plan for controlling welders which is being considered carefully and undoubtedly will meet with much success. We speak of the testing of welds.

Testing of Welds

A number of ideas have been suggested for the testing of welds. Some shops require their welders to make sample welds each month which are tested and the results posted on a blackboard for all the shop men to read. This has both its advantages and disadvantages. Another plan is to cut out a section of a weld, where it is practicable, and examine it for fusion and porosity. If the welder does not know just when his work is to be tested, he is likely to be forced to constant care. We know of some cases where

*From an address delivered to the Cleveland Section of the American Welding Society May 6. The author is professor of shop practice at Stevens Institute of Technology, Hoboken, N. J.

welders are being required, after making a good sized weld, to stamp their initials and the date alongside of the job so that there can be no question as to responsibility of workmanship, if the weld fails. The testing of welds is of vital importance and it will be of interest to many to learn that a special committee of the American Welding Society is devoting considerable attention to the question at the present time.

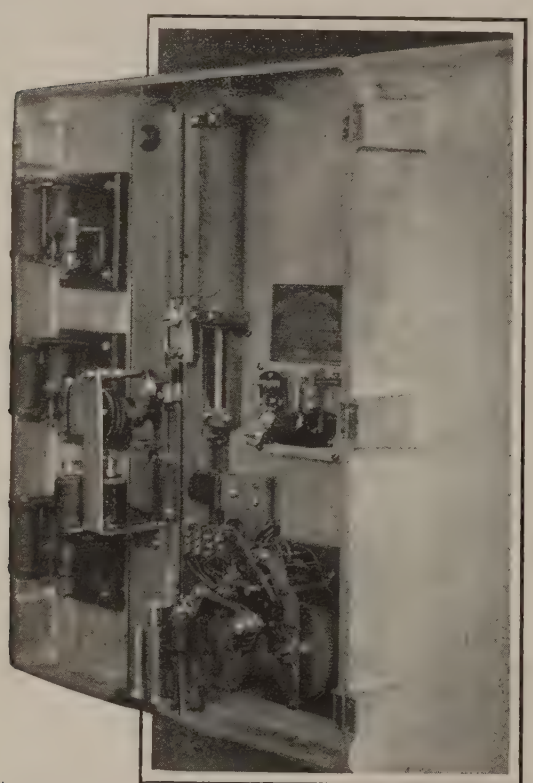
The fusion weld made its debut in the repair shop. During the past 5 years however it has been gradually expanding to the manufacturing plant, where now it is of the greatest value. Its application to the automobile industry is well known. There was a time when nearly all steel tanks were riveted. Now there are millions of them being made each year with all welded joints. The all-riveted locomotive fire box is now being welded. Intricate castings which formerly it was impossible to make are now cast in parts and the parts welded together.

Fine success has been obtained in the experimental welding of steels such as nickel, chromium, tungsten, cobalt and vanadium. The depositing of alloyed steel on cheaper base metals where intense heat and wear are concerned has been successfully accomplished by the oxyacetylene torch. This is opening up a fine new field for fusion welding and making available certain applications of alloyed steels which were not practicable before.

SAVING ELECTRIC CURRENT

Automatic Device for Steel Furnaces for Which Large Economies Are Claimed

An automatic fuel saving device for electric furnaces has been invented and patent applied for by Edward T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y. The inventor states that the use of this device by his company, which produces electric steel on a large scale in several different types of furnaces, has saved about $1,500 each month since they were installed or from October, 1919, to Jan. 1, 1921. A description of the apparatus furnished by the inventor follows:



The Moore Automatic Fuel-Saving Device for Electric Steel Furnaces

The device is known as a maximum demand regulator, in connection with which is also a device known as a maximum demand meter. The regulator when properly connected in the main power circuit will be actuated according to the variations of power. The device has one element which rises at a rate depending upon the rate of consumption of energy, another element operating independent of the first element, but located so as to co-act with same under proper conditions, responding only to a time basis. In other words, it is actuated by a contact closer which makes contact every 15 min. or half hour, depending upon the basis upon which the power is purchased.

Assuming, therefore, the contact to be in its normal position of the time element, with the contact of the energy element somewhat below it, it will be appreciated that as the contacting energy element rises, it will eventually come into contact with the time element, provided the rate of energy consumption is great enough to cause this action. When contact is made, relays interposed in the circuit are actuated, causing a definite fixed resistance to be inserted across one of the circuits of the furnace regulator panel located at the electric furnace. This amount of resistance which can be inserted automatically, can be so adjusted as to cause a load reduction on any one furnace or all furnaces in an installation, and causing a load reduction on each furnace of a predetermined amount. Therefore, when a maximum demand occurs for which the regulator is set, the load is automatically cut on the furnaces at a predetermined amount, said amount being adjusted to a value which will not slow down production or increase the length of the heat being made in the furnace.

Operating coincidentally with the energy element is a pen device which will trace upon a chart driven by a suitable clock, the progress of rise of the energy element during the demand period, about 15 min. At the end of the 15-min. period, suitable contact is made by a clock restoring both the energy element and the time element to their normal position ready to begin another operation. It will thus be seen that the pen will trace upon the chart the maximum demand during any demand period, which can be read off directly in kilowatts if desired, thus eliminating some of the objections of some of the present demand meters.

At the works of our company we have had one of these regulators installed since Oct. 1, 1919, and up to Jan. 1, 1921, we have saved conservatively $1,500 per month. There have been months when we have saved over $2,000 by the use of this device, simply because the demand had been kept down some months over 2000 kw., and, as we pay a demand charge of $1 per kw., the apparent savings will result. Since Jan. 1, 1921, we have been operating only one furnace part of the time, so, naturally the savings can only be in proportion. The power bills during normal production run as high as $25,000 per month, and even greater savings than those indicated might be effected, it being possible to cut the load on the furnace a greater amount than we are doing at present.

On a 6-ton Heroult furnace drawing a normal load of 150 kw., the amount of cutting at the time of peak load can be conservatively fixed at about 400 kw., but during refining, when the normal load is only about 400 to 500 kw., the amount of cutting can not be much greater than 75 to 100 kw. Otherwise, the input into the furnace would be so reduced during the cutting period as to seriously affect the temperature within the furnace, having a deleterious effect upon the steel. The device inherently takes care of this load variation, that is, cutting a relatively large amount when large consumption obtains during melting, but cutting only a small amount relatively when a small load is being taken during refining.

Electrical Cleaning of Blast Furnace Gases*

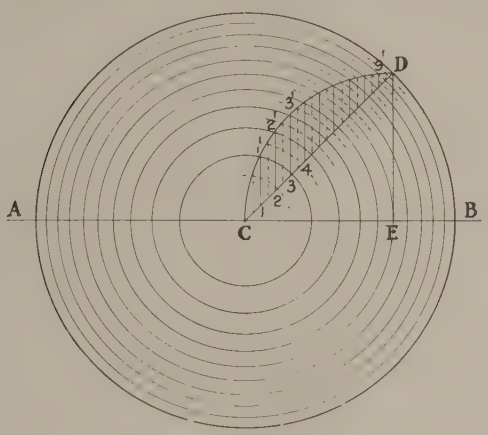
What the Problem Is — Why Present Methods Fall Short of Desired Results— How the Electrical Screen Does Its Duty

BY N. H. GELLERT†

IN November, 1919, a paper was read by the writer at the meeting of the Philadelphia section of the Association of Iron and Steel Electrical Engineers on the general subject of "Electrical Cleaning of Gases as Applied to Blast Furnaces." Since that paper was read there have been several changes in the electrical cleaners at the two plants where they have been installed, at Dunbar, Pa., and at Sheridan, causing a decided improvement in the operation of both plants. As a matter of fact, Sheridan has been put into operation since the last paper was read. Naturally, as time goes on, a great deal is learned that is new. Methods and apparatus are therefore developed to further the art of electrical precipitation. It is with this in view that the writer will endeavor to discuss, not so much the actual physical plants now operating at blast furnaces with electrical cleaning apparatus, but methods and features which enter into the general problem of investigation and adaptation of electrical cleaning to blast furnace gases.

General Gas Cleaning Problem

In general the problem, including that of other gases besides those that issue from a blast furnace, may be split into two parts:



To Lay Out Concentric Rings of Equal Area Within a Pipe: On horizontal line AB lay off the diameter of pipe to scale. Draw the circle corresponding to the pipe and through the center C erect 45 deg. radius CD. At intersection D drop line DE perpendicular to line AB. With intersection E as center draw arc of circle CD. Divide radius CD of large circle into desired number of equal parts. Project these points to the arc CD and parallel to DE, intersecting at 1', 2', 3', . . . 9. With C as center draw circles of radii, C1', C2', C3', etc. The annular rings between these circles will be of equal areas.

For velocity measurements the Pitot tube should be located at the mean velocity radius of each ring. These radii are determined by laying off on radius CD the points midway between 1 and 2, 2 and 3, 3 and 4, etc. These are projected, parallel to DE on the arc CD. This point of intersection, with C as center, fixes the radius.

1. The cleaning of non-combustible gases,
2. The cleaning of combustible gases.

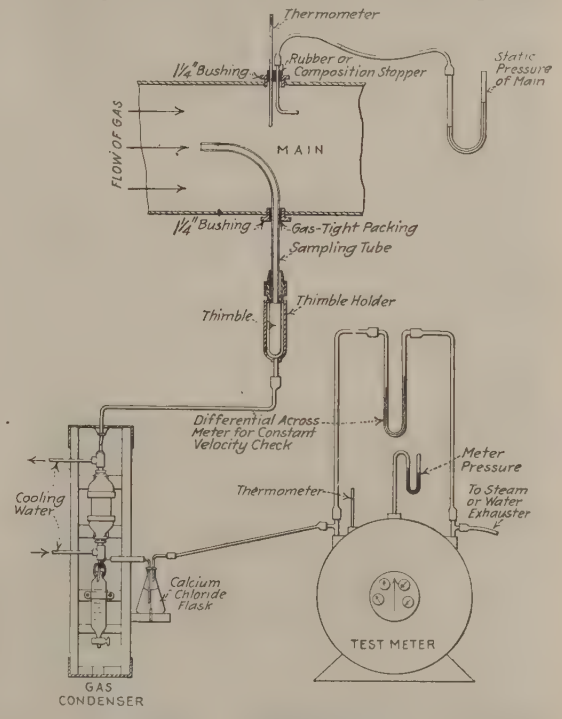
Non-combustible gases usually issue from furnaces or stacks in which gas either has been utilized for combustion purposes or the non-combustible gases are driven off by heat primarily as inert gases.

Combustible gases, in the second part of the general problem, include gases used for industrial purposes, manufactured in producers, in coal gas and water gas plants and also gases issuing from the blast furnace.

In general, blast furnace gases contain 2 to 10 grains of dust per cu. ft. of gas at standard conditions of temperature and pressure, namely at 62 deg. Fahr. and 29.92 in. of mercury, which is atmospheric pressure. This dust exists in the form of both dust and fume. The fume is so finely subdivided, however, that in a great many respects it acts as a perfect gas. To determine how to apply a cleaner to the blast furnace gas, there are at least four things which must be investigated:

1. Temperature,
2. Velocity and volume,
3. Dust content,
4. Moisture content.

It is evident that, since the measurements are made under the most difficult conditions, usually out in the open air and under a varying condition of load with variations in temperature, velocities, dust content and moisture content, the data must be taken over a long period of time if they are to be of any real value. In addition, inaccuracies will be encountered in the actual measurements, due to the fact that it is not as a rule possible to take them under the conditions necessary for extreme accuracy. Nevertheless, the measurements obtained give sufficient information to make it possible



Typical Gas Sampling and Measuring Setup of Instruments

for a blast furnace operator to get a fairly good indication of what he is doing, and how to correct any conditions that need correction.

Determining Velocity and Volume of Gas

To make a volume determination a Pitot tube of a standard type, a manometer tube, rubber tubing, some boards and nails, measuring rule and a few tools are necessary. A gas measuring station location should be selected in the gas main where the most uniform gas flow conditions are approximated. The conditions are always adversely affected by bends, connections, offtakes, explosion doors, manholes, etc. It is seldom that a station can be selected in blast furnace gas main systems which will give the ideal flow conditions

*Abstract of paper read before Cleveland section of Association of Iron and Steel Electrical Engineers, Cleveland, April 11.

†President Gellert Engineering Co., Philadelphia.

assumed in theoretical discussions. If a straight portion of main can be found, four to ten times the diameter in length and without valves, offtakes or some other interfering object, the conditions may be assumed to be good for gas measurements.

After this station has been located, it is necessary to determine the inside dimensions of the main in which the flow of gas is to be measured. If the main is horizontal, care should be used in sounding the inside bottom of the main for any deposits of flue dust which may reduce the total cross-sectional area. The area of the circular main should then be calculated.

Velocity of gas flowing through the main is greater at the center than near the walls. Therefore, to get the average gas velocity, it is necessary to take a large number of velocity readings across one or (preferably) two diameters of the main. By dividing the main into equal areas it is possible to get the average main velocity in the simplest way, and with the least expenditure of time. The average velocity of the total gas flow will be the average of the velocities obtained at the mean velocity points of the equal area zones.

If the main is very large and great accuracy is required in the measurements, twenty equal area zones should be used instead of ten. If less accuracy is

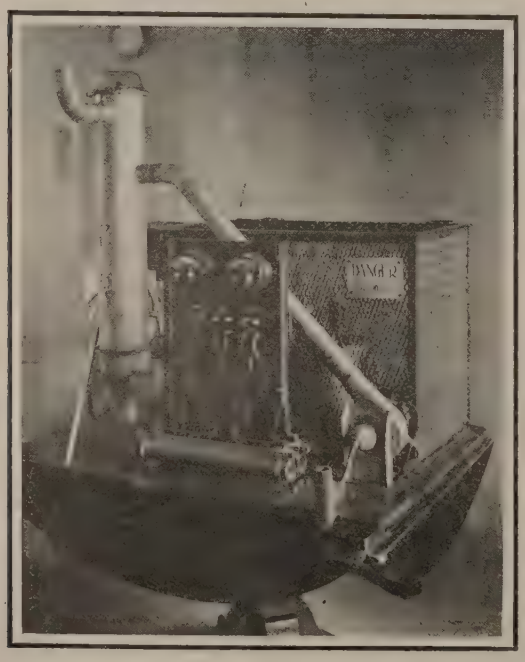
Table 1—Ten Area Percentage Table

Diameter and radii of concentric rings for equal areas. Mean velocity points located both as radii percentages and percentage distance from side of pipe. Areas numbered out from center. Inside diameter of pipe equals 100 per cent.

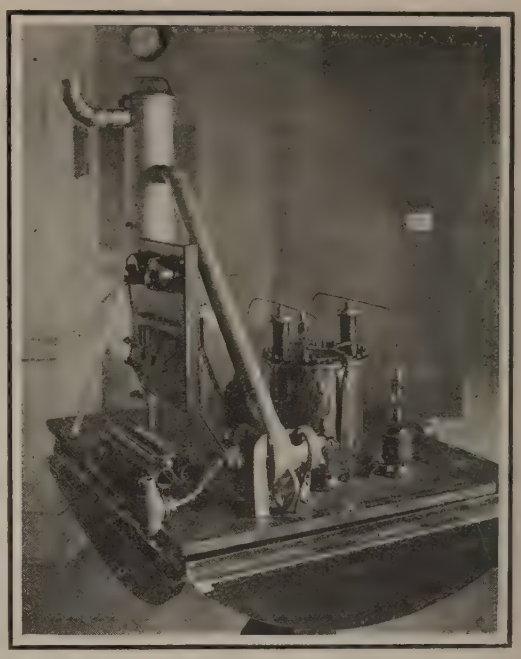
Area	Diameter	Radii as Percentage of Pipe Diameter	Mean Velocity Point Percentage of Pipe Diameter Radii	Distance from Side
1	31.6	15.8	11.2	38.8 and 61.2
2	44.7	22.4	19.4	30.6 and 69.4
3	54.7	27.4	25.0	25.0 and 75.0
4	63.2	31.6	29.6	20.4 and 79.6
5	70.7	35.4	33.5	16.5 and 83.5
6	77.5	38.7	37.1	12.9 and 87.1
7	83.7	41.8	40.3	9.7 and 90.3
8	89.4	44.7	43.3	6.7 and 93.3
9	94.9	47.4	46.1	3.9 and 96.1
10	100.0	50.0	48.7	1.3 and 98.7

permissible, and for ordinary sized mains up to 3 or 4 ft. diameter, only five equal areas need be used. A graphical method of laying out any number of equal concentric areas in a section of a circular main is shown. The directions for doing this are given in the caption.

Tables 1 and 2 give the data for laying off a circular main into ten equal areas, and also into five equal areas, and also show the distance of the mean velocity point for each concentric area from a given



Experimental Apparatus Set Up for Demonstration Purposes



Side View of Experimental Apparatus, with Screen Removed Which Normally Guards the High-Tension Connections

point inside of the main. In all this discussion, this point inside of the main, when used in making measurements, is the inner edge of the lining at the point where the Pitot tube is introduced into the main.

The central area of the main will have the cross section of a circle, while all the other areas will be annular cross sections of varying widths. The outermost ring, closest to the pipe, has the smallest width, while the innermost ring, closest to the center, has the greatest width. This, of course, results from the requirement of having equal areas. When accurate measurements are required and nearby bends or connections cause swirls and eddies in the main, two traverses should be made in the main at right angles to each other, one vertical and one horizontal. For this purpose two holes are made in the main on diameters at right angles to one another. The Pitot tube is inserted first through one of the holes and then through the other.

Under normal conditions of blast furnace operation, the following simple formula, which has been used with sufficient accuracy for air measurements, will be found to apply without appreciable error to blast furnace gases.

$$V = 2.9\sqrt{TH}$$

V = the gas velocity in ft. per sec.
T = absolute temperature in deg. Fahr. $(t + 460)$ (more closely 459.6)
H = velocity head in inches of water.

This holds true because the density of blast furnace gases is almost identical with that of air. Ordinary

Table 2—Five Area Percentage Table

Diameter and radii of concentric rings for equal areas. Mean velocity points located both as radii percentages and percentage distance from side of pipe. Areas numbered out from center. Inside diameter of pipe equals 100 per cent.

Area	Diameter	Radii as Percentage of Pipe Diameter	Mean Velocity Point Percentage of Pipe Diameter Radii	Distance from Side
1	44.7	22.4	15.8	34.2 and 65.8
2	63.2	31.6	27.4	22.6 and 77.4
3	77.5	38.7	35.4	14.7 and 85.3
4	89.4	44.7	41.8	8.2 and 91.8
5	100.0	50.0	47.4	2.6 and 97.4

air at 32 deg. Fahr. and 29.9 in. mercury weighs 0.0807 lb. per cu. ft., and blast furnace gas under the same conditions will weigh between 0.0794 and 0.0819 lb., depending upon the kind of ore used and the furnace practice. Furthermore, the pressures found in blast furnace mains beyond the first dust catcher seldom

exceed 6 in. of water above atmosphere, which corresponds to only 0.22 lb. per sq. in. added to the normal atmospheric pressure of 14.7 lb. per sq. in.

After a series of Pitot tube readings are made in each one of the ten equal areas, the same kind of measurement is made at right angles to the original measurements. This enables the investigator to get the average velocity of each area. By averaging the velocities of the equal area zones, he can get the closest approximation to the main velocity, and consequently the volume of the gases passing through the main. The formula for the volume is

$$Q = 60\,AV$$

Where Q = the volume in cu. ft. of gas flowing per minute
V = the velocity in ft. per sec.
A = the inside cross section of the main in sq. ft.

Methods of Cleaning Blast Furnace Gases

Two general methods of cleaning blast furnace gases are in use:

1—Wet cleaning,
2—Dry cleaning.

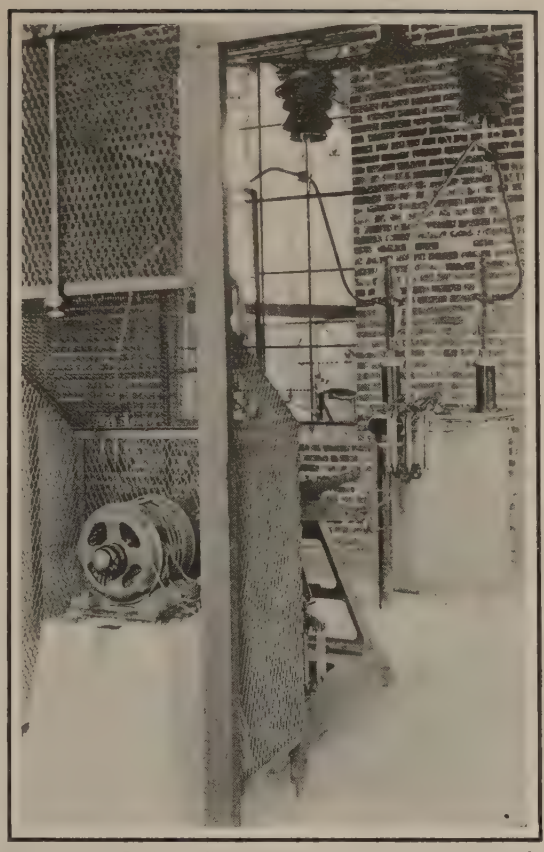
A great deal of money has been spent in developing wet cleaning methods, and a great many wet cleaners are now installed on blast furnace plants throughout the country. Nevertheless, because of certain fundamental undesirable factors, there has been a tendency on the part of operators to get away from wet cleaning and to go to dry cleaning. The main objections to a wet cleaning process are:

1. Loss in sensible heat, due to the reduction of temperature of the gas when using large quantities of water, which are necessary in order to get the best results from this method. A table taken from Mr. Diehl's paper, before the American Institute of Mining Engineers in 1914, shows that nearly 8 per cent greater B.t.u. exist because of the sensible heat in unwashed blast furnace gas at 400 deg. Fahr. and with 35 grains of moisture per cu. ft., as compared with washed gas at 70 deg. Fahr. and with moisture saturation at 70 deg. When using 625 tons of coke per day, at a 500-ton blast furnace, about 50 tons of coke might have been saved per day. At $6 per ton, a saving of $300 per day for 300 days amounts to $90,000.

2. The second objection is the pollution of streams. It has been found that, at several blast furnace plants, fish life and bacteria are eventually destroyed in those streams where the effluent of the washer is discharged. This has resulted in some places in enjoining furnaces from discharging the effluent into the streams. In other places, it has resulted in controversy. The trend of municipal and state authority is toward the prohibition of discharges dangerous to fish life. The elimination of this possible contention is advisable.

3. Wet washers often are not very efficient. The result is, especially where there is much fume in the gas, that the washer does not remove the fume and dust to a sufficiently great degree. The dampened particles of fume and dust deposit in the stove burners and in the boiler burners and, because of their hydraulic qualities, stay in the burners until they become a hard mass, which eventually has to be dug out with chisel and hammer. At some plants, this is a real nuisance and causes money losses due to the necessity of shutting down the stoves and boilers and cleaning them.

4. Another objection is the necessity for large quantities of water. This means a large pumping plant, maintenance and repairs of pumps, a great deal of moving machinery and a large source of supply of water. This is not always available, and more than



Each Motor Is in a Cage Where It Can Be Reached, the High-Tension and Transformer Connections Being Behind the Screen

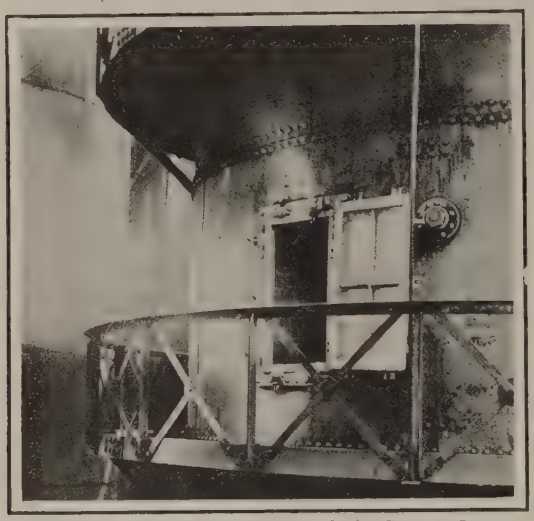
One Unit of Apparatus Includes Switchboard, Transformer, Rectifier and Motor

one plant has not gone to cleaning its gases, because of its inability to get water.

Throughout this paper, it must be understood that the cleaners discussed are not secondary cleaners or intensive scrubbers, but are primary cleaners, used to remove dust from the gases to such a degree that the gas may be burned effectively in the stoves and boilers, and not at all intended for the cleaning of gases for gas engine purposes.

Dry Cleaners Used Abroad

Practice in Europe has been somewhat different, as there were early efforts to develop dry cleaners. As a matter of fact, dry cleaners have been operating



Dust and Fume Coming Out with the Current On

in Europe for some time, and have been mainly objectionable from two standpoints:

1. Their high cost,
2. Possible damage to the cleaner.

While the cleaners built in Europe (of the bag type) cleaned the gas more effectively than any primary cleaner could, and even went so far as to prepare the gases for gas engine purposes, the bags, being inflammable, necessarily were subject to destruction whenever the heat put through the cleaners exceeded the safe limits of their material. The high cost of installation of this type of cleaner also militated greatly against their adoption, and perhaps was the chief reason why such dry cleaners were not installed in this country. And the sensible heat lost in cooling the gas robbed it of a great deal of the economies which might be obtained were the sensible heat retained.

With dry cleaners able to pass the gas without any considerable reduction in temperature, there is to be added to the efficiency caused by the cleaning of the gas, the efficiencies effected by the use of the sensible heat. Certain difficulties, however, in the cleaning of gases by the dry process must be taken care of.

Any screen type of cleaner which attempts to filter out particles of dust and fume, even when the filtering medium is not destroyed by the normal heat of the blast furnace gas, must be sufficiently fine in nature to present a hole smaller than the finest particle of dust and fume going through, in order to remove successfully the objectionable solid material in the gas. If the screen is so fine that it will remove the particles of fume, the back pressure will be high and the screen will clog up quickly. If the screen is designed with apertures large enough to prevent any considerable back pressure, the fine particles of fume and dust will go through. The problem, therefore, of screening the fume and dust out of the blast furnace gas is not a simple one.

This same difficulty was encountered during the war in the elimination of mustard gas, existing not in the form of gas, but in the form of dust and fume of a very fine nature. When the mask was made with a filter fine enough to keep all of the mustard gas out, breathing was exceedingly difficult. When the mask permitted easy breathing, mustard gas fume at times penetrated it. The American Chemical Warfare Service, at the time of the armistice, had developed an apparatus for removing the danger due to the inbreathing of mustard gas, and the difficulty of breathing through a very closely packed filter. The apparatus which the Service decided to try out was exactly, in principle, the one kind of apparatus now being applied to dust and fume collection from blast furnace gas.

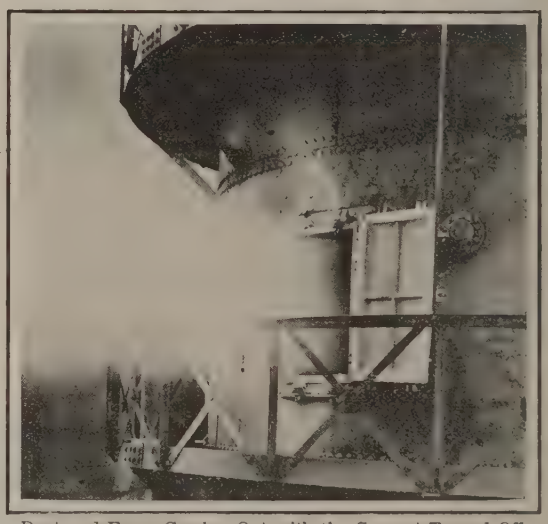
Handling of Hot Gases

It is evident that conditions arise when the gas discharging from the furnace top is very hot, and it is impossible to utilize any system of dry cleaning without destroying the cleaning medium; for instance, in the manufacture of ferromanganese, the gases discharging from the furnaces have temperatures running as high as 1500 deg. Fahr. As steel glows red hot at temperatures of this kind, some necessity arises for cooling the gas to such a point that destruction of the steel does not take place.

As a matter of fact, both at Dunbar,* and Sheridan,† where ferromanganese is made, the problem has been a very serious one. It has not been a question of whether the cleaner could operate or not at such temperatures, but simply of whether steel could maintain its strength or not under such conditions of stress. As all steel men well know, the strength of steel drops very rapidly with the increase of temperature, until at about 1500 deg. the strength is less than one-quarter of the original strength.

Some means must be devised to cool the gases to such a point that they may be safely passed through the cleaner. This problem is not at all present in furnaces manufacturing pig iron, as the temperatures rarely run over 400 to 500 deg., though in exceptional cases they may reach 700 to 900 deg. Steel can be made to stand this strain.

With the hotter gases, however, it is necessary to design coolers that will function without the addition



Dust and Fume Coming Out with the Current Turned Off

of moisture to the gases. If it is desirable to cool the gas from 1300 deg. to 400 or 500 deg., so as not to lose the sensible heat in the gas at this lower temperature, care must be taken not to add water for cooling purposes, as the amount of water present when the gas is saturated at 400 deg. is so great that it would seriously handicap combustion in the stoves and boilers. A cooler, therefore, must be of such type that the heat is transferred from the gas into the water through tubes and not by direct contact.

Electrical Gas Cleaning

Electrical cleaning of gases, as developed several years ago by Dr. F. G. Cottrell, is a very simple process making use of a few fundamental facts in physics. The principle involved is not difficult, and can most easily be understood by conceiving of a gas

*American Manganese Mfg. Co. †Lavino Furnace Co.

passing through an invisible electrical screen so fine that the finest particle of fume cannot pass through, yet occupying no space, having no material body and consequently presenting no source for back pressure. It is by means of this electrical screen interposed between the outlet of the furnace and the inlet to the hot stoves and boilers that blast furnace gas may be cleaned of its dust and fume content to a degree finer than any mechanical screen can clean it without considerable loss in back pressure.

The reason for this is that the electrical screen is woven, not of wires, but of lines of electrical force. The threads of force constituting the screen are so closely knit together that a substance must drop below its molecular form to get through, when conditions are correct for the screen to operate. Yet these lines of force, having no material body, do not interrupt the flow of gas, on which they have no effect whatever. In a simple manner, the action of an electrical cleaner may be described as follows:

The gas is conducted upward through a vertical pipe. An electrode chain or wire, suspended vertically in the exact center of the pipe, is held taut by a weight at the bottom. This electrode is charged with high tension unidirectional current. It therefore must be suspended on the proper insulators, which are capable of withstanding the potential under which they are impressed. The pipe itself is grounded.

Dirty gas, passing through the pipe and coming into contact with the charged electrode, becomes ionized. As the electrode is negatively charged, and has a corona discharge due to the high potential impressed upon it, the ionization of the gas is rapid and thorough. The gas molecules carry the charge to the dust particles, which for the most part are negatively electrified, since the electrons prevail in the gas. Immediately upon being charged, the dust and fume particles are repelled by the electrode and are deposited on the sides of the pipe, which interrupt their flight from the chain.

Within the pipe, therefore, there are three forces in action. There is a vertical force due to the velocity of the gas, which is carrying the dust and fume particles upward. There is the force of gravity, which tends to carry the dust particles downward. Since the force due to the upward velocity of the gas is much greater than that due to the action of gravity, the resultant of these two is a vertical force upward. The third force is that caused by the charging of the dust particles through the ionization of the gas. This is a horizontal force, as the action of repelling the particles from the chain is at right angles to the chain.

The resultant of these two final forces is the diagonal of a parallelogram, having both these forces as sides. If the vertical force is very great, too great for the particular pipe described, the horizontal force may not be sufficient to cause a resultant that would precipitate the particles of dust to the sides of the pipe. While the particle of dust would be acted upon by the horizontal force, the resultant might be such that the particle would not travel to the side of the pipe within its length.

Application of Theory to Practical Conditions

The problem, therefore, in electrical precipitation is to regulate the vertical force so that it is not too great, and to make the horizontal force sufficiently great to form a resultant which will precipitate the particle of dust to the side of the pipe. The principle is not simply one of ionization and is not one of magnetism. The particle of dust does not stick to the side of the pipe because of the magnetism caused by the corona discharge and gas flow, but because it is held there fast by the resultant electrostatic force acting upon it throughout the entire period of operation. It is as though an arm had extended diagonally from a point on the electrode and pinned the particle of dust to the side of the pipe with a finger, and were holding it there without letting go.

Control of the vertical force is, of course, made in the design of sufficient cross sectional area in a precipitator to give what has been found to be the best velocity of the gas for precipitation purposes. To get the horizontal force necessary for precipitation is a question of design of electrical equipment. The voltage that can be impressed on the electrode is limited by the gap between the side of the pipe and the electrode. This has erroneously led to the assumption that the bigger the pipe, and the greater the voltage that may be impressed, the stronger the force that may be secured to act horizontally. This is not true, as the force varies inversely as the square of the distance between the object to be precipitated and the electrode, so that even with higher voltage, the impressed force on the particles may be less than with lower voltage.

To develop the current which will do the work necessary in an electrical cleaner, certain electrical apparatus has been specially developed. The larger electric companies have spent a great deal of money in the research work necessary to develop apparatus wholly dependable under the severe conditions of usage in this work. The pieces of electrical equipment, however, are few in number, and are divided into units.

One unit consists of a switchboard, transformer, rectifier and motor, and the necessary insulators and conductors for getting current into the precipitator. The switchboard is a special panel having on it a circuit breaker, ammeter, voltmeter, double-throw, double-pole switch, set of sockets for voltmeter blocks, three-pole starting switch, and a five-point transformer switch. Back of the panel are the starting rheostats for the synchronous motor, and below are the resistances in series with the transformer. All connections on the panel are of low tension.

All the high tension connections are inside steel guard work, to prevent the operator from coming in contact with the high tension equipment. The circuit breaker is used to break the transformer primary circuit when the voltage exceeds a safe limit for the transformer, while the double-throw switch underneath the instruments is used to cut in the line on the right polarity. The five-point switch is used to obtain a different transformer ratio without leaving the operating position at the switchboard, and without the necessity of going into the high-tension room to make any change in ratio.

The rectifier consists of a rotor and a stator, the former revolving in direct unison with the synchronous motor, as the motor is directly connected with it by a coupling. Since the four-pole synchronous motor, running on 60 cycles, revolves at 1800 r.p.m., and since there are 3600 cycles in each minute, there are two cycles of alternating current to every revolution of the motor, and consequently of the rectifier. The latter acts much the same as an armature on a direct current generator, since it is acting in synchronism with the revolutions of the motor, and consequently with the alternating current.

It is always desirable to apply negative current to the precipitator, and consequently to the transformer and rectifier, if the polarity is right, as may be determined by the method to be described later.

Of special interest is the transformer built for precipitation purposes—very compact, although considerably larger for the same power output than are transformers used on lower voltages. Great care is used in the selection of the silicon sheet steel, cut into strips for the transformer coil laminations, and annealed and treated so that they may be successfully used in the high tension transformer. The low tension coils are wound of copper wire, usually of rectangular cross section covered with a double layer of cotton. If these coils are wound for several voltages, as they are for precipitation transformers, two layers of windings are made with the taps distributed along the middle length of the outer layer. In transformers in use for blast furnace precipitation there are five taps.

Insulation between the high tension and low tension circuits consists of a black varnished material similar to cambric, and is usually wrapped to a thickness of nearly ¼ in. The high tension coils are then assembled in specified order, with the proper insulation over the low tension coils or, in some designs, beside them, after they have been independently wound and insulated.

This portion of the transformer has engaged pos-

sibly the most serious and careful attention of the designer. The service represented by the Cottrell precipitator with a mechanical rectifier in circuit is the most severe which can be imposed upon a transformer. There are about eighteen separate coils in the high tension winding of the usual sized transformers used in precipitation work. These may be divided into the following groups:

1. The buffer or end coils.
2. The intermediate group.
3. The main winding proper.

The buffer or end coils are supposed to receive the most severe electrical strains. Undoubtedly, they do receive the extreme effects due to a very steep electrical wave front impinging on the transformer windings, and accordingly they are provided with extremely heavy insulation between turns.

Some special features in connection with the development of the equipment for precipitation are present in the installation erected at Sheridan. The electrical house, as originally built there, was of brick, 22½ ft. square. It was built independently of any other building but, after it had been erected, one end wall was torn down and the house in which the generator sets were placed was built on to it, so that the whole electrical equipment would be together. These generators were used not only for furnishing power to the precipitator sets, but also for furnishing power to the cars at the bins, supplying the skip hoist. The house was built on an embankment which brought it on the level with the operating platform of the precipitator. There is sufficient room inside of the house for a duplicate set of equipment should that later be desirable.

The three major insulators placed in the high tension compartment, which are the only insulators exposed to the gas, are of the floor bushing type. It is necessary to clean these about once a month. To make it possible to get at these without shutting off the gas from the precipitator, the compartments are equipped with small valves which can be quickly closed, and small doors which can be readily opened. The operator, standing in the open air and extending his hand into the compartment, can readily clean the insulator in a short time. The adoption of this type of insulation has made it possible to operate much more continuously than before, when there were thirteen insulators on the inside of the precipitator, and when cleaning these insulators necessitated the complete shutting down of the plant and the cooling of the precipitator.

Results obtained both at Sheridan and at Dunbar have been satisfactory; at Sheridan, particularly. The precipitator there has been operating continuously and collecting approximately 5000 lb. of dust per day from approximately one-half of the gas output of a 250-ton furnace.

This dust is extremely fine in nature and ignites on exposure to air. It has consequently been impossible to determine the fineness of the dust, as it sinters as soon as it is dumped, and screen tests taken after the dust has cooled off do not indicate the condition of the dust when collected.

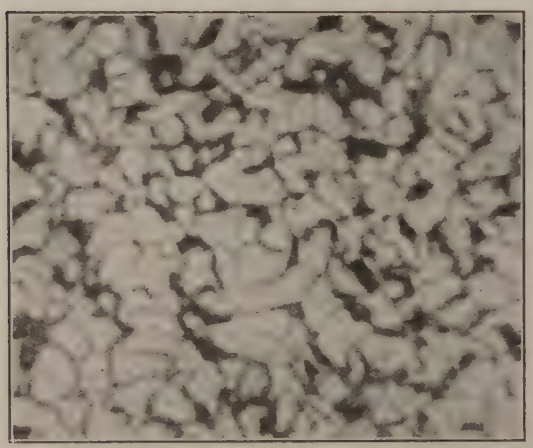
When tests were made on the Dunbar plant, running on pig iron, before it was turned on ferromanganese, the indications were that the precipitator could clean ordinary gases from a pig iron blast furnace to less than 0.1 grain. The two plants now running have clearly indicated that electrical precipitation is on the right road as an effective method of cleaning gases from blast furnaces.

Embrittling Effect of Pickling Upon Carbon Steel

Study of Grain Sizes Shows That Pickling Increases Width of Junction Lines Between Grains

BY C. J. MORRISON*

THE fact has been known for many years that steel after being subjected to pickling processes showed a tendency to brittleness. This embrittling effect is particularly noticeable in wire, small rods and thin sheets



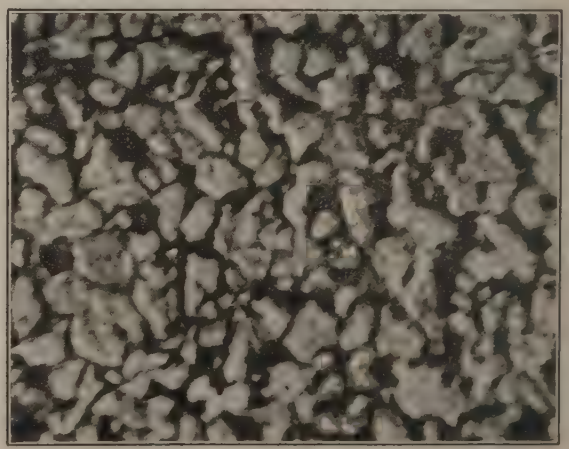
Photograph No. 1 Shows the Sheet as Received

and sometimes renders the metal unfit for use in certain products.

Experiments showed that the steel would apparently return to its original condition if raised to a temperature of about 300 deg. Fahr. and held at that temperature for a few minutes. Many theories have been advanced to explain the phenomenon, but it remained for the microscope to show exactly what takes place in the metal.

An ordinary black sheet 30 x 32 x 0.058 in. was pickled by the sulphuric acid process and then baked for 15 min. at a temperature of 300 deg. Fahr. Samples for the microscope were taken from the sheet as received, after pickling, and after baking, and photographs, here reproduced, were made to show the structure.

The changes that have taken place are clearly shown and the fact that No. 1 and No. 3 are almost identical shows that the metal has been restored to its



Photograph No. 2 Was Taken After Pickling But Before Baking

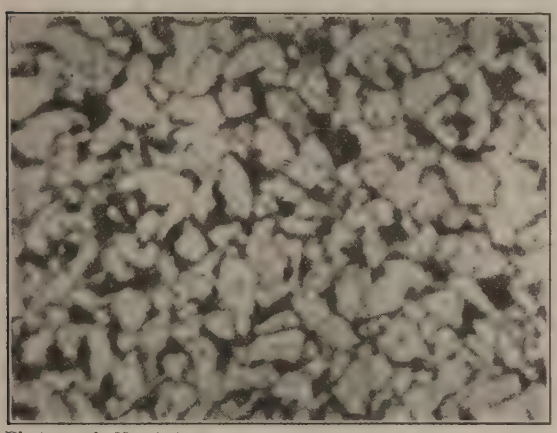
*1156 Carlyon Road, Cleveland.

original condition. An analysis of the micrographs shows what has taken place.

In No. 1 the grain size is 0.0007019 in. and the width of the junction line is 0.0000274 in. The scleroscope shows 31 to 32 H.

In No. 2 the grain size is reduced to 0.0006805 in. while the width of the junction line has increased to 0.0000640 in. This increase in the width of the junction line should be particularly noted. The scleroscope shows no change but gives 31 to 32 H.

No. 3 is practically the same as No. 1 and shows a grain size of 0.0007141 in. and the width of the junction line is 0.0000274 in. Again the scleroscope shows practically no change but gives 29 to 31 H.



Photograph No. 3 Shows the Condition After Baking for 15 Min. at 300 Deg. Fahr.

This analysis shows conclusively that the brittleness is due to the increase in the width of the junction line and also that the baking restores the metal to its original condition.

The micrographs were prepared and the analysis made by C. G. Zanzinger, metallurgist, Atlas Tack Corporation, and to him should be given the credit for solving the perplexing problem of brittleness.

Coal Handling Plant for Melbourne Proposed

WASHINGTON, Aug. 9.—The railroad commissioners of the State of Victoria, Australia, have strongly advocated the erection of a thoroughly modern coal-handling plant at Melbourne, reports Trade Commissioner A. W. Ferrin. It is understood that a site will be selected near the Victoria dock. The estimate of the cost is £150,000 and the provisions for this expenditure will be made in the railroad loan application bill, to be introduced in the State parliament early in the session.

Technologic Paper No. 191, of the Bureau of Standards, entitled, "Some Factors Affecting the Life of Machine Gun Barrels," gives star gage measurements on six machine gun barrels at various stages of firing which indicate that, when the life limit is reached, exhaustion is due to a combination of the abrasive action of the bullet and the abrasion of gases. Amorphous martensite on the surface of the bore has been reproduced by the high temperature from an electric arc, its formation being due to the extremely rapid cooling caused by the large mass of cold metal near the highly heated surface. Cracking of the bore is due to dimensional changes of the hardened brittle surface of the steel resulting from the variations in temperature between separate shots. The cracks originate at irregularities of the surface of the bore.

Scrap metal and iron and steel will be sold through sealed proposals by the salvage division of the arsenal at Rock Island, Ill., bids to be received not later than 2 p. m., Aug. 15. Over 500 tons will be disposed of.

MORE STEEL UNEMPLOYMENT

Falling Off in Business Reflected in Men Out of Work

WASHINGTON, Aug. 9.—Decrease of 24,816 employees in the iron and steel industry in July represented a decline of 7.6 per cent when compared with June, according to figures of the United States Employment Service. Those engaged in this industry constituted 21 per cent of the total employed in 14 groups. In metals and metal products, other than iron and steel, the decline was 1300 workers, or 1.8 per cent. The survey, covering 1428 firms in 65 large industrial centers, each firm normally employing 501 or more, the total being 1,600,000, shows a net decrease of 16,914, or 1.1 per cent on the payroll at the end of July. The net decrease in these same establishments since Jan. 31 has been 117,924, or 7.3 per cent.

Industrial classifications showing increase in employment are vehicles for land transportation; railroad repair shops; leather and its finished products; textiles and their products; lumber and its manufactures; tobacco manufactures and paper and printing. All other classifications show a decrease, the largest decline in unemployment having been in a prominent iron and steel center, Youngstown, Ohio. Amounting to 4,927 workers or 22.8 per cent, this reflects the inactivity of the chief industry in that city.

Iron and steel and metal lines stand out, throughout the report as the darker side of the industrial situation. From mining to manufacturing, the entire industry in all its ramifications has felt the full force of the existing industrial depression. As a result, serious unemployment continues in a great number of inter-related industries and in widely separated sections of the country. The outstanding causes are held to be a falling off in the foreign demand and continued listlessness of the domestic market, creating an almost unprecedented lack of orders.

Analysis of the returns seems to indicate that in the majority of instances where there has been improvement in the employment situation, it is primarily traceable, directly or indirectly, to the harvest and other seasonal agricultural activities. Secondarily, and to some extent as a natural corollary, there have been material gains in railroad occupations, principally in those which have to do with repairs to rolling stocks and roadbeds. Despite an obscured outlook there is manifest a general optimism, which everywhere agrees as to the certainty of an approaching business revival and varies only in the predicted time it is destined to arrive.

Value of Manganese Ore Affected Freight Rate

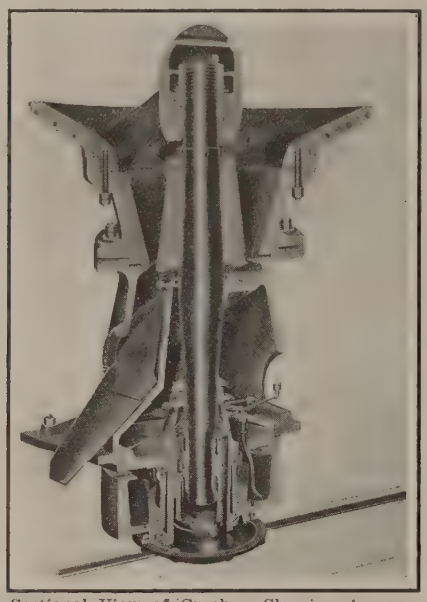
WASHINGTON, Aug. 9.—Examiner J. Edgar Smith of the Interstate Commerce Commission has submitted a tentative report holding that the rate of $5.52 per gross ton on shipments of manganese ore from First Ford, Va., to Pittsburgh and Sharpsburg, Pa., in the period from March 3 to June 2, 1919, was not unreasonable. He based his finding on the value of the commodity, which he stated to be about $2,000 per carload, and recommended that the complaint, filed by C. G. Chevalier, be dismissed. After the shipments, about 20 in number were made, the Railroad Administration reduced the rate to $4.50 per gross ton. The complainant had suggested that the latter rate be regarded as reasonable and made retroactive. The examiner said that a finding of unreasonableness cannot be predicted upon the fact that a rate was reduced subsequent to the movement at the solitication of the complainant.

The Harlan plant of the Bethlehem Shipbuilding Co., Wilmington, Del., is arranging for the resumption of work at its car shops, which have not been operated for a number of years past. Initial production will be devoted to the construction of 10 cars for the Huntingdon & Broad Top Mountain Railroad & Coal Co., Huntingdon, Pa.

Gearless Rock Crusher

Application of the direct drive principle to standard gyratory crushers of all sizes, from the smallest up to and including the No. 60, the largest size of gyratory rock crusher yet built, has been made by the Kennedy-Van Saun Mfg. & Eng. Corporation, 120 Broadway, New York. The machine is said to be simplified, its wearing parts reduced, its power requirements diminished.

The crusher shown contains the ball-joint eccentric, a most important advance in gyratory crusher design, because it maintains alinement of the main shaft and its bearing in the eccentric, and thus eliminates cramping or binding, and consequently prevents heating, high power consumption, rapid wear and loss of eccentricity. The machine has a highly arched spider, permitting the passage of any stone that will enter, and the arrangement of spider ring clear of the top of the concaves, prevents breakage through expansion of the concaves.



Sectional View of Crusher, Showing Arrangement of Parts

The bottom plate sleeve acts as a support for the packed lower dust collar, and as this sleeve does not revolve, the wear on the collar is reduced to a minimum. This sleeve acts also as a support in which the eccentric sleeve and ball are contained, and for supporting the driving dogs. It also forms a journal for the driving pulley, which has ball bearings. The bottom plate sleeve is shouldered on the inside to prevent the eccentric sleeve from moving upward. At the bottom it has a groove and shoulder for receiving the bayonet lock that supports the ball race and pulley.

Made in two parts, the eccentric sleeve is joined by bolts passing through at top and bottom. It has a pocket on the thick side for receiving the locking pin that connects the ball and socket bearing to the eccentric sleeve. This pin, flattened on the sides, provides ample bearing in the pocket, preventing wear. At the bottom, where the eccentric is joined together, it forms a male driving dog for fitting into the female seat.

Driving power is applied through a universal device that eliminates friction and side strain due to the driving of the eccentric, and relieves that grinding and side thrust common to gyratory crushers. Thrust due to pressure against the eccentric is delivered to the eccentric sleeve at the middle of the ball, and thus the eccentric sleeve floats without pressure from top to bottom.

Supported by the bayonet lock method, the pulley is keyed in position. The eccentric is driven by a double male and female connection cast integral with the bottom plate, the latter being bolted to the pulley and the joint packed to prevent oil leakage. When the pulley turns, both bottom plate and driving dog move, turning the eccentric directly and eliminating pull and side thrust on the eccentric.

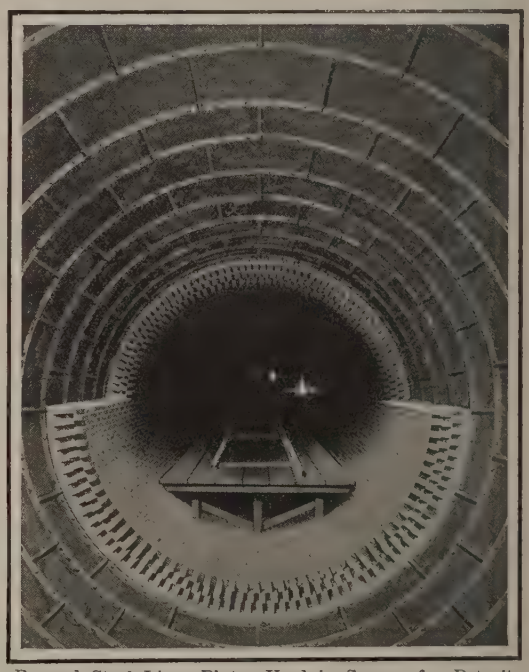
Oil from the eccentric chamber flows freely between the balls, over the top of the pulley hub into the oil well inside the pulley. From this reservoir it is scooped up by centrifugal force and delivered to the top of the eccentric and ball and sleeve. This scoop acts on the same principle as that through which a locomotive in motion scoops water from a canal between the tracks.

As the base of the bottom shell is made square, stone may be spouted in any direction. This enables the operator to set the machine in any position without having to predetermine whether it shall be right hand, left hand or standard. Thus the crusher may be driven from a line shaft by belt or rope drive and the drive pulley can be on the same horizontal plane, or above or below the crusher, as desired.

Pressed Steel Tunnel Linings

Tunnel liner plates and steel forms for concrete construction have now been designed of pressed steel. The plates consist of flanged sections and they are bolted together, making a continuous rigid shell which can be carried forward a considerable distance in advance of the masonry. They are said to be equally satisfactory if used with brick or concrete. Removable steel forms can be used for the inner face of the tunnel.

It is claimed that by providing this rigid steel lining there result safety to workers, convenience, economy and saving in shoring. Tunnelers can keep in advance of the construction forces. These tunnel plates and steel forms are the latest developments of the Truscon Steel Co., Detroit.



Pressed Steel Liner Plates Used in Sewers for Detroit, 12 Ft. to 13 Ft. 8 In. in Diameter

Increase of the capital stock of the Moline Iron Works, Moline, Ill., from $500,000 to $750,000 was voted recently at the annual meeting of stockholders in the company. Directors for the year were elected as follows: L. E. Nutt, J. J. Creedon, J. T. Miles, L. A. Dorman, C. R. Rosborough, D. E. Miles, B. V. Nutt and M. C. Nutt. Officers were chosen as follows: President, L. E. Nutt; vice-president, J. J. Creedon; secretary, L. A. Dorman; treasurer, J. T. Miles.

TRADE ASSOCIATIONS

Administration Asked to Define Allowable Practices in Collecting and Disseminating Statistics

WASHINGTON, Aug. 9.—Authoritative announcement by the Federal Administration regarding trade association activities in particular relation to statistical work is expected to be made in the near future. The suggestion that a statement of this character be issued has been made by the counsel for the National Association of Manufacturers in a letter written on July 25 to Secretary of Commerce Herbert Hoover. The purpose is to obtain a clear idea as to what trade associations may do with respect to gathering and distributing statistical data among members and how the material may be used without violating the law.

The letter to Mr. Hoover invites his attention to a provision of the Census Act of March 3, 1919, calling for the collection and publication of "statistics of products of manufacturing industries," for the years 1921, 1923, 1925 and 1927, and a provision of the act of Feb. 14, 1903, creating the Department of Commerce, providing for special investigation and reports. It is pointed out that discussion of the Secretary with trade and craft organizations representing particular industries now under way is an endeavor to perfect plans so that reports of the kind mentioned may be secured currently and comprehensively. These reports are to be obtained through the Bureau of the Census and it is claimed that this method thoroughly protects by all the safeguards of the general census act the individual activities of any person, firm or corporation making such reports.

The counsel for the National Association of Manufacturers explains that there are a number of trade and craft organizations which represent a substantial proportion of those engaged in a particular line of industrial activity who have, or maintain, statistical bureaus for the collection of trade information of the same general line or character as it is understood Mr. Hoover wishes to secure for the department and the public. The letter continues:

It is common knowledge that there are organizations calling themselves trade or craft associations which represent only a minor portion of such industry and whose activities in statistical and other lines are subject to very proper interrogation by the agencies of the Government as to whether or not their activities are not subject to serious question as being in violation of existing law and wholesome business ethics.

It is believed that it is not difficult for the department to ascertain, in view of the very complete information in the Bureau of the Census as to the total production in different lines of industry, whether an association represents a substantial portion of its particular industry.

It is the judgment of the writer, and in this judgment he is fortified by the opinion of competent counsel, that the single fact of associations collecting and publishing to their members and the public the facts relating to production, sales, shipments, stocks on hand and prices obtained, all of such being a record of accomplished facts, is not in violation of any Federal law. It is recognized, however, that the use made of such information may or may not be subject to legitimate criticism.

It would be decidedly helpful to American industry to have the governmental viewpoint upon these subjects authoritatively stated as early as possible.

The National Association of Manufacturers is interested in the subject only from the general standpoint of American industry, as it neither maintains nor contemplates the establishment of any statistical activity, it being the belief of the association that any such work is properly an activity pertinent to the work of trade and craft organizations.

Hoover's Comments on Trade Associations

Secretary Hoover, commenting on the work of the recent conference on statistics of production, said:

"For some weeks the department has been making a careful study of the purposes and activities of trade associations. We find that the vast majority of such associated activity is a constructive contribution to national welfare.

"The department wishes to co-operate with such associations as wish it in the collection of information as to production, stocks of raw and other materials, percentage of industry in active operation, total orders, and other accomplished facts of interest to them and in the making of the information available to the whole public.

"The making of such information currently public acts alike to protect legitimate business enterprise and the public interest."

Lake Ore Movement in July

Shipments of Lake Superior ore from upper Lake ports in July were 4,047,687 gross tons, or 5,590,919 tons less than those for July, 1920, or a decrease of 58 per cent. The total of this season's shipments to Aug. 1 was 10,418,914 tons, which compares with 26,079,111 tons to Aug. 1, 1920. The shipments by ports in July and for the season in 1920 and 1921 are as follows:

	July, 1920	July, 1921	To Aug. 1, 1920	To Aug. 1, 1921
Escanaba	1,174,468	238,258	3,117,277	449,062
Marquette	610,321	80,470	1,538,724	133,414
Ashland	1,293,239	434,088	3,606,108	961,025
Superior	2,249,431	875,005	6,694,927	2,591,235
Duluth	2,783,537	1,731,094	7,000,222	4,639,393
Two Harbors	1,527,610	688,772	4,121,853	1,644,785
Totals	9,638,606	4,047,687	26,079,111	10,418,914
Decrease, 1921.		5,590,919		15,660,197

The decrease to Aug. 1, this year, in the season shipments was 15,660,197 tons or 60.04 per cent as compared with last year. Duluth contributed 24.88 per cent of the total against 26.84 per cent a year ago, the Great Northern docks showing an increase this year.

Lake Iron Ore Analyses for 1921

The Lake Superior Iron Ore Association, Cleveland, has issued its analysis book for 1921, compiled by its secretary, W. L. Tinker. The number of ores listed is 293, as against 290 in the book for 1920. "Mesabi Sinter" appears in the 1921 book, being the ore obtained from the concentration and sintering of the magnetites of the eastern Mesabi district. It is evidently the successor to East Mesabi Sinter of the preceding book. The guaranteed analysis of this ore shows iron, 64 per cent; phosphorus, 0.027 per cent, and silica, 9.00 per cent, as against 63.27 per cent, 0.008 per cent and 10.38 per cent, respectively, according to the 1918 analysis, which applied also to 1919 and 1920.

Technologic Paper No. 192, of the Bureau of Standards, entitled, "Tests of Centrifugally Cast Steel," is now available. Six castings manufactured by the Millspaugh centrifugal process were examined as to their physical and chemical properties including hardness, tensile, impact, density, internal stress, segregation, soundness, and microstructure, both in the condition as cast and after various heat treatments. This investigation shows the possibilities of substituting heat treatment for forging in this type of casting. An abstract of this discussion was printed in THE IRON AGE, May 24, 1921.

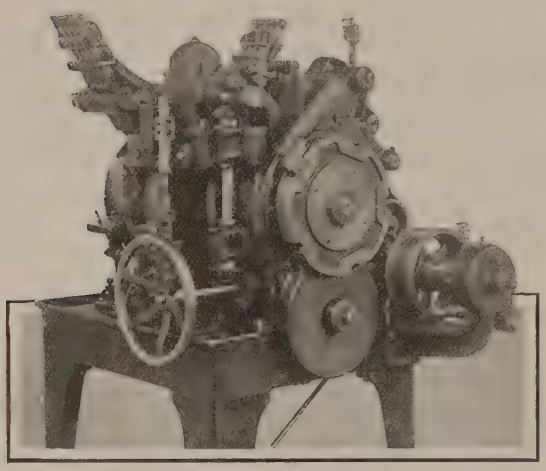
Apprenticeship in Wisconsin has made good progress during the past year despite the industrial depression, according to a report made by the industrial commission. In the year ended June 30, 40 employers were added to the list of those taking on indentured apprentices. In this year 511 boys were indentured, compared with 347 in the previous year. A total of 180 boys completed apprenticeships and were granted certificates. The majority of indentures and certifications are from metal working shops, mainly in Milwaukee.

The United States Government has transferred all the Government owned property known as the Scituate Proving Grounds, Scituate, Mass., to A. A. Brand, Suburban Land Co., Inc., Boston. The property comprises 210 acres and has a mile frontage on the ocean, together with more than fifty buildings and a railroad system.

The Atlas Crucible Steel Co., Dunkirk, N. Y., has posted notices that the local plant will be closed during the month of August, with production to be resumed in September.

Special Machine for Drilling and Tapping Spoke Nipples

The Langelier Mfg. Co., Arlington, Cranston, R. I., has placed on the market a machine for drilling and tapping automobile wire-wheel spoke nipples having a capacity of 15 to 20 pieces per minute. Nipples are drilled and tapped in gangs of five. There are three heads of five spindles each. The first head drills three-fourths through the work, the second finishes the hole, while the third does the tapping. Nipples are held in position and carried to each head by a five station intermittently revolving drum carrier. The first station is for loading; the second, for the first drilling operation; the third, for the second drilling operation; the fourth, for tapping; and the fifth, for ejecting the nipples from the carrier. All operations therefore are



The Disk Wheel and Snubber Arm Prevent Overtravel of the Carrier and Stop It Before Locking in Position

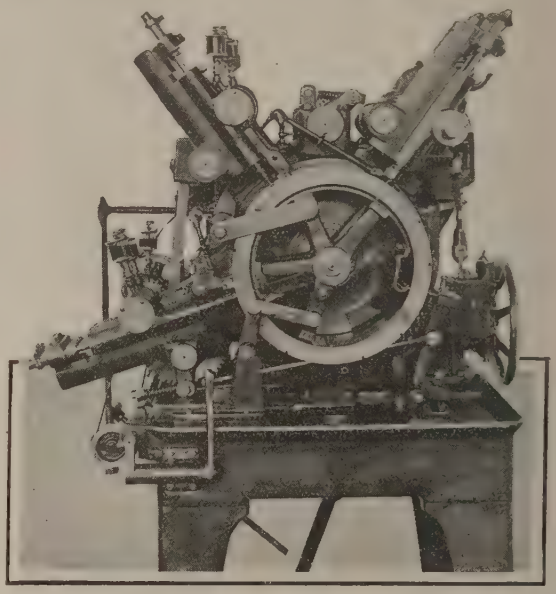
automatic except that of placing the work in the carrier.

The carrier revolves on a horizontal axis and is moved intermittently to each successive station by a one-tooth driver that engages a five-tooth gear with teeth of special design. To prevent possible overtravel of the carrier and to bring it to a stop before locking in position, a snubber arm is used, which engages a disk wheel with five equi-distant semi-circular notches in its periphery, fastened to the rear of the carrier shaft as shown in the illustration. The snubber engages the notches in the wheel under spring contact and is operated by a separate face cam. The carrier is locked positively and accurately at each movement by a cam operated punger that fits itself successively into five equi-distant, tapered-side, hardened-steel blocks embedded into the periphery of a large disk fastened to the rear end of the carrier.

The operator inserts five nipples in the carrier between each of of its movements. Should he not properly seat the square ends of the nipples in the locating bushings, they would project and interfere with the action of the carrier and possibly cause breakage. To prevent this, an automatic machine stop is provided, consisting of an oscillating blade hung inside the carrier and projecting downward sufficiently low to cause improperly seated nipples to come in contact with it when the carrier is in motion. The mechanism for ejecting nipples consists of an oscillating arm carrying a gang of five plungers that push the nipples to the inside of the carrier where they fall into a chute leading to the bed of the machine. This arm operates simultaneously with the feed motion of the first drilling head, the two being connected by a rod. All nipple holders in each station are provided with holding and locating bushings. The carrier itself is made in the form of a drum, one end being open and facing the operator, nipples being loaded with heads up. To prevent these from falling out when the carrier revolves and to provide a resistance for drilling and tapping thrusts, a hard-steel concentric segment ring, stationed and supported on the end of the carrier shaft, is used inside the carrier.

Drilling and tapping spindles have spiral gear drives, run in phosphor-bronze bearings and their outer ends are held in adjustable sleeves, which can be clamped in the feed yoke heads to proper working positions. Spindles have thrust ball bearings for both directions inside the adjustable sleeves. Feeds for drilling and tapping spindles are actuated from a large double path face cam, which engages with cam rolls on the feed yoke bars. The outer path on the face cam actuates the drill feeds for both the first and second drilling heads and the inner path the feed for tapping spindles, its rate of feed being so timed as to follow the lead of taps when tapping. Drills in the first drilling head have guide bushings for accurate starting and centralization of holes in the nipples. The tapping spindle drive has reverse mechanism with a quick return. The movement of the blade operates a knockout, which in turn actuates a No. 4 Carlyle-Johnson clutch in conjunction with a multiple disk brake.

The main drive of the machine is by a 3½-in. belt on a loose 10-in. pulley mounted on the hub of the friction clutch. From thence the drive is to the worm and gear drive by bevel and spur gearing, belt connection being provided for driving the tap reversing snap mechanism cam. A rotary pump supplies cutting



Nipples Are Drilled and Tapped in Gangs of Five. All operations are automatic except placing work in carrier

lubricant, drawing its supply from the tank after the lubricant has been strained. The machine occupies 46 x 58 in. floor space, stands 66 in. high and weighs approximately 4600 lb.

Reynolds Spring Co. Expands

The Reynolds Spring Co., Jackson, Mich., maker of automobile products, will build an extension to its Water Street plant, 132 x 204 ft., two stories, reinforced concrete, steel sash, at a cost of $110,000. It will be ready for occupancy Dec. 1. The company has also installed a trackless trolley system between its Otsego and Water Street plants for its employees, the buses being rubber-tired and getting their power from overhead wires. Watson R. Smith, vice-president Watson Spring Co., will be in charge of building operations. It is planned to increase the present force of 600 employees to 1200. According to the president, July was the best month for the company of any this year, with August promising to be even better.

The American Manufacturers Export Association will hold its annual meeting at the Waldorf-Astoria Hotel, New York, Oct. 5 and 6.

Manufacturers Denied a Hearing in Railroad Labor Case

Judge R. M. Barton, chairman United States Railroad Labor Board, Chicago, has denied the application of the National Association of Manufacturers, the National Founders' Association and the National Erectors' Association for a hearing in connection with the case of the Federated Shop Crafts against the Pennsylvania Railroad. These three associations desired to have their interests as shippers properly presented in connection with what they consider to be an attempt of the Federated Shop Crafts to require all emloyees to belong to a union in order to secure representation in dealings between the railroads and their employees on labor questions. The Railroad Labor Board held that to open its doors to the public at large and the many civic bodies having an interest in railroad labor questions would result in delay and prevent the board from arriving at a prompt decision in matters before it. The letter of Chairman Barton added that the board has in mind and fully appreciates the vast shipping and business interests involved in the questions it decides and at all times gives consideration to these interests.

Increasing Railroad Shop Operations

Since Aug. 1 practically all railroad companies operating in Wisconsin have either reopened or enlarged the working forces of operating shops handling locomotive and car construction and repairs.

At Milwaukee, the Chicago, Milwaukee & St. Paul Railroad Co. is doubling the working hours of the locomotive and car shop, one of the largest operated by the system. The total number of workdays, counting each day worked by each man as one workday, is being increased during August by approximately 35,000 hr. The greatest increase will be in the car department, where 2318 men are employed. These men have been working 10 days a month. During August this will be increased to 19 days, and during September to 20 days. The locomotive shop, employing 1500, will work each present employee 18 days in August, compared with 10 days in July.

At Kaukauna, Wis., the Chicago & Northwestern Railroad Co. recalled 40 men Aug. 1 at a 12 per cent reduction in the former wage. This number of men is 18 per cent of the total laid off April 1. At Janesville, Wis., ten additional men were placed at work in the division shops during the week, with promise of re-employment of a similar number each week during August. At LaCrosse, Wis., the Chicago, Milwaukee & St. Paul increased the working schedule from four days a week to six.

Increased Labor Efficiency in Akron

The efficiency of workers in the Akron, Ohio, rubber plants has increased over 100 per cent since early last year, according to reports from that city. It is stated that 27,000 employees in the nine largest tire plants are turning out 75 per cent of the production obtained 16 months ago with 72,000 men. One factor in the large increase in production is that the rubber companies in re-employing men have selected the better class of workers, weeding out labor of the floater type.

More Unemployment in Pennsylvania

Unemployment in the State of Pennsylvania increased further in the last two weeks of July, according to the semi-monthly report of the Pennsylvania State Department of Labor and Industry. The total number of unemployed as of Aug. 1 was 306,635, as compared with 263,000 on July 1. Unemployment in the metal industry is particularly heavy, being estimated at 67,000 workmen. About 64,700 common laborers and more than 46,000 miners also are idle. District offices of the Department of Labor and Industry make the following reports of unemployment as of Aug. 1 and of July 15: Altoona, 26,335 against 20,850; Erie, 15,200, against 14,775; Harrisburg, 14,405, against 20,850; Johnstown, 20,090, against 19,290; McKeesport, 5275, against 5890; New Kensington, 10,250, against 10,250; Philadelphia, 127,000 men and 11,650 women, against 116,000 men and 11,550 women; Pittsburgh, 55,550, against 50,850; Scranton, 15,130, against 15,375; Williamsport, 5750, against 6650.

Employment Stationary in Cleveland

There is little change in the employment situation in Cleveland during the past month, according to the monthly survey of the Cleveland Chamber of Commerce committee on labor relations. Reports from 99 manufacturers employing 500 or more persons show that on July 31 there were 54,161 employees on their payroll as compared with 54,165 on June 30. The automobile industry kept up about as well through July as in June, according to employment reports from automobile and automobile parts plants. Eighteen companies in this field had 7463 employees on their payrolls July 31, as compared with 7742 on June 30. The peak, 10,310, was on May 30.

Increase in Employment in Detroit

Detroit is one of the 27 American cities to report an increase in employment for the month of July, according to the industrial survey of the United States Department of Labor. The statistics indicate that in the month the payrolls of the larger Detroit firms were increased by 7905, an increase of 6.07 per cent over the figures recorded June 30. The figures upon which the computations are based are actual payroll figures from all firms that employ more than 500 workers.

In the Field of Labor

The allied crafts employed at the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., have taken steps to appeal to Congress through Massachusetts congressmen to secure appropriations which will keep the shipyards in operation.

Effective Sept. 1, wages of all employees, including the president and all other officers, of the Union Twist Drill Co., Athol, Mass., will be reduced 20 per cent. During the war the firm raised wages 10 per cent two times. The plant is closed for a three-week vacation period.

The plants of two implement manufacturers at Louisville, Ky., are operating at only about 10 per cent of normal, while the wagon department of another company is not doing much better, and only about 25 per cent in the automobile and truck departments.

E. F. Holloway, district director of the U. S. Employment Bureau, headquarters at Louisville, Ky., handling Kentucky and several Southern states, in a report released on Aug. 5, shows that unemployment is greatest at this time in the machine, metal working and allied trades, pointing out the very slow conditions at Newport, Covington, Ky., and at points in the South. In Louisville the unemployment situation has not been so bad, due to diversification of industry and absorption. The building trades are shown to be fairly active. No farm labor shortage is reported.

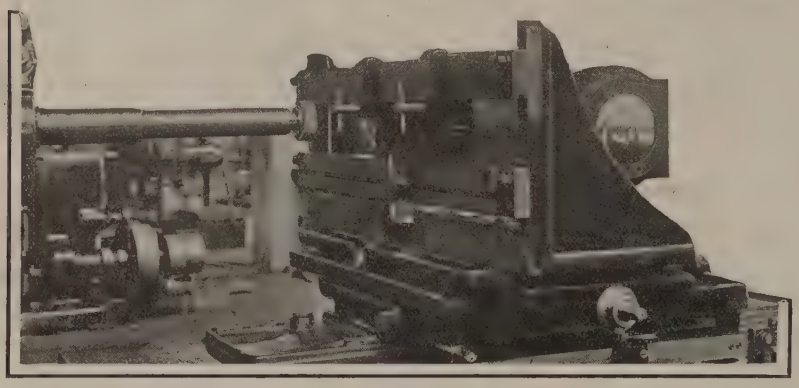
Sale of Dismantled Naval Vessels

WASHINGTON, Aug. 9.—The Navy Department has sold five dismantled naval vessels from which the metal will be salvaged as scrap. The awards were made as follows: To A. Marx & Sons, New Orleans, cruiser Cincinnati, $15,100; gunboat Castine, $12,500; to Barde Industrial Co., Seattle, Wash., cruiser Minneapolis, $36,000; cruiser Marblehead, $11,100; to H. A. Hinter's Sons Co., Philadelphia, cruiser Raleigh, $10,800. The cargo steamer Supply was offered for sale, but no bids were made for it.

Cylinder Block Regrinding Jig

A jig for holding automobile cylinder blocks while being reground, taking the place of the jig heretofore manufactured, is being marketed by the Heald Machine Co., Worcester, Mass. It is adaptable for the company's No. 55 and No. 60 internal grinders, and for the No. 65, a manufacturing machine.

The new jig is known as Universal Quick-Locating and is designed to eliminate the necessity of using the knee to raise and lower the work to the correct position for the grinding operation. It is of cast iron and furnished in but one size, 41 in. It bolts to the grinding machine table and is provided with two bars, each 3 in. wide by 1½ in. thick, the lower bar being dovetailed for holding a bracket and diamond. The upper bar has a zero or indexing marker on each end, which is used with a graduated scale on both sides of the jig. A set of locating brackets movable horizontally and having removable pins of sufficient length and strength to support a cylinder block is also provided for the upper bar.



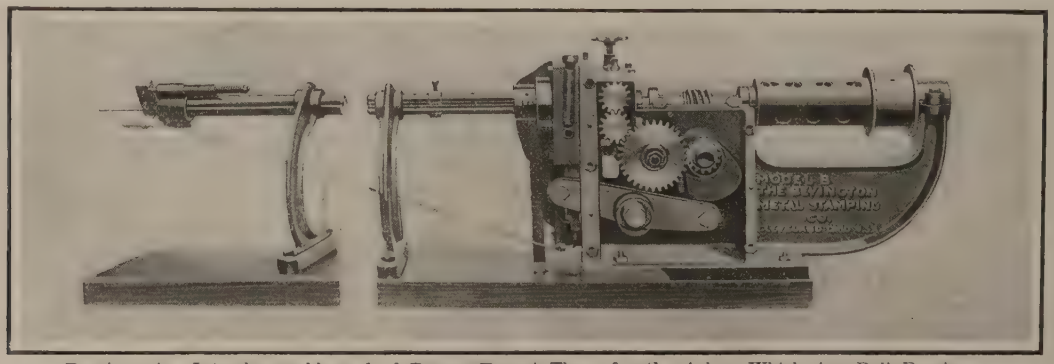
The Indexing Marker and Graduated Scale on the Upper Bar Facilitate Locating the Cylinders to Correct Position for Grinding

To operate, the workman first measures the diameter of the cylinder hole, which, let us say, is 4 in. The top bar is then set so that the zero or indexing line on each end is opposite the 4-in. graduation. The bar is then clamped and the locating brackets moved, so that the pins will be about the same distance apart as the two end holes in the cylinder block, after which the block is rested on the two pins and clamped in place. This will bring the center of the hole to be ground to the correct height for the grinding spindle to enter. The pins are then removed and the locating brackets slid out of the way of the grinding wheel.

Wire Straightening and Cutting Machine

The Bevington Metal Stamping Co., 1545 East Eighteenth Street, Cleveland, is marketing an automatic wire straightening and cutting machine having a capacity for wire ranging from 5/32 in. in diameter to No. 20 Washburn & Moen gage. Various other sizes are also furnished, to handle wire from 1/64 to ¾ in. in diameter and in various lengths to suit the length of wire to be cut.

The features claimed for this machine are its simplicity, noiseless running and freedom from vibration. All bearings are interchangeable and of bronze, except those for the arbor, which are ball bearings. It is pointed out that because of the interchangeability of bearings, repairs can be easily and cheaply made. Gears are cut from steel and the feed rolls and cutting dies are of heat-treated tool steel. The straightening dies are of gray iron, wood, babbitt or brass, depending on the wire to be handled. The machine is driven by a ¾-hp. motor.



Bearings Are Interchangeable and of Bronze Except Those for the Arbor, Which Are Ball Bearings

Industrial Activities in New England

The P. A. F. Corbin division, American Hardware Corporation, New Britain, Conn., has increased its working schedule from 32 to 40 hr. weekly, and reduced wages of employees from 18 to 28 per cent.

The Alaska Freezer Co., Winchendon, Mass., has resumed operations after being idle for two weeks. The plant is on full time.

The Gilbert & Barker Mfg. Co., Springfield, Mass., heretofore operating 46 hr. a week, has resumed a 48-hr. week schedule, but with a reduced number of employees, who have accepted a slight reduction in wages. The management states the business outlook in the company's line is good, and some additions to the working force may be necessary before long.

The Groton Iron Works, New London, Conn., has completed the last contract on hand and will immediately reduce its working force.

The New London Ship & Engine Co., Groton, Conn., has released altogether about 60 workmen because it has completed contracts on submarines S-19, S-20 and S-21.

The General Electric Co., Lynn, Mass., last week reduced wages of 12,000 employees, effective Aug. 8. The cut varies in amount, according to the different classes of workers. Of the 12,000 employees, 4671 who, prior to June 30, 1921, completed five years' service, received $171,765 last week in supplementary compensation. This sum represents 5 per cent of the company's earnings for the half year ended June 30.

The Warner & Swasey Co., Cleveland, resumed operations Aug. 1 on a three day week schedule. This company's plant was shut down July 1.

German Small Tool Prices the Lowest

Twist Drills Sold at 50 Per Cent Less Than British Product—British Compete with United States and Germany Only on High-Speed Tools

BY PAUL M. TYLER

GERMAN competition has again developed as a dominant factor in the European supply of twist drills, reamers, milling cutters and other classes of small tools, both in plain carbon and high-speed steel grades. This competition is especially serious in view of the fact that there are fairly large accumulations of stocks, particularly of American carbon tools, in England, and because of the general trade depression that restricts consumption to a minimum. Whereas in the latter part of 1920 deliveries were the leading factor, price has now become the main consideration and German manufacturers are able to quote figures considerably below the costs of manufacture in other countries. The writer's observations on a recent trip to Europe were confined mainly to England and Belgium and in these countries (up to the end of June, at least) the actual deliveries of German tools had been practically negligible, due partly to the prejudice against the purchase of articles from a former enemy country and partly to uncertainty over the operation of the reparations recovery bills pending in both these countries. German tools, however, were stocked by merchants and enjoyed a fair share of what little trade was being done.

Catering to the Buyer

In addition to the low prices they are able to quote, German manufacturers are aided in their attacks on foreign markets by the favorable credit terms they allow. A large proportion of the orders are placed subject to approval on delivery and without any advance payments. The German firms are also ready to make up samples with the merchant's name stamped on the product and with no reference to the fact that they were "made in Germany." One merchant in Brussels wrote to a German manufacturer asking bids on a variety of tools and almost by return mail received a complete set of samples each marked with his name and address, although he had never had any previous business relations with the German firm. In Cologne, also, the writer found an agent of one of the large German twist drill manufacturers who claimed that he could furnish any reasonable quantity of these tools from stock and mark and pack them in such a way as to give the impression that they were made in the United States or other countries. While German lists are made up on the basis of diameters in millimeters, English sizes can be obtained from stock at the same price as the next higher metric size. There seems to be no difficulty in obtaining export licenses and payments are ordinarily to be made in marks at current rates of exchange. New price lists were issued early in 1921 and the usual "discounts" are 200 per cent above list less 20 per cent (to dealers) on sizes above 10 mm. (say ⅜ in.) on carbon tools and 150 per cent

Comparative Table of Twist Drill Prices

Taper and Straight Shank Twist Drills (Carbon)

Diam., Inches	Taper and Straight Shank — American — List Each $	Taper and Straight Shank — American — Net Each $	Taper and Straight Shank — English — List Each s.	d.	Net Each s.	d.	Taper and Straight Shank — English — Equivalent* Each $	Taper Shank — German — List Each Marks	Taper Shank — German — Net Each Marks	Taper Shank — German — Equivalent* Each $	Straight Shank — German — List Each Marks	Straight Shank — German — Net Each Marks	Straight Shank — German — Equivalent* Each $
¼	.60	.26	2	6	1	7.5	.33	3.05	7.3	.12	2.0	4.9	.08
5/16	.80	.34	3	6	2	3.3	.46	3.8	9.0	.15	3.2	7.7	.13
⅜	1.20	.51	5	0	3	3.0	.65	4.9	11.9	.19	4.5	10.8	.18
7/16	1.60	.68	6	9	4	4.6	.88	7.8	18.8	.31	6.0	14.4	.24
½	2.00	.86	8	3	5	4.1	1.07	9.9	23.8	.40	9.3	22.3	.37
⅞	2.60	1.11	11	0	7	1.8	1.23	12.6	30.2	.50	12.6	30.2	.50
1	3.50	1.50	14	9	9	7	1.92	17.4	41.8	.70	17.4	41.8	.70
1¼	5.50	2.35	23	0	14	11.4	2.99	27.0	64.8	1.08	27.0	64.8	1.08
1½	8.50	3.63	35	6	23	.9	4.62	45.3	108.7	1.81	45.3	108.7	1.81
1¾	12.50	5.34	52	3	33	11.6	6.79	61.5	147.6	2.46	61.5	147.6	2.66
2	18.50	7.91	77	3	50	2.5	10.04	81.0	194.4	3.24	81.0	194.4	3.24
2¼	24.50	10.47	102	3	66	5.5	13.29	109.5	262.8	4.38			
2½	30.50	13.04	127	0	82	9	16.55	144.0	353.6	5.89			
2¾	38.00	16.25	158	6	103	.3	20.61	180.0	432.0	8.53			
3	48.00	20.32	200	0	130	0	26.00	232.5	558.0	9.30			
3¼	65.00	27.79	271	0	176	1.8	35.23	279.0	669.6	11.16			
3½	85.00	36.34	354	0	230	1.2	46.02	335.0	804.0	13.40			
3¾	112.00	47.88	467	0	303	6.6	60.71	408.0	979.2	16.49			
4	140.00	59.85	583	0	378	11.4	75.79	462.0	1108.8	18.48			
4½	200.00	85.50											
5	260.00	111.15											
6	400.00	171.00											

Taper and Straight Shank Twist Drills (High Speed)

¼	1.10	.84	6		4	7.8	.93	14.40	28.80	.48	7.75	15.50	.26
5/16	1.50	1.14	6	6	5	.45	1.00	16.25	32.50	.54	12.90	25.80	.43
⅜	2.00	1.52	8	6	6	7	1.32	21.00	42.00	.70	20.65	41.30	.69
7/16	2.50	1.90	13		10	.9	2.02	41.00	82.00	1.37	34.25	68.50	1.14
½	3.50	2.66	16		12	4.8	2.48	56.00	112.00	1.87	55.65	111.30	1.86
⅞	4.75	3.61	20	6	15	10.64	3.18	77.50	155.0	2.58	77.50	155.0	2.58
1	6.25	4.75	26	6	20	6.45	4.11	105.65	251.3	4.19	105.65	211.3	3.52
1¼	10.75	8.17	44		34	1.2	6.82	177.50	355.0	5.92	177.50	355.0	5.92
1½	17.25	13.11	76		58	10.8	11.78	268.75	537.50	8.96	268.75	537.5	8.96
1¾	25.00	19.00	104		80	7.2	16.12	391.25	782.5	13.04	391.25	782.5	13.04
2	35.00	26.60	140		118	6	23.70	544.0	1088.0	18.13	544.0	1088.0	18.13
2¼	45.00	34.20	185		143	4.5	28.68	734.0	1468.0	24.47			
2½	65.00	49.40	240		186		37.20	989.0	1980.0	33.00			
2¾	85.00	64.60	315		244	1.5	48.83	1283.0	2566.0	42.77			
3	105.00	79.80	400		310		62.00	1669.0	3338.0	55.63			
3¼	135.00	102.60											
3½	165.00	125.40											
3¾	195.00	148.20											
4	225.00	171.00											

*Foreign prices converted at £1 = $4, and 60 marks = $1.

above list less 20 per cent (to dealers) on all classes of high-speed steel tools.

German Prices Half the British

Representative prices will be found in the accompanying table, and it will be noted that the German prices will average less than one-half British prices, even on the basis of the exchange rate of 60 marks to the dollar prevailing in the early part of June when the quotations were made. The differences are most marked in the case of carbon drills, but are very large even in the case of high-speed steel drills, especially in the smaller sizes where the raw material is a less important item in the cost of manufacture and the advantage of cheap labor is obtained to a greater degree.

In comparing the prices as given in the table, it should be noted that the prices are all quoted at manufacturers' or merchants' warehouses in the countries named. The German prices must be increased by approximately 7½ per cent on the basis of f.o.b. Hamburg and a trifle more for delivery in Belgium, France, or England. Before reaching the consumer in any of these countries, there will be added also a middleman's profit, as few if any of the German firms have established direct agencies abroad. For this reason most of the German tools that have been exported so far have been plain carbon steel, and English manufacturers have enjoyed a practical monopoly in the sale of high-speed steel tools of all kinds. The prices of American high-speed steel tools have been so high that the only sales of this class have been a very limited range of specialties.

Straight Shank Twist Drills
Jobbers' or Short Lengths

Diameter, Inches	American			English			German		
	List, Dozen	Net, Dozen	Net, Each	List, Dozen	Net, Each	Equivalent U. S. Money,* Each	List, Each	Net, Each	Equivalent U. S. Money,* Each
	$	$	$	s d	s d	$	Marks	Marks	$
CARBON									
1/8	1.80	.77	.06				0.55	1.3	.02
1/4	3.25	1.39	.12				1.18	2.8	.05
3/8	6.00	2.58	.21				2.42	5.8	.10
1/2	12.00	5.13	.43				3.9	9.4	.16
5/8							5.3	12.5	.21
3/4							7.8	18.7	.31
HIGH SPEED									
1/8	5.90	4.48	.37	1 5	1 2.9	.25	3.6	7.3	.12
1/4	7.35	5.59	.47	2 5	2 1.4	.42	6.0	12.0	.20
3/8	10.50	7.98	.67	4 3	3 8.7	.74	9.5	19.0	.32
1/2	20.00	15.20	1.27	6 0	5 3.0	1.05	16.7	33.5	.56

*Foreign prices converted at £1 = $4, and 60 marks = $1.

Prior to the war, the European market for carbon steel cutting tools was shared mainly by American and German manufacturers, the former doing the larger share of the business in England, while German makers enjoyed the bulk of the Continental trade. There were a number of British manufacturers of carbon tools, but the output was small and most of the home requirements were imported. With the more general adoption of high-speed steel, the manufacture of small tools became a more important industry in England, but it developed mainly as a branch of the high-speed steel industry. The extraordinary demands for tools for use in the manufacture of munitions resulted in a rapid expansion in the output.

British Manufacturers' Associations

Altogether, there are now probably nearly 50 self-styled manufacturers of twist drills and perhaps an even larger number of makers of milling cutters in England. Most of the output, however, comes from about 20 fairly large firms, all of whom are members of a group of associations which govern prices. Among these are the British Twist Drill Manufacturers' Association, the Milling Cutter Association and the Screwing Tackle Manufacturers' Association (taps and dies), all having headquarters in Sheffield and operating in close conjunction, so far as prices of high-speed steel tools are concerned, with the High Speed Steel Association. The majority of the small tool makers in England do not make their own steel, although most of the larger ones use steel from only one works. The tendency toward obtaining ownership of steel works, however, has been marked and recently several firms have absorbed tool steel plants in order to assure themselves of a supply of steel and, in the case of high-speed steel, to obtain a better market for their scrap. Even when owned by the same interests, the tool steel works are rarely adjacent to the small tool factories.

Milled and Composite Drills

In England, twist drills are almost invariably milled from the solid bars, although at least two firms are licensed to manufacture them from a twisted section and produce a small quantity for use in the shipyards for non-precision work. In the largest sizes of high-speed drills, rarely under 1½ in., some makers produce a drill which has only the tip made from high-speed steel which is attached by means of a brazing compound to a carbon steel shank and flues, and inserted tips of high-speed steel are occasionally employed in lathe tools—either brazed on or fitted into a slot in a bar of carbon steel. Generally speaking, however, English tools are made of the same metal throughout. Most of the high-speed tools, both in England and on the Continent, contain only 14 per cent of tungsten, the higher grades being furnished only on special order. It is not common to specify the tungsten contents and the special steels are sold by brand names. On the basis of tungsten powder at 2s. and ferrotungsten (80 to 85 per cent) at 1s. 7d. per pound of tungsten contained, the prices of high-speed steel in England in July, 1921, were 3s. per pound for the usual 14 per cent grades and 3s. 9d. per pound for 18 per cent, with some special grades selling a few pence higher. Taking sterling exchange at $3.60, these prices correspond to 54 cents and 67.5 cents, respectively, per pound.

British Carbon Drills Not Competitive

Methods of production do not call for special comment. While a fair proportion of the equipment in the older British works is out of date, the new equipment that was put in during and since the war is almost identical with that employed in the United States; in fact, much of the machinery is actually of American manufacture and in some cases American firms have laid out the factories and installed the machinery. Production costs at some of these new plants should compare favorably with those of American manufacturers, even in the case of carbon tools. But with few exceptions, in spite of the lower wage scales, since the scale of production is much smaller than that maintained in American plants, the costs at British works are too high to allow extensive competition with American or German firms except in high-speed steel tools.

Bit Stock Drills (Carbon)

Diam., Inches	American			German		Equiv. U. S. Money,* Each
	List, Dozen	Net, Dozen	Net, Each	List, Each	Net, Each	
	$	$	$	Marks	Marks	$
1/8	3.00	1.03	.09	3.60	8.64	.14
1/4	5.00	1.75	.15	3.70	8.88	.15
3/8	8.50	2.91	.24	4.15	9.96	.17
1/2	13.00	4.45	.37	5.25	12.60	.21
5/8	18.00	6.16	.51	7.50	18.00	.30
3/4	24.00	8.21	.69	9.60	23.04	.38
7/8	30.00	10.26	.86	12.25	29.40	.49
1	36.00	12.31	1.03	16.10	38.64	.62
1 1/8	42.00	14.36	1.20	19.00	45.60	.72
1 1/4	48.00	18.24	1.52	23.50	56.40	.92

*Reckoning 60 marks = $1.

French Tools in England

There is some production of small tools in France and French tools are offered in London at prices a little lower than those quoted by American and British firms, but this is believed to be merely a result of purchases at a favorable exchange rate, as sales are

from stocks in England. There is at least one manufacturer of tools in Belgium, but Belgian production is a negligible factor even in the home consumption of that country and the development of any considerable export trade is out of the question. The Austrian firms that enjoyed some export business before the war do not appear to have resumed operations as yet and are not a factor in the post-war situation.

Germany's Low Labor Cost

The situation apparently resolves itself into a struggle between American and German manufacturers for the business in carbon tools and between British and German manufacturers in the rapidly expanding market for high-speed steel tools of all kinds. When it is realized that few German mechanics receive more than 80 marks per day and most of the operators of machines manufacturing these classes of tools are paid less than 70 marks (say $1) per day, it would seem that Germany has an overwhelming advantage in production costs. It is absolutely impossible to get figures as to the exportable surplus of German works, but for the present they are able to supply a relatively large volume of foreign business and stocks are accumulating.

GERMAN ECONOMY MOVEMENT

Combination of Engineers and Industrialists Under Government Auspices to Study Wastes

BERLIN, July 19.—Under the name of National Board for Economy in Industry and Trade, an organization has been formed at Berlin under the auspices of the Ministry of Economics and with the co-operation of leading industrialists. It is a combination of the various forces at work for the increase of production by the elimination of waste in labor and material. Its principal executive organs are the Society of German Engineers and other large technical and economic organizations. This endeavor for greater economy in industrial production originated in the standardization movement in German engineering, which has lately spread to other industries. It was found that mere standardization would not solve the problem, and in 1920 steps were taken to enlarge the operation schedule by treating such subjects as working of materials, mechanical and individual means of production (tools, machinery, and psycho-technics, time studies, etc., respectively), plant operation (works transportation, energy and heat economics), and works organization. The Government appointed a commissioner for industrial economics, who is now to be superseded by the newly-founded institution, it being recognized that such problems should be handled by self-governing bodies set up by the industries.

Active Support by All Industries

So far the center of gravity of the whole movement has been in the machine industry, while the extension of activities to other industries is in the course of development. A large number of industrial branches, as, for instance, engineering works, forging plants, foundries, metal working plants, paper mills, etc., are already in collaboration with the different suborganizations and other industries (pottery, textile, chemical) are engaged in preliminary preparations. The Government has sanctioned a grant of 1,000,000 m. and an equal amount has been contributed by industry. The trades and industry are lending active support by technical contributions, research, experiments, investigation of special subjects, and the delegating of representatives to meetings.

Wide Range of Subjects Considered

Some of the principal subjects considered, apart from scientific management, standardization and typification, are the following:

Working of aluminum; investigation of steels and lighter metal suitable for measuring instruments; possible retrenchments in the consumption of copper and alloys; cheapening of production by improving certain special machinery; improvements in the design and construction of hand tools; collecting of data for the elimination of non-productive manual operations; scientific plant layout, with special attention to mechanical transportation; agreements on technical formulæ, usages, etc. For the technical training of laborers, artisans and engineers a network of local organizations is being spread over Germany. With the co-operation of a large number of firms, touring expositions are being arranged, and the establishment at Berlin of an experimental and model institute for the training of works officials has been decided upon. Another organization just being formed and based on similar principles will devote its attention to the study of rational utilization of waste and old material.

Merger of German Locomotive Works

Another big merger has taken place in the German engineering industry, which possibly may form the nucleus of a powerful locomotive combination. At a meeting of the board of directors of the Rheinische Metallwaren-und Maschinenfabrik at Düsseldorf it was decided to establish a community of interests with the Allgemeine Elektrizitäts Gesellschaft (A. E. G.) at Berlin, the Friedrich Krupp Aktien Gesellschaft and the Cologne iron trading firm of Otto Wolff, and to increase the capital stock of the company by 95,000-000 m. to 120,000,000 m., at the same time providing for a further increase by 50,000,000 m. as a reserve for extension of the plant. This merger will place the Rheinmetall, as it is generally called, among the leading locomotive works of the world.

Wage Rates Low Abroad

Figures given on page 1692, THE IRON AGE, June 23, for wages paid labor in the iron and steel and allied industries abroad, compared with wages paid in the United States, are amplified by the full report now issued by the Committee on Ways and Means, House of Representatives, Washington, from whom a copy of the 103-page pamphlet, dealing with many industries, may be obtained on request. Some of the outstanding features gleaned from the report follow:

Wages per Day	1913–4	1919–20	*Place*
Foundry:			
Skilled labor	$1.92	$0.60	Germany
Semi-skilled	1.40	0.52	Germany
Unskilled	1.03	0.45	Germany
Skilled	...	1.53	France
Semi-skilled	...	1.15	France
Unskilled	...	1.02	France
Skilled labor	...	1.67	Austria
Iron and steel mills:			
Highly skilled	2.12 to 2.90	2.00 to 3.20	France
Skilled workers	1.55 to 1.93	1.28 to 1.52	France
Common labor	0.68 to 0.89	0.96 to 1.28	France
Rolling mills:			
Skilled	2.09	0.65	Germany
Semi-skilled	1.54	0.60	Germany
Unskilled	1.32	0.52	Germany
Wages per Week			
Blast furnace and rolling mill average	...	$43.12	U. S. A.
Steel mill workmen	...	9.96	Japan
Iron and steel common labor	...	12.52	England
Iron molders	..	15.46 to 17.40	England
Coppersmiths, ship	...	18.27	England

Rates per Ton in Bar-Iron Plants

	1895	1907	1913	1920	
Puddlers	...	$2.33	$2.74	$7.50 to 8.27	England
Puddlers	$5.50	...	...	16.00	U. S. A.

Application for a Pennsylvania charter will be made Aug. 8, for the T. E. Malone Co., Pittsburgh, which will engage in the manufacture and sale of foundry facings, equipment and supplies. Thomas E. Malone, formerly secretary of J. S. McCormick Co., Pittsburgh, George R. McAleenan and John Jackson are interested in the new company.

New Type of Induction Electric Furnace

Primary Winding Above Bath—Experience with 2-Ton Unit—For Refining Molten Metal and Serving as Holding Reservoir and Melting Ferromanganese

THE General Electric Co. has developed and placed in full commercial operation for test purposes an improved induction type of electric furnace. While the induction furnace is in principle a transformer, much more space than usually exists between the primary and secondary circuits is necessary because of required heat insulating material between the primary and the secondary. As a result the reactance is, unavoidably, comparatively large. This means that, unless the power supplied to the furnace is of low frequency, it will operate at low power factor. While a low power factor would not materially affect the energy consumption in a certain process, a low power factor furnace would be more expensive. Furnaces

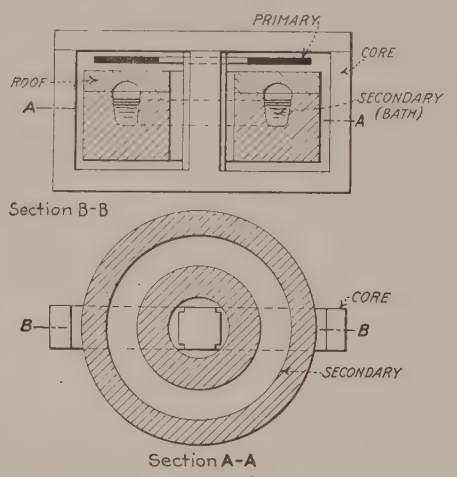


Fig. 1—Diagram of General Design Which Shows the Location of Primary Winding Above the Bath or Secondary Winding

are, therefore, generally designed for lower frequencies than what is standard among central stations.

In the new furnace the primary winding is located *above* the crucible where it is entirely out of danger in case the metal should leak out of the crucible. It is surrounded by a non-magnetic metallic casing which gives mechanical protection, and also acts as guide for the cooling air which is brought in at the bottom of the furnace so as to flow along the center leg of the core and out horizontally over the winding. The casing, being grounded, also serves to protect the operator against accidental contact with the primary circuit. The winding with its casing is attached to the upper leg or top yoke of the core so that this unit can be detached and removed from the furnace.

The crucible is of simple ring form giving substantially constant cross-section for the charge which is accessible by means of two or more lateral doors.

The roof is of unit construction, bricks of suitable shape being bridged across an outer and inner steel ring. With this construction, the roof, it is found, can be made tight and can be removed from the furnace in a short time. The furnace, it is added, can be built stationary or tilting in several well known ways.

According to a description prepared by M. Unger and C. A. Scharschu, of the General Electric Co., the metal in the induction furnace is subjected to certain electromagnetic forces, which are two-fold, an attracting force and a repelling force; that these forces are not of a small magnitude, but are, on the contrary, quite considerable.

The attracting or pinch force they describe in part as follows: The current carrying liquid conductor of the ring from crucible, they say, may be considered as a bundle of an infinite number of strands of current carrying elements and they thus are mutually attractive and pull together and the electromagnetic force tends to change the cross-section to circular. To obtain a true circular section would require an infinite force, so that in practice only the upper surface of a normally rectangular section will be curved or rounded off. This attracting force acts only on particles carrying current, and particles less conducting, as, for example, oxides, slag and gases, are therefore forced out to the circumference, i.e., a separation takes place, as in a centrifugal separator.

If the metal section should be restricted at some place, the current density becomes greater there and so also the attracting force. The result of this is that the liquid becomes agitated and if the restriction or the current is great enough, the agitation will be so great as finally to break the circuit. This phenomenon is usually referred to as the pinch force of the pinch effect.

The secondary or the "bath" forms a loop, and the current density and consequently the magnetic flux density are no longer uniform, being greater on the inner face of the loop. The attracting force is, therefore, strongest along the inner face of the loop and this causes, on the exposed surface, a slope of the metal as well as a circulatory motion in planes perpendicular to the direction of the current, as illustrated in Fig. 2. In practice the section of the bath will not be entirely uniform and this is desirable as, due to the attracting or pinch force, the metal will be caused to move in

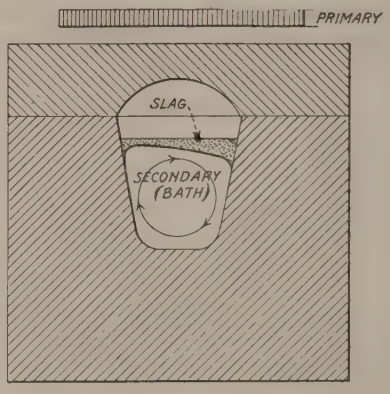


Fig. 2—Diagram to Illustrate How the Mutually Attractive Elements of the Secondary Bring About a Circulation Within the Bath and the Repellent Force Between Primary and Secondary Drives Downward the Current Carrying Bath so That the Slag Collects at the Top

direction parallel to that of the current. This motion is, however, according to Messrs. Unger and Scharschu, very gentle but sufficient to produce uniformity of the metal.

Of the repelling or centrifugal force they say: When adjacent conductors are carrying current in opposite directions and they are free to move, they will move away from each other, or, in case one of the conductors is liquid, it may be forced against the retaining wall. The primary circuit being over the secondary circuit, the current carrying elements of the bath are,

consequently, repelled toward the bottom of the crucible, thus forcing the impurities to the surface as indicated in Fig. 2.

The combined effect of the electromagnetic forces acting upon the bath of the induction furnace of such a design is consequently as follows: The metallic or current carrying parts of the bath are forced toward

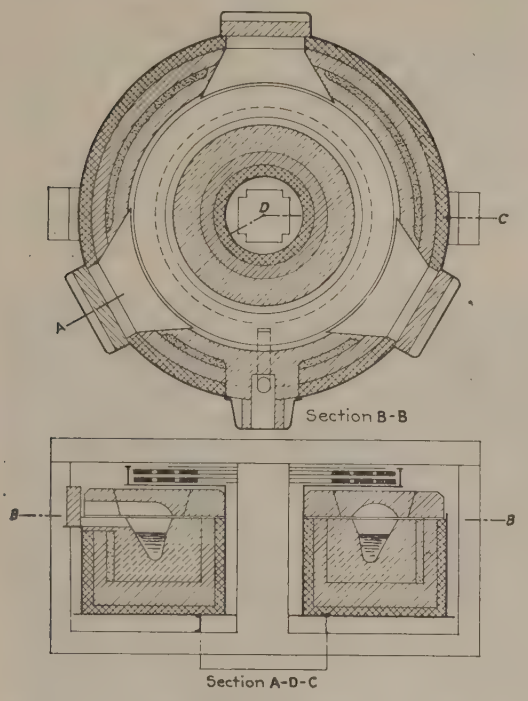


Fig. 3—The 2-ton Steel Induction Furnace Has Three Charging Doors

the center of the conductor so that impurities are squeezed out radially. The metal is also repelled toward the bottom of the crucible causing impurities to rise to the surface. The bath is, furthermore, subjected to circulation; one circulation in vertical planes, perpendicular to the direction of the current and another in horizontal planes in the direction of the current. The former circulation is generally far more pronounced than the latter which can, however, be increased by tilting the furnace, thus purposely making the cross-section of the bath uniform.

To operate the furnace, the secondary must be a closed ring or circuit, as otherwise no induced current can flow and there will, consequently, be no heating. The first charge must consist, therefore, of a metal ring of steel or of whatever metal it is desired to melt. The ring must be homogeneous and of fairly large section to avoid rupture from the pinch force at the time it commences to melt down. A positive method to avoid this trouble is to pour some molten metal over the ring shortly before it commences to melt. Another equally satisfactory method is to use two rings, one of lower melting point than the other, such as cast iron and steel. As soon as the ring is melted down, the furnace may be charged up to full capacity and metallurgical processes started. A certain amount of metal must always be left in the furnace after each pouring so as to hold the electric circuit complete. This, of course, does not apply in case liquid charges are used, as in duplexing.

It is not possible to start the furnace by using a charge of metal scrap or borings or graphite as the contact resistance becomes too great for the induced current to reach a sufficiently high value for heating.

In discussing the power supply the authors point out that it is usually necessary to install a motor-generator set for each furnace to transform the polyphase standard frequency supply into single-phase low frequency power. By regulating the field excitation of the generator of the set, the power can be varied as desired. The load required being steady the power factor of the furnace is of no interest to the central station as it does not affect the power supplied to the motor-generator set. So far as the central station is concerned, the induction furnace load is polyphase, high power factor, standard frequency and therefore an ideal one.

A 2-ton induction furnace has been in operation at the Pittsfield works of the General Electric Co. for over a year. It is rated 250 kw., 2200 volts, single-phase, 15 cycles with a hearth capacity of 4000 lb, of steel. The general design of the furnace and part of the installation is shown in Figs. 3, 4, 5 and 6. For the refractory and heat insulating material the General Electric Co. has developed for this purpose a refractory called "furnite." The roof is made from firebricks of special shapes, built up as a unit between two steel rings as shown in Fig. 4.

The furnace is provided with four doors, one of which is used exclusively for pouring. A so-called tea-pot pouring spout, as shown in Fig. 4, is used for pouring the metal entirely from below the slag line. The doors are not airtight, and, for the purpose of better control of the furnace atmosphere, the furnace is piped up for gas; one ⅜ in. gas pipe entering the crucible on each side of the three charging doors. By providing lateral doors as shown in Fig. 3, the entire bath is accessible, and slagging operations can be carried out with a minimum of effort.

The 4000 lb. charge forms a ring about 6 ft. diameter, 8 in. deep and 11 in. wide at the top. The charging doors are about 2 ft. wide and 10 in. high. The furnace occupies a floor space of about 12 x 12 ft. No water cooling is used. The available power is 2200 volt, 60 cycles, 2-phase and this is, by means of a motor-generator set, converted into 2200 volt, 15 cycle single-phase power. A 7.5 hp. blower set is provided for the furnace, and a small blower for the generator.

The furnace has, so far, been used almost exclusively for reclamation of different grades of steel scrap. The scrap is delivered either pressed in bundles or in form of small pieces and this is melted and refined in the furnace and poured into ingots.

The lining consists of two parts; the brick or per-

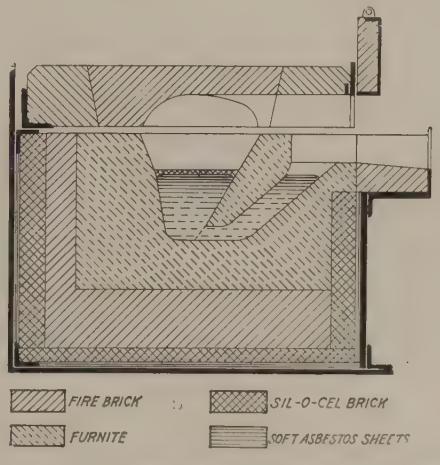


Fig. 4—The Pouring Spout Connects as Indicated with the Lower Part of the Bath and the Section Drawing Shows How the Refractory Material is Built Up

manent lining and the rammed or replaceable lining. A layer of asbestos sheet is placed around the sides and bottom of the furnace shell before the brick lining is put in. The brick lining is made up of one layer of sil-o-cel bricks around the sides and bottom of the furnace laid up as tightly as possible with a lime-silica bond. Three layers of circular fire bricks are put in the bottom of the furnace and one layer around both the inside and the outside shell. The bricks on the inside wall are laid up with fire clay as tightly as possible, whereas in the outside wall, the bricks are laid loosely so as to allow for expansion. This kind of brick lining serves the purpose of heating insulation

and to support the rammed lining.

The rammed lining is made up of basic material known as "furnite" with a binder of pitch. The rammed lining is put into the furnace in the following manner: A sheet metal cylinder is placed inside the outer brick wall of the furnace and is held at about 2 in. from the brick wall by means of steel spacers. Batches of furnite of approximately 1000 lb. are heated to about 70 deg. C. and mixed with warm pitch. This mixture is spread evenly around the bottom of the furnace, giving a layer between 1½ in. and 2 in. thick, and by means of air rammers the layer is rammed quickly into place. Successive layers are added and rammed before the preceding layer has had a chance to become cold, and after the lining has reached a depth of about 7½ in. it is quickly leveled by means of a straight edge and spirit level and the crucible and pouring spout forms are put in place. Both forms are made of cast iron, the crucible form being washed with kerosene to prevent the lining from sticking. The pouring spout form is allowed to remain in place and is melted down with the starting rings. A thin layer of lining material is put around the forms and tamped into place by hand rammers so as to make a perfect bond with the lining already in place. Successive layers of lining material, approximately 2 in. thick are rammed into place by air rammers until the top of the furnace is reached.

The crucible form, steel spacers and metal cylinders are then carefully removed. The space left between the outside brick wall and the rammed lining is loosely filled with granular calcined magnesite, the doors are cut down to proper level, the starting rings are put in place and the roof and top yoke with the coils placed on the furnace.

To put in the rammed lining requires about 12 hr., the labor being about 75 man-hours. With the exception of a skilled man to supervise the ramming of the lining, unskilled labor is used.

Starting rings of cast iron melt down safely in about 30 hr. The cast steel rings require somewhat longer time, whereas a combination of cast iron and cast steel rings are melted in about the same length of time as cast iron rings. The cast iron ring weighing about 400 lb. is put in the bottom of the crucible and the cast steel ring of about 1300 lb. is placed on top of the cast iron ring. The cast iron ring melts first and the cast steel ring sinks into the molten pool of metal, thus automatically repairing any break which may occur in the cast steel ring. Starting rings are of course used only when a new lining is put into operation.

The combination starting ring gives a molten charge of about 1700 lb. The bath is covered with lime to which is added sufficient fluorspar to make it pasty and sufficient mild steel scrap to bring the charge up to 3500 lb. As low carbon steel is made, iron ore is used to reduce the carbon and the oxidizing slag is withdrawn through the slagging door to remove the phosphorus. The slag is removed in 5 to 10 min. A new lime slag is added (75 lb. lime and 1 lb. spar) and the alloy additions are then made. In about ½ hr. thereafter, 2000 lb. of the charge is poured into an ingot, leaving about 1500 lb. of metal in the furnace.

One ton of metal is poured every 3½ hr. with an average energy consumption of 750 kwhr. in the furnace and 950 kwhr. at the bus bars, which includes power for the crane, lights, etc., and losses in the motor-generator set and the blowers. When melting down scrap which is in such form that the entire charge of one ton can be put in the furnace at one time, the energy consumption at the bus bars was lowered from 950 to 775 kwhr. per ton of metal poured, and the time per heat from 3½ to 2¾ hr.

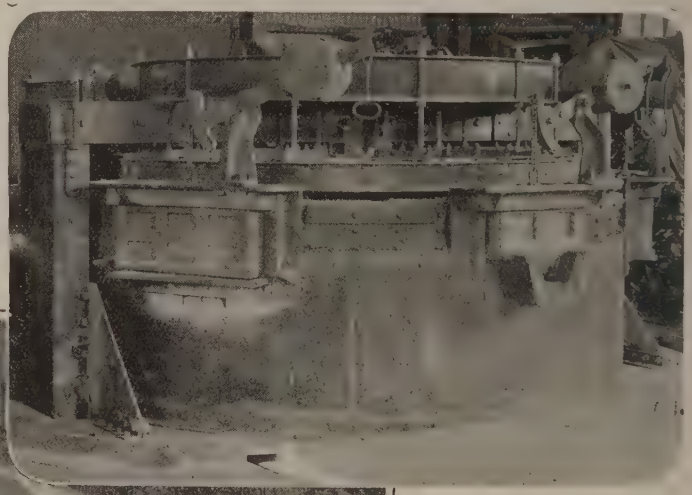


Fig. 5—Above, Induction Furnace Completely Erected

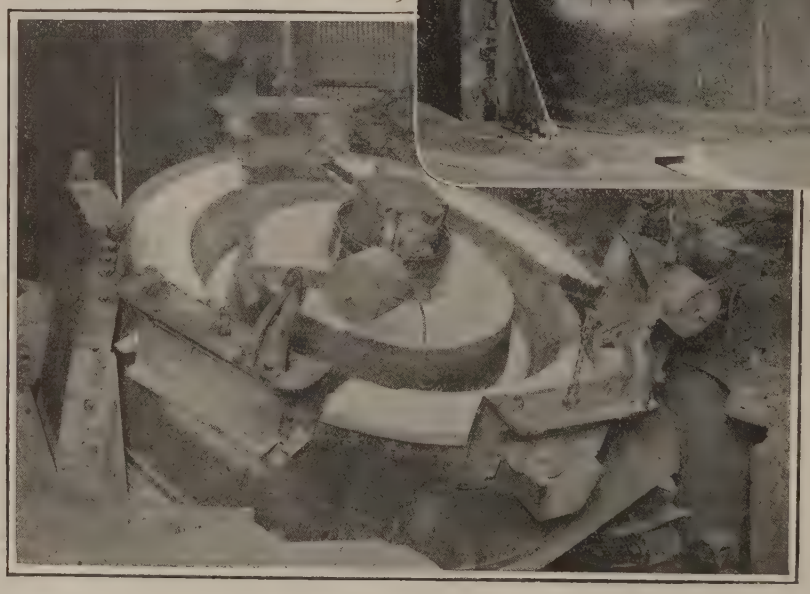


Fig. 6—At Left,—Top Removed, Rammed Lining is Shown in Place

Copper Precipitates on Iron

Extensive experiments carried out by the Chemische Fabriken Weiler-ter-Meer at Uerdingen have shown that in the electrolytic copper plating of iron by the well known process of immersing the wire in a copper sulphate bath, the adding of a small quantity of glue or gelatine had yielded very satisfactory results, an addition of as low as 0.1 per cent of glue having already proved sufficient. It is claimed that, from the viewpoint of economy and reliability, the new process is superior to the old ones.

Liquid fuel is now used on 2536 steamships listed by Lloyd's, the total gross tonnage being 12,797,000, or an average of more than 5000 tons per ship. Seven years ago only 364 steamers were listed as equipped for burning oil fuel, their gross tonnage being some 1,310,000, or an average of about 3300 tons per ship.

Sources of Waste in Building Industry

Duplication of Effort, Poor Management, Slack Production and Arbitrary Labor Regulations, All Blamed

HALF a billion dollars a year in wages is being lost in the building industry through unemployment, it is asserted in a report made public by the Committee on Elimination of Waste in Industry, of the American Engineering Council. Lack of work is declared to be the outstanding fact in this industry, whose critical condition following the war is attributed primarily to high costs of construction.

The committee's investigation covered the entire country, special attention being paid to representative cities such as New York, Boston, Philadelphia, Baltimore, Chicago, Cleveland, Atlanta and San Francisco. The inquiry into the building industry was made as a part of a national assay of waste conducted by the committee, of which J. Parke Channing of New York is chairman and L. W. Wallace of Washington vice-chairman. This assay originated with Herbert Hoover, who recently retired from the presidency of the American Engineering Council, and embraced six leading industries. The building investigation was in charge of Sanford E. Thompson of Boston, who directed a large force of field workers. An abstract of the report follows.

Waste is causing huge losses in building which, including all trades and common labor incidental to it, ranks second among the industries, and contributes to the wealth of the nation more than $3,000,000,000 yearly. Yearly averages for the past six years show that 32 per cent of the activities of the industry, which employs some 3,000,000 mechanics and laborers in a single year, is devoted to residential buildings, and 18 per cent to industrial buildings, "miscellaneous" covering the rest.

How the Waste Originates

Chief among the sources of waste in the building industry are irregular employment, inefficient management and wasteful labor regulations. Customs or conditions prevailing throughout the industry, and poorly designed equipment, are given as secondary causes. The annual economic loss due to accidents is estimated as high as $120,000,000. Application of safety methods, it is stated, would save to the industry 12,000,000 days a year.

Loss through duplication of estimates and designs, and duplication in bidding, runs into the millions. An acute national shortage of housing exists, with costs prohibitive to householder and banker. Improvement in production per man is noted as a result, in part, of weeding out war's misfits. Many union rules are condemned as absolutely wrong. Both employers and employees are blamed for restriction of output.

Haphazard management in planning and controlling work, and lack of standards, which often double the labor cost, characterize most construction undertakings. But a few builders, recognizing the waste in money and man power, are adopting methods that approach modern factory management.

The building trade workman is busy on the average about 190 days in the year, or two-thirds of his time. A few contractors, individually or associated, are attacking this problem with effective results. The public also must be educated to the need of a sensible distribution through the year of its construction requirements. Development of methods of conducting work in cold weather and arrangement of work to provide indoor operations in cold and stormy weather will help here. Idleness, however, is not due entirely to seasonal demands; strikes and lockouts are appreciable causes.

Labor Troubles Most Potent in Wastefulness

One of the great economic wastes to be found in the building industry is the strike. The waste to the men engaged, the contractor and the public is hard to estimate. The major causes of strikes are demands for increase in wages, recognition of the union, decrease in working hours, and jurisdictional disputes. Incidental to these causes and often aggravating them are working conditions, while in almost every case the prime factor is a lack of understanding and failure of the employers and the workers to get together.

From 302 in 1914, the number of strikes and lockouts in the building trades increased to 452 in 1919, an advance of 50 per cent. This increase is accounted for in part by the greater demand for labor in 1919, which inevitably makes the requirements of workmen more exacting and arbitrary. Of the 452, only 18, or 4 per cent, are listed as "lockouts," so that the waste due to lockouts is relatively small.

If the Massachusetts strike rate of 138,519 working days lost in 1920 is applied to the entire industry, a waste of some 3,000,000 days per year is found. If the greatest cause, the demand for an increase in wages, could be eliminated, strikes as a factor of waste would shrink into insignificance. The remedy that suggests itself is co-operation. Management and labor must forget the sore spots of past conflicts and, through wholehearted co-operation, fix by proper studies a minimum wage to correspond with a standard amount of production, with additional compensation for additional output. This would furnish an incentive to the men and would give recognition to deserving mechanics.

Restriction of Output Due to Union Rules

Union regulations have produced enormous losses through direct or indirect restriction of output. Workmen and contractors, however, are beginning to appreciate that reduced output reacts in tremendous fashion upon themselves. Wasteful labor regulations consist of requiring skilled men to do work that could be performed by unskilled, restricting individual incentive through requiring uniform wages, limiting the number of apprentices, excessive reduction of working hours; restricting output by prohibiting the use of labor-saving devices, and jurisdictional regulations, which distribute certain types of work to different trades, frequently without regard to expense.

It must be recognized that the unions are by no means alone in their restriction of output. Contractors and builders and supply dealers affect the situation indirectly by maintenance of high prices, collusion in bidding and unfair practices. Collusion between unions and employers also has sometimes raised prices unduly.

One great fundamental cause for low output is the fact that all members of unions in the same trade are paid the same wage. It has been found that, on construction jobs, there are usually a few men who do one-third more work than the average. These men also do better work. Is it fair that these good men receive the same wage as the others? Restriction of apprentices in many cases is extreme and unfair. Overtime and travel rules, also, tend to increase building costs unduly.

Despite the restrictive action of many of the union regulations there is growing evidence of willingness to co-operate, especially in Philadelphia and San Francisco. In Cleveland co-operation in tile setting was hindered by employers. Co-operation in the needle trade of Montreal is cited as an example for the building industry.

Heavy Losses Involved in Accidents

In some construction trades accidents involve losses up to 10 per cent of the labor cost, in addition to the human loss of lives and energy. The average loss, computed from insurance statistics, is about 2½ per cent of the labor cost. Here also certain contractors have found it possible to cut their accidents in half, through special efforts.

In Massachusetts, during one year, accidents caused

a loss of 485,486 days. In New York State, where four times as many workers are employed in the factories as are employed in building and construction work, there were more fatalities due to accidents in building than in factories during a 4-year period. Accidents are largely caused by carelessness of the workmen, or lack of ordinary safeguards. Conditions which would not be tolerated in a factory for 24 hours are found on every job.

No Lack of Demand for Buildings

The total shortage of housing in 1921 is found to be 53 per cent of the total square footage (the real measure of value) constructed in 1915. To this percentage must be added, if we consider the footage constructed in 1915 as equal to the requirements of that year, 7½ per cent, as an increment to cover the increase in population. The need for building is most evident. Costs are so high, however, that the householder cannot afford to buy, nor can the banker loan money, because of the danger of loss through the inevitable fall in prices. Income tax conditions have forced funds once available for mortgages into tax-exempt securities.

Loss Occasioned by Labor Turnover

Large fluctuations in the number of men employed by representative contractors indicate a great fluctuation in the volume of business carried on. Assuming that the figures for unemployment, due to all causes, in the building trades in Massachusetts are representative of the entire country, and if one-half of this unemployment could have been eliminated, the value to the building industry or its wealth to the country would have been increased as follows: 1915, $106,000,000; 1916, $91,000,000; 1917, $113,000,000; 1918, $85,000,000; 1919, $141,000,000; 1920, $192,000,000.

Representative average conditions in the building trades of Philadelphia and vicinity reveal lost or wasted time as high as 44 per cent among iron workers, 37 per cent among cement finishers, 36 per cent among steam fitters, plasterers' helpers and stone cutters, 40 per cent among roofers and 29 per cent among painters and paper hangers. This percentage is based on the relation of the average days worked per year to the number of effective days possible.

The days at work average 189 per year for the various trades in Philadelphia. The average of estimates reported by contractors is 210 working days a year. Over half of the lost time is laid to bad weather and the balance chiefly to waiting for or looking for work. An extreme example of labor turnover in Philadelphia is the case of a man who, in the course of 5½ years worked for 76 different contractors and was hired 108 times. This enormous turnover causes losses to both employers and men.

How the Unions Can Help the Industry

Unions must co-operate to the extent of eliminating the flat rate for all mechanics of a trade, and of modifying the restriction that forbids mechanics to accept piece work. With definite standards fixed, and with the co-operation of both parties, fair incentives can be introduced. The most encouraging sign in the elimination of the above causes is found in what is known as the "Philadelphia Plan," put forth by the labor element of that city, under which a committee, composed of an equal number of representatives from groups of employer and employed, would constitute a tribunal or council.

General failure of the building industry as a whole to develop and use a greater amount of mechanical equipment is scored. Greater strides have been made in almost every other industry in the application of mechanical means. Union objection to labor-saving devices is wrong in principle and will be relegated to the past, like the restriction of output.

Architects frequently cause expensive delays, and occasionally complete shutdowns, by failure to deliver detail plans and specifications at the proper time. Waste of time and energy and money through duplication of estimates and of designs runs into millions every year. An equal, if not greater, source of waste is said to be the duplication in figuring quantity by all bidders.

The most encouraging feature in the building industry to-day is the action of a few of the builders, and a few groups of building trade workmen, in making intensive studies of the causes and remedies for irregular employment and haphazard conditions of work. Along with this is the growing appreciation on the part of both labor and management that, to build more buildings and maintain high wages, it is necessary to attain greater and greater productive capacity per man.

Never in the history of our country was it so important that certain fundamental principles of economics—principles which are not mere theories, but are based positively on facts—should be accepted and established as a working program. These principles will throw overboard the fallacy that restricting production can make work go further, and will supplant this with the knowledge that to get, one must give; that to receive, the equivalent must be given in money or in time or in effort, and that increased returns can be attained only through increased production.

Handy Aid for Oxy-Acetylene Cutters

A handy aid for the use of metal cutters who use the oxy-acetylene blowpipe has been devised recently by K. McDermott, steam engineer and assistant mechanical engineer of the South Chicago Works of the Illinois Steel Co. It is in the form of a nickel-plated hand rule about a foot long and 1⅛ in. wide and ⅛ in. thick, graduated to indicate tip sizes and oxygen pressures best suited to cutting steel sections of any thickness.

The Illinois Steel Co. uses two different makes of blowpipes and as a common scale would not apply to both, one side of the rule is graduated for one type and the other side for the other. By a proper computation of scale a workman's rule can easily be made for any make of blowpipe. The manner of using the device is simple. Instead of reading thickness in inches and fractions, one reads tip size and pressure, thus rendering unnecessary any resort to memory or reference to a cutting table.

The new device is found to be a time saver and insurance against error and waste if the scale is read correctly. Any one can easily make his own cutting rule suited to the equipment used, as the idea is not patented.

Stockholders of Hame & Chain Company Sue Officers and Directors

Minority stockholders of the National Hame & Chain Co., operating at New Albany, Ind., a large plant, have filed suit against officers, directors and majority stockholders, charging gross mismanagement of the company, payment of large salaries and bonuses, and refusal to pay dividends to minority stockholders, although there is a surplus of $150,000 available. The suit names George D. Todd, former mayor of Louisville, Ky., president; Laura D. Todd, vice-president; J. Gault Fulton, secretary, and Arthur Loomis, treasurer. It is held that officers hold 670 of the 1000 shares of stock. The suit is brought by Joseph Burghard, owner of 300 shares of stock, and Joseph and Austine Burghard as executors of the estate of Ernest R. Burghard, deceased. It is held that officers holding majority of the stock have had control for two years, and will not even allow minority stockholders to investigate the books, and have dissipated assets in an effort to force the minority stockholders to sell.

New Automatic Starter for Motors

The Cutler-Hammer Mfg. Co., Milwaukee, Wis., has developed a new 9604 automatic starter for small squirrel cage motors to allow a large starting inrush for several seconds, but at the same time to give protection against burnout troubles. Two mercury overload relays mounted below the contact fingers, as shown in the illustration, are designed to eliminate all fuse troubles and the attendant expense, while allowing momentary overloads and overloads as high as 25 per cent for a limited period.

Two Mercury Overload Relays Eliminate Fuse Troubles

The new overload relay consists of a glass tube carrying a mercury column which forms a part of pilot circuit of the magnetic switch coil. A portion of this column is surrounded by a heating coil or thermal element. This element is in series with the motor circuit and is heated in the same proportion as the motor windings. Excessive current passing for too long a period heats the coil, causes the mercury to boil and the vapor to pass up into a chamber at the top of the tube. This action breaks the liquid mercury column and opens the circuit to the magnet coil. As this coil is de-energized, the contact fingers drop away and disconnect the motor from the line. After such an interruption, the mercury cools down, becomes liquid again, drops back into the tube so that the pilot circuit to the magnet coil is complete when the control button is depressed. In other words, the relays quickly reset themselves. The motor will not start, however, until the control button is depressed after the relays have reset.

As the functioning of these overload relays depends upon the temperature at which mercury will boil, the current required to operate the relay increases with the decrease in the temperature of the surrounding air. In other words, if the motor and the starter are installed in a cool location, the relay permits a greater starting current or a higher overload than if the temperature of the surrounding air were higher. If the motor and starter are located in an unduly hot place, the mercury relays will act in the place of a thermocouple.

The push button station which is supplied with C-H 9604 starters can be installed in any position that is most convenient for the operator. The starters may be used in connection with machinery driven by squirrel cage motors of comparatively small horsepower, 7½ hp. and less.

Court Proceedings of Walden Worcester, Inc.

In recent proceedings brought by Walden Worcester, Inc., Worcester, Mass., against the American Grinder Mfg. Co., Milwaukee, Wis., for the cancellation of the latter's trade-mark "Blackhawk," the United States patent office has rendered a decision favorable to Walden Worcester, Inc., the patent office examiner holding that Walden Worcester, Inc. (who is proprietor of the trade-mark "Tomahawk") has been injured by the registration of the trade-mark "Blackhawk."

Walden Worcester, Inc., has also recently instituted suit in equity in the Federal District Court of Wisconsin against this same company for alleged unfair competition, and trade-mark and patent infringements. C. N. and F. W. Jonas Brothers of Chicago, San Francisco and Los Angeles are made joint defendants. C. N. and F. W. Jonas Brothers at one time were selling agents in the West for Walden Worcester.

July Steel Ingot Output Very Small

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in July of 803,376 gross tons as compared with 1,003,406 tons in June. The decrease was 200,030 tons or 19.9 per cent. Estimating the production of other companies on the basis of those reporting, the total output of ingots in July was 954,128 tons or 38.126 tons per operating day, counting 25 working days in July against an estimated total of 1,191,693 tons, or 47,667 tons per operating day, in June. This is a decrease of 237,565 tons or 9,541 tons per day. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

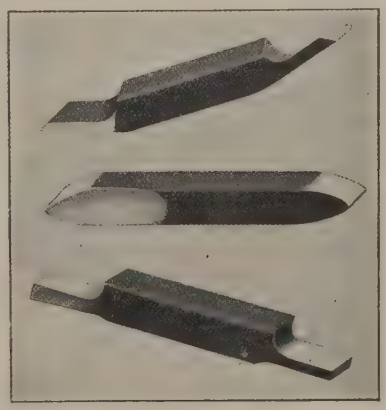
	Open Hearth	Bessemer	All Other	Total
January, 1920...	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920...	26,197,843	8,112,753	121,656	34,432,252
January, 1921...	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376

The July ingot production was at the yearly rate of 11,857,186 tons, counting 311 operating days to the year. This compares with a rate in June of 14,824,437 tons, in May of 17,980,465 tons, in April of 17,242,773 tons and in March of 21,258,405 tons.

The decrease of 237,565 tons in the estimated ingot output of all companies in July from that in June compares with a decrease of 200,278 tons in the July pig iron output from that of June.

New England Tool Bits

The New England Tool & Machine Co., 51 Taylor Street, Springfield, Mass., has placed on the market tool bits, manufactured under a patented process, to fit standard tool holders taking square stock, in the following sizes: 3/16 in., ¼ in., 5/16 in., ⅜ in., 7/16 in. and ½ in. These tools are cut from annealed bars. The thread tools are ground on a special block and the flat and angles on the U. S. standard threads are ground with the same operation, proper clearance being allowed. They have a cutting edge on both ends and are offered to the machine shop trade with a view to cutting down production costs by eliminating time spent by workers in grinding tools. Their size permits checking in and out of tool cribs as are drills and other tools, thereby eliminating loss sustained in tool bits as usually handled in the shop.



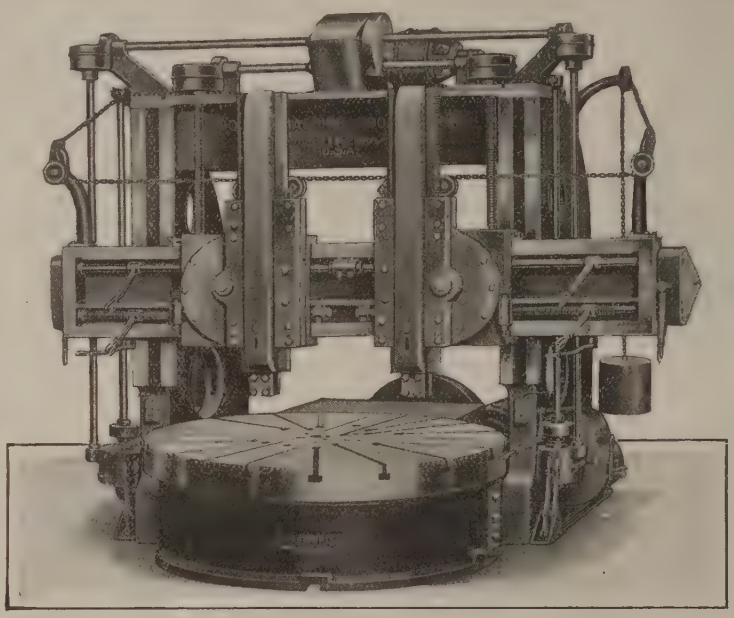
Thread Tools are Ground On a Special Block

Vertical Turning and Boring Mill

The vertical turning and boring mill shown in the accompanying illustration is being offered by the Jones Machine Tool Works, Philadelphia, in 60, 72, 84, 100, 120 and 144-in. sizes.

One of the outstanding improvements incorporated is the push button control for starting and stopping the motor. Other levers are conveniently located on each side of the machine. The drive is by a constant or variable speed motor, the constant speed motor giving 16 changes of speed through the change speed box. From the motor the drive is through heat-treated steel sliding change speed gears, miter gears and pinion to the large steel ring gear, which is bolted to the under side of the table.

The table runs in an annular flat-shaped bearing of large diameter constantly lubricated, and is driven by the steel spur gear. The table spindle is supported in vertical bronze bearings located in the main base. The top vertical bearing is cone shaped, adjustable for wear, and the lower bearing is straight with the lower end supporting the step bearing. This is composed of alternate layers of bronze and steel washers which run in oil and are used for raising the table off the annular bearings when machining small, light work at high speeds. The housings are of box-girder pattern, bolted to the base and tied together by the bridge, which also supports the elevating mechanism.



Push-button Control for the Driving Motor Is a Feature. The table runs in an annular flat-shaped bearing constantly lubricated

The crossrail is of the three-track type, the saddle screws being located between the two lower tracks, the worm shafts for operating the rams being between the two upper tracks. The crossrail is clamped to the inner and outer guides of the housings and is raised or lowered through steel screws and bronze nuts by power from a motor on the bridge. The saddles are fitted with clamps and bronze taper gibs for taking up wear, also a clamping screw for locking the saddles to the crossrail when the ram is feeding. Operation is by hand ratchet feed for fine adjustment; power feed or quick traverse through steel worm and bronze nut. The rams are scraped and fitted in saddle swivels, which are made to swivel 30 deg. either side of vertical by ratchet wrench through a steel worm and worn-gear segment, the face of the segment being graduated in degrees to indicate the angle. The rams can be operated by hand-ratchet feed, power feed or quick traverse through a steel worm and bronze worm gear, steel pinion and rack. Counterweights are located in the rear side of the housing. Clamping screws are provided for locking the rams when saddles are feeding. Tool holders are from steel forgings and have a taper shank, straight shank being furnished if desired.

Change speed gears are of 0.60 to 0.70 carbon heat-treated steel and are of the sliding type, positive, no friction clutches being employed except when the machine is belt driven. Shaft bearings are bronze bushed and all parts inside the speed box run in a bath of oil. The table is stopped in any position by throwing the power off by foot brake when the machine is belt driven, or by an electric brake of the solenoid type when motor driven. Feeds for saddles and rams are independent for each side of the machine, and safety friction clutches are provided to prevent breakage in case the saddle or bar become jammed. The rapid power traverse driving shafts receive power from the motor on the bridge, and the operating levers are at each end of the crossrail. They are independent for operating each side of the machine.

New Export Organization

The Associated Machinery Corporation, recently incorporated with capital stock of $50,000 by four manufacturers of contractors equipment, has opened an office at 50 Church Street, New York, in charge of Charles L. Langlotz. The company will act as an export selling agent to India, Burma and Ceylon for the Pawling & Harnischfeger Co., Milwaukee, Wis., electric traveling cranes, ditchers, excavators, etc.; the Chain Belt Co., Milwaukee, Wis., chain, water screens, concrete mixers, sprockets, elevators and conveyors; the Insley Mfg. Co., Indianapolis, Ind., clamps and excavators, and the Novo Engine Co., Lansing, Mich. The branch in India will be in charge of Lionel R. Vinall-Moon, who recently sailed for India to establish the first office of the company at Rangoon. Both Mr. Langlotz and Mr. Vinall-Moon were formerly associated with the Allied Machinery Co., New York, the former being in the New York office and the latter the representative in India.

Ford Motor Co.'s Furnace Breaks Its Record

Last month blast furnace A of the Ford Motor Co., Dearborn, Mich., broke its previous records for tonnage and coke consumed per ton of iron. Average tons per day, 509.8; coke per ton of iron, 1981 lb.; average silicon 2.85 per cent; average sulphur, 0.029.

The Central Pennsylvania Coal Producers' Association has addressed another letter to John Brophy, president of district No. 2, United Mine Workers of America, asking for a joint conference on or before Aug. 5, the purpose being to discuss the wage reduction question. Past invitations of the operators for a conference have been turned down by Brophy on the ground that the requests did not specify the reason for the meeting.

The Rolls-Royce Co. of America, East Springfield, Mass., plant closed July 29 for five weeks or until Sept. 6. A month ago the company employed 800, but at the time of closing the number had been cut in half. Early in July the plant was closed two weeks.

Tilley & Brown, metal heating engineers, Plainfield, N. J., have been awarded the contract for the new mold and core drying oven and fuel oil system in the plant of the Monel Metal Products Corporation, Bayonne, N. J.

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Steel Prices and Costs

Much light on the condition of the railroads has been shed by tables and charts showing the disposition of "the railroad dollar." The *Railway Age* of July 30 had a full-page colored chart on this, with another showing the total receipts and disbursements. An appraisal of the condition and prospects as to steel prices would be greatly aided by a similar presentation, but this is impossible because the figures are not reported. In the case of railroads the official reports furnish the necessary data.

Anyone at all familiar with the business of producing steel, however, can make some rough estimates that will be enlightening. The object, of course, is to gage present prices for steel and see upon what foundation they rest. THE IRON AGE composite price of finished steel products that comprise 88 per cent of the total output of the country in finished steel stands at 40 per cent above the average in the ten years ended June 30, 1914. The two largest parts of the iron and steel industry's dollar are wages and freight rates. If a 30-cent rate for common labor becomes standard, that will be 58 per cent above the 19-cent rate paid in 1914, but a still higher percentage above the average rate paid in the ten-year period on which the 40 per cent increase in steel prices is figured, for wages had been advancing more or less steadily from a 13-cent rate in 1898. As to freight rates, they are up from 75 to 100 per cent. General supplies for mills, furnaces, mines and coke works are up by large percentages. Coal at mine is up much more than 40 per cent. The Steel Corporation's taxes, outside of Federal taxes, increased about 125 per cent from 1913 to 1920, while its property account as shown on the balance sheet increased less than 10 per cent.

As to the part of the iron and steel industry's dollar that goes to "capital," the Steel Corporation's report for 1913, a year with earnings 17 per cent greater than the average in the ten-year period on which the steel price comparison is based, showed 28 cents out of each dollar received from the public as making up bond interest, sinking funds, depreciation and extraordinary replacements (some of which represented labor and freights ultimately), dividends and surplus.

While these references are not complete and precise they show increases in necessary expenditures so much greater than the increase in market prices that it is clear the steel industry is much worse off with the prices of to-day than it was during the ten years before the war. If the experience of those ten years is a criterion, steel prices to-day are considerably below a normal relation to the cost of production. That is a condition as to prices that was to be expected by reason of the lightness of demand and the strenuous character of the market competition. The point is that the condition has arrived. It is not something that is expected to be developed in future by further price declines.

Before the war steel prices went below the average and above the average. Already they are below the normal relation, and the only remaining question is how much farther below the normal they can go, until one of two things occurs, or both—an advance in prices or a decrease in costs, represented in wages, freights and other expenditures.

Sentiment and Business

As a nation we have been very prone to overwork certain words, a practice that represents loose habits of thinking or at least loose habits of speaking. The words "optimism," "sentiment" and lately "normalcy" have been used rather too much. Optimism is a trait of character, its antonym being pessimism. Given the same set of facts, the optimist views them one way, the pessimist the other way. Yet men use these words to indicate the character of facts, not the character of the man who views the facts.

Then as to "sentiment," the word is commonly used in the form that sentiment is better or sentiment is worse, the actual meaning being that men appraise business conditions as better or worse. It may be held that this diffusive way of speaking does no harm, because people understand what is meant. It does do harm, because unconsciously if not consciously men associate "sentiment" with what the word really means. One of the dictionary definitions of the word is "a judgment permeated or prompted by feeling." We do not

want that in business. When it is said that "sentiment is better" in business we want it to be that the calm and deliberate judgment of business men, not influenced by sentiment, is that the fundamental conditions of business have improved. If, for instance, the taking out of building permits has increased, the amount of debits to individual accounts at banks has grown, the freight ton-mileage of the railroads is heavier, and the volume of orders received by sellers is larger, it is much better to say that these conditions have improved than to remark lamely that men who have observed and analyzed these things are displaying "a better sentiment."

What American business needs is to study facts. It has been misled all too often by its feelings, and it has helped itself do this by overuse of such words as optimism and sentiment. Secretary Hoover recognized this at the outset in his work in the present cabinet, and purposes to give business all the concrete information that can be made available as to actual commercial movements and conditions. In this program there will be no statistics of the number of pessimists and optimists who were in business, on an average, during the ten years before the war, and the relative proportions month by month at the present time, and no graphs of the amount by which the judgment of business men is "permeated or prompted by feeling."

Another word often used harmfully is the word "waiting." We are told that there is a "waiting" market. Originally, perhaps, the word was introduced into market nomenclature to suggest, as to a dull market, that it was not permanently dull, that the condition was only temporary. If that was the motive, it was good; but with a careless habit of thought and expression we have fallen into the way of picking on the first thing that comes to mind, though preferably something that cannot occur soon, and then glibly saying that the market is waiting on that. Just now it is a reduction in freight rates. Nobody knows that men in general are waiting for that event and a canvass of individuals might fail to find a single man who was waiting to act in his own business until freight rates were reduced. Yet we say business is waiting on the rate reduction and thus close our minds to the possibility of an improvement in business before that time, which may be six months or more in the future.

A measure of the effect of the war and submarine destruction on the world's shipping industry is afforded by a comparison of British and American steel plate exports before and since the war. For 1912 and 1913 the two countries shipped out 11,450 tons and 22,550 tons of plates per month, respectively, the exports from the United States being about twice those from Great Britain. In 1919 and 1920, however, British exports rose to 18,250 tons per month while those from the United States were 70,300 tons per month. Even for the first quarter of 1921 the British exports were 24,700 tons and the American 76,200 tons per month; but both have declined drastically since. Never in the history of any country were the steel plate exports so heavy as in the last 27 months from American mills, at nearly 71,000 tons per month. Nor is it likely that this record will ever again be approached. Keen competition may be expected for the world's needs in plates and serious study must be given to finding an outlet for the increased American steel plate capacity.

The Outlook in British Steel

British steel manufacturers are staggered by the magnitude of the difficulties they now face. The coal strike has been settled, but iron and steel manufacturers cannot go ahead at the high prices they must pay for fuel. The boom of 1919 and its overhang in 1920 pushed the British steel market pounds per ton above what German, Belgian and French makers were willing to do. After the coal strike settlement British prices came off from £3 to £5 per ton, but they are still so far above those named on the Continent as to put British works out of the running as to most of the current export trade. In a recent statement issued jointly by the National Federation of Iron and Steel Manufacturers on behalf of employers and the Iron and Steel Trades Confederation for the workmen, the opinion was expressed that "in view of foreign conditions the industry will not be able to export unless fuel as well as other items of cost are reduced to a level not higher than from 75 to 100 per cent above pre-war." The statement further says that the difficulties confronting the industry "are not of its own making nor within its control; they exist largely from political causes and appear to us to require Government attention."

The London *Ironmonger*, commenting on the concluding words in the above, expresses surprise that the steel industry, "which was among the first to demand the cessation of all Government interference, should now begin to talk of Government assistance." It adds:

> There have been times of great depression in the trade before now, and the industry has always pulled through by the exercise of courage and self-reliance. It may be, however, that the present depression came at a time when the makers were less prepared to meet it than on any previous occasion. There have been changes in the administrative staffs of many works during the six years of war, and the periods of control and afterward of booming prices which followed did not provide the best experience for dealing with the depression when it came. The works that best organize themselves to meet conditions surpassing the keenest pre-war competition will be the most successful in the future; and although at the moment the cost of fuel is the main factor, enterprise and enlightened guidance are bound to make their effect felt in the end.

There is no question that high fuel and labor costs will continue for a long time to be a serious handicap to British steel manufacturers in the export trade. Production of British steel will not resume on any scale until the price of coal comes down 50 per cent or more and it will be many a day before such a drastic readjustment can take place, with the control of coal production and prices so largely in the hands of the labor unions.

It seems likely, moreover, that Continental steel will be increasingly a factor in the British market. There is scarcely a quotable market, in fact, in British material, the business done being in the smallest quantities and from accumulated stock. The nearest approach to the real steel market in Great Britain to-day would be the quotation of prices now being paid there for Continental iron and steel.

It is true, as the editorial quoted above reminds the counsellors of despair, that the British steel industry has always pulled through—just as the nation has been able to pull itself together when there seemed nothing ahead but disaster. Doubtless the way will be found at length out of the dangers that now loom up so threateningly; but it must be said that the pessimists have most of the facts on their side as the case stands to-day.

German Steel Exports

While Germany's production of pig iron and steel is not yet made public, figures as to the foreign trade in iron and steel are available, though rather old. *Stahl und Eisen* for June 30, 1921, gives details of exports and imports for the first eleven months of 1920, which indicate unmistakable recovery as far back as eight months ago. A comparison of last year's exports and imports with the pre-war movements is made in the following table:

	Exports Tons Per Month	*Imports Tons Per Month*
1912	456,600	23,700
1913	479,800	25,400
1920 (11 months)	142,600	32,500

German steel exports at the end of last year were at more than one-third the pre-war rate, the average for September, October and November having been 176,111 tons, or about 36.7 per cent of the 1913 figures. Of last year's exports about 40 per cent, or 57,351 tons per month, were steel bars, plates, sheets and structural steel.

Germany lost by the war nearly 40 per cent of her steelmaking capacity. In view of that loss and of the country's handicap in raw materials, the record in exports last year is not only surprising but points to very considerable exploits in the countries to the east, particularly Russia, when those outlets are opened, as they are bound to be in the next few years.

Larger Use of Alloy Steel Castings

The character of the steel casting output of the country is changing. A comparison of the 1920 statistics with those for 1913 shows this quite clearly. While the total steel casting production last year in relation to the total steel output was practically the same as in 1913, or about 3 per cent, the ratio by processes was quite different. There was a marked decrease in the proportion of open-hearth castings and a sharp increase in the electric furnace product last year. In 1913 open-hearth steel castings were about 89 per cent of the total, but in 1920 the percentage declined to about 78. There was an increase of 5 per cent in Tropenas or side-blow converter castings last year over 1913; but the striking gain was in electric steel castings. In 1913 electric steel castings were less than 1 per cent (0.88 per cent) of the total, but in 1920 they were 12.4 per cent, last year's output exceeding even the record of any war year, which adds to its significance.

Even more noteworthy is the showing for alloy steel castings, the use of which has developed rapidly, particularly those made in electric furnaces. It is true that in 1912 and 1913 the total of alloy castings exceeded any records before or since, but this was due mostly to the large number of locomotive engine frames made of vanadium cast steel, these being in great demand at that time. Electrically made alloy castings last year exceeded any war or pre-war record, having been 11,710 gross tons, as compared with 6057 tons in 1919 and only 926 tons in 1916 and practically none in 1913.

It is evident that in the development of the steel foundry industry, the electric process is to play a prominent part. Not only is this true of ordinary steel castings, but especially of alloy castings, which are more and more in demand as a substitute for alloy forgings. The many available alloy steels and the assurance of their almost perfect heat treatment, combined with decreased cost as compared with forgings, make this possible.

Copper vs. Steel for Boiler Tubes

While it has been the general practice in the United States for half a century to fit steel tubes in locomotive boilers, this does not appear to have been the case in Europe. Copper boiler tubes are said to have been coming into use to a large and increasing extent in England, Australia and South America, while brass tubes on the Continent of Europe are very largely used. Exigencies of the war cut down the use of copper, but efforts are now under way to force copper to the front as the material for this purpose.

In a pamphlet issued by the Brass and Copper Tube Association of Birmingham, England, the relative advantages of the two metals from the standpoint of the British manufacturer are set forth. These advantages appear to some extent clear cut, but in others require analysis. Thus it is stated that the average life of steel boiler tubes is from 80,000 to 120,000 miles, or roughly, four years. Copper tubes, on the other hand, are credited with a life of from 240,000 to 360,000 miles or some 12 years, while as much as 480,000 miles was said to have been obtained.

With a life stated to be three times that of steel tubes, the first cost of the copper tubes is put at only about twice that of the former; and it has been estimated that during a period of 12 years the cost of a ton of copper tubes, plus interest on the investment and minus the scrap value of old tubes, would figure out at £186. This contrasts with an estimate of £293 for steel.

In making the above calculation, the first set of steel tubes is figured at £70 6s. 4d., which with interest amounts to £79 at the time the second set is installed. The investment stands at £175 at the

date of installation of the third set. The net cost is found by adding interest to this item and deducting, each four years, a set of old tubes at £10 per ton, after allowing 25 per cent for loss of weight.

Similarly, the copper tubes figured at £138 per ton amount in 12 years at 5 per cent compound interest to £247. From this is deducted the scrap value of the old tubes at £72 per ton, after allowing 15 per cent for loss of weight.

Attention is called also to possible fuel economies through using the tube of greater heat conductivity than is inherent in steel, and to the savings both in expenses and in locomotive operating time from the less frequent renewing of tubes.

CORRESPONDENCE

Cold Worked Steel

To the Editor: The interesting article in THE IRON AGE of July 21 by C. E. Bregenzer, entitled "Production and Uses of Cold Drawn Steel," should have a few words of explanation and interpretation.

The title is incorrect because a great many of the parts which are listed are cold rolled and not cold drawn. A much more appropriate heading would have been "Production and Uses of Cold Worked Steel." Strip, from which many of the parts are made, such as washers, collars, go-cart trimming, alarm clock cases, brake bands, diaphragms, etc., cannot be cold worked by any other method than rolling. Axles, arbors, shafts, shafting, special shapes, etc., are drawn. Here again the qualifying statement should appear; all axles or shafting cannot be cold drawn.

In the process of drawing the flow of the metal at the surface is faster than it is in the center, resulting in a greater tension or hardness at the surface, which may be likened to a tightly drawn skin. When a keyway is made lengthwise to the bar there is a tendency for the steel to spread at the edges of the cut, increasing the diameter of the bar at that point and throwing it sometimes considerably out of round.

In relation to shapes, the author has stated that "any shape can be drawn for which a die can be made." This, however, is not really true, as there are many shapes which it is impossible to draw because of the sharpness of the angle or the length to which it is necessary to make the metal flow in order to fill out the die. There are limitations. It would have been much better to have stated that "there are few shapes which cannot be produced by cold drawing." That would more or less limit the statement.

It is to be hoped that the article will develop discussion among manufacturers who use steel in the construction of their product, because the interests of the industry, which, according to Mr. Bregenzer's figures, amounts to approximately 3 per cent of the total finished steel products, can be very materially advanced through a better understanding of the needs of manufacturers. Manufacturers should take the steel mills into their confidence and furnish full information regarding the part to be manufactured, its function and the conditions under which it operates, so that they may take advantage of the steel companies' greater knowledge of steel, gained through constant research and experiment. Most steel companies have a very complete laboratory, which is at the service of manufacturers.

The production figures which Mr. Bregenzer gives and the distribution by major industries are certainly interesting, and are the first really authentic information which has come to my notice. Personally, we appreciate very much the efforts put forth to give cold worked steel some little publicity and in this I am sure other makers of cold worked steel will concur.

C. E. MACCONNELL,
Advertising Manager,
Lancaster Steel Products Corporation.
Lancaster, Pa., Aug. 2.

Proposal to License Business Men

To the Editor: To "start something," in the slang phrase, implies the setting in motion of an extended train of thought or action. This was probably intended to be the effect of the article recently summarized by THE IRON AGE on page 86 of the issue of July 14, and justly qualified as notable. Reading the article without knowing its authorship, the suggestion put forth, that no man should be allowed to engage in important business without passing an examination and securing a license, might be supposed to be the product of some parlor radical who believes that government can take the place of individual initiative; as if "Book-taught Bilkins" could ever be able to show the experienced mechanic how to do his work well. The writer of the article is, however, Alvan T. Simonds, the successful president of the Simonds Mfg. Co., widely known as one of the strongest American manufacturing concerns, maker of saws, knives, files and steel. Evidently, Mr. Simonds put forth his interesting suggestion with the intention of "starting something." It will be of interest to take up the train of thought, and consider whether it would be possible to insure the business world against the consequence of failures of corporations or individuals through any system of examination and licensing of those about to engage in new enterprises.

What Licenses Are For

It is stated in the article that licenses are required to be obtained by men about to engage in the practice of law or medicine. Licenses are also required of steam engineers, automobile operators, and many others who engage in professions or trades which may have direct effect upon the welfare, health or morals of the public. However, the examinations or investigations required prior to the granting of such licenses are not intended to determine whether the applicant will be successful in his own affairs, but only whether he possesses sufficient knowledge to avoid conspicuous errors likely to lead to accidents or danger to himself or others.

A physician earning a scanty livelihood in a small town has passed the same State requirements as the immensely wealthy specialist in the large city. One steam engineer with a first class license earns $3 per day; another with the same grade of license may earn $5,000 per year. The licensed man is supposed to have sufficient knowledge so that he will not prescribe poison by mistake for a helpful drug, or pump cold water into an overheated boiler. But whether the licensee will become a highly valuable member of society, or make less than a bare living for himself and family, is something which no license can ever determine.

The examination required of the lawyer on entering practice is for an entirely different purpose. It is rather to insure his knowledge of ethics and general code of practice of the legal profession, than to guard against his ignorance of points of law. Something to the same end, of maintaining a somewhat definite moral code, is obtained by the membership of the stock exchanges, operating as they do as clubs or voluntary organizations, requiring certain practices of their members, and dismissing those whose methods depart too flagrantly from the accepted code of the organization.

Business Success and an Educational Test

In the proposition to license men about to engage in important business, it must be that Mr. Simonds has in mind something other than the mere certification that the candidate has a good knowledge of economic laws. Records of the great commercial agencies show that over a long period of years the average of business failures is considerably under 1 per cent, and in recent years, tends to one-half of 1 per cent. Surely Mr. Simonds does not intend to imply that 99 per cent

of business men have that thorough knowledge of fundamental economic laws which he suggests should be determined by examination and licenses, nor that the greater proportion of the 1 per cent of failure is due to ignorance of economics.

It is a fair conclusion that business success comes to a large majority of men who are by no means fitted by any test of education or knowledge of principles to obtain it. The fact, cited by Mr. Simonds, that 120,000 corporations in the United States in 1917 produced no profits, shows only that 1917 was an abnormal period, which indeed we all know; and the same is true of the month of February, 1921, in which, according to Mr. Simonds, there were 1641 commercial failures, representing an indebtedness of over sixty million dollars.

Few Know Economical Principles

It is not possible to conceive that any considerable proportion of these failures could have been avoided by an average knowledge of the principle of economics, and an average knowledge is all that could be insured by any form of examination. Since the close of the war in 1918 it was perfectly evident to the very few men who were willing to think in international terms and study world conditions, that a huge financial crisis was impending. However, a search of the printed records of the past three years shows only two names, Richard Martens and Frank A. Vanderlip, who were conspicuous for their bold telling of the truth about the economic situation. The vast majority of recognized successful leaders of trade and industry in the United States are, on the contrary, on record repeatedly up to within twelve months of this writing, as predicting unlimited prosperity, continuance of industrial activity, vast profits, and higher and higher prices for American commodities demanded by all the world; and this in spite of the fact that all of the nations engaged in the late world war were financially exhausted, and operating their governments at enormous deficits.

The Ship Captain Is a Typical Leader

The secret of success in business is not in education, nor in experience, nor in any set of qualities or attainments which can be definitely analyzed and set apart. Mr. Simonds' illustration of the ship captain, entrusted with the welfare of ship, passengers and crew, gives a clew to the secret of success in leadership. Evidently the captain's success is not due to education alone; the mates have as good a knowledge of navigation as the captain, and often indeed the captain is less experienced than they. The ship captain's supremacy is due to his ability to control men, and to think and act quickly and correctly, whatever the crisis. No mere examination can determine whether a man who has studied navigation and sailed the seas for years has in him the necessary qualities for a successful captain.

All life activity is the result of individual initiative. The successful man is he who is able to create an idea, give it shape and form, and carry it out to a useful result. The qualities of success are often found in men totally ignorant of economic laws; yesterday keeping a small news stand, to-day operating a large organization; yesterday carrying a hod, to-day building and owning a block of houses.

Business Laws Like Rules of a Game

The laws which we have made to govern the operations of business are like the rules of a game. Rules of play are not to make the players successful, but to provide a standard of practice by which the game shall proceed to the greatest satisfaction to the players. From time to time we find that the public comfort can be promoted by changes in practices, and laws are passed to insure their adoption. In this way we have gradually forbidden the employment of children, and the continuance of unhealthful conditions of work. We have spread the cost of accidents over industries as a whole, through systems of labor insurance. We have done away with the practice of lower prices for wholesale transactions in the case of transportation lines, without disturbing it in other fields of business. But all these laws are only rules in the business game, intended to provide equality between those more willing to observe the public interests and those interested only in furthering their own ends.

Business failures will always occur, no matter how well informed the leaders of industries may be. World-wide depressions, crop failures, and stock panics are no less "acts of God" than are floods and fires. The widest knowledge and the greatest foresight will not enable a man to succeed under every condition. The man who has a fundamental knowledge of economic laws has the advantage over him who has not, just as the man who knows the details of the technical side of his industry has the advantage of him who has no such knowledge.

It may be that at some time in the distant future, it will be possible to analyze and classify the subtle qualities which promote success in business and to teach these in our schools. At the present time, however, the civilized world appears thoroughly convinced that governmental interference with a man's right to practice his business in the best way he knows how is the most unfortunate experiment a nation can make.

STERLING H. BUNNELL,
Bunnell, Macy & Henriques,
Consulting Engineers.
New York.

Census Report on Wire Manufactures

WASHINGTON, Aug. 9.—The United States census report shows the value of the output of iron and steel wire manufactures in 1919 was $264,778,000, an increase of 128 per cent compared with that of 1914. The output of copper wire and wire manufactures in 1919 was $114,234,200, an increase of 166 per cent over 1914 and the output of brass wire was valued at $16,024,500, an increase of 152 per cent.

Total production of iron and steel wire in 1919 was 2,508,890 short tons, an increase of but 3 per cent over 1914. Of this 592,430 tons were for sale as plain wire. The production of coated wire for sale as such in 1919, chiefly galvanized wire, was 392,925 tons as compared with 374,480 tons in 1914. Production of wire nails and spikes amounted to 12,429,200 kegs, a quantity decrease of 3.5 per cent as compared with 1914. Production of barbed wire totaled 341,130 tons, 75 per cent less than the output in 1914. Wire rope, cable and strand, showed an increase from 52,740 tons in 1914 to 103,010 in 1919. The output of woven wire fence and poultry netting, aggregating 312,150 tons, was 24 per cent less than the output in 1914, but the higher unit prices in 1919 resulted in materially greater values for all classes of products, the values of the respective years being $419,795,800 and $30,527,000.

Total production of bare copper wire in 1919 was 193,370 tons, of which 161,660 tons were sold as such, at a value of $68,011,300. The production for sale in 1914 was 84,920 tons, valued at $26,206,000. The total production of insulated wire and cable in 1919 was valued at $129,623,100, but of this the major portion was reported by insulating establishments that purchased the wire.

The output of wire drawing mills in insulated wire and cable was valued at $45,406,200, comprising 29,470 tons of paper insulated cable. The output of these products by the wire drawing mills in 1914 was 48,390 tons, valued at $15,709,300. The output of brass wire as reported in 1919 was 50,521,000 lb., valued at $16,024,500, a quantity increase of 28 per cent. Wire of other metals represented a production of 14,596,000 lb., valued at $6,339,700, a quantity increase of 111 per cent. Included under "other metals" are copper-clad steel wire, monel metal, nickel silver and other nickel alloys, zinc, etc.

An engineering assembly is planned to be held in conjunction with the annual meeting of the American Engineering Council of the Federated American Engineering Societies. It is expected that the assembly will be spread over three days, starting between the middle and the latter part of January. The subject is to be discussed at the meeting of the American Engineering Council in Washington, Sept. 30.

AUSTRIAN MARKET DEPRESSED

German Competition Less Active—French Sellers Sound Market—Increase in Magnesite Exports

(*Special Correspondence*)

VIENNA, AUSTRIA, July 23.—Although German competition has displayed less activity in the Austrian market of late, the general situation shows little improvement. Interested circles ascribe the present inactivity of German exporters to the price recovery in Germany. Generally, offers by German works are 50 to 100 m. per ton higher than domestic quotations with terms of delivery averaging 6 to 8 weeks. There can be little doubt, however, that the slackening of German competition is but temporary and largely due to the fact that the Rhenish-Westphalian industry is being awarded most of the business which normally would go to Upper Silesia. With indications of an early solution of the Upper Silesian problem, renewed importations of German iron are anticipated.

France Threatens To Be Formidable Competitor

Herr Rothballer, Director-General of the Alpine Montan Gesellschaft, stated at the government inquiry on customs duties that the country threatening to become the most formidable iron and steel competitor to Austria was France rather than Germany. France, he declared, bids fair to become the leading iron producing country in Europe with her augmented wealth in coal and iron. The steadily proceeding price cuts in the French iron market have made domestic producers feel apprehensive and repeated attempts of French works and merchants to sound the Austrian market have lately been reported. Much will, of course, depend upon the further development of the tariff.

Market Conditions Erratic

No price reductions have appeared as yet, and works have shown no inclination to make concessions. The Alpine Montan Gesellschaft, widely connected with the manufacturing industry, has been able to dispose of its output, which is now about 50 per cent of normal, but the smaller works are finding it increasingly difficult to hold their own. In the case of bar iron for instance, they are unable to quote the price named by the Alpine works of 2900 kronen per 100 kg., as their production costs are by several hundred kronen per ton higher. Pig iron is quoted at about 2000 kr. per 100 kg., while 2300 kr. are quoted for ingots, and 2550 kr. for muck bars. Few of the foundries are working to capacity, especially the malleable iron foundries, which are operating at about 35 per cent of capacity. Nevertheless, several plants, idle for some time because of the coal shortage, have resumed operations on a limited scale. Rather erratic conditions prevail at Vienna foundries, some plants operating to capacity while others curtail production. Since April, 1921, the following prices are in force for gray iron castings:

	Kr.
Ordinary castings:	
100 to 1000 kg.	4 800
Over 1000 kg.	4.500
Less intricate castings:	
2 to 100 kg	6.040
100 to 1000 kg.	5,200
Over 1000 kg.	4.900
Intricate castings:	
2 to 100 kg.	7,100
100 to 1000 kg.	6 100
Over 1000 kg.	5,800

Reports from Graz elaborate upon the difficult position of the Styrian iron industry through labor trouble.

Export Activity Halted

The period of activity in the export market has come to a halt, even the producers of special steel whose products have been much in demand abroad, have been forced to lay off men. It remains to be seen whether the renewed depreciation of the krone will have a stimulating effect. In manufacturing, stocks are accumulating as a result of the sluggish business and foundries, construction shops, etc., are beginning to feel the depression. Only the locomotive and rolling stock builders and manufacturers of electrical supplies report satisfactory conditions. Despite the lull, the situation is not critical and the slight revival of export business to Czecho-Slovakia, which has adopted a more liberal attitude toward Austrian imports, is generally regarded as a hopeful sign.

The principal export market for the first quarter of 1921 was Italy with 33 per cent, followed by Czecho-Slovakia with 22 per cent, Germany, Hungary, Switzerland, Jugo-Slavia and Poland. Of the total imports Germany led with 55 per cent.

Magnesite Exports Increase

There has been a notable development of the magnesite industry, several new mines, mostly in Styria, having been opened in 1920. It is noteworthy that while the United States headed the list of consumers of Austrian magnesite in pre-war years, Germany now leads. Germany is now taking larger quantities of roasted magnesite than before the war. Moreover, crude magnesite is now shipped abroad while practically none was exported before the war. The aggregate output in 1920 represented approximately 50 per cent of the 1913 production. Exports have been steadily increasing since and are given at 21,300 tons for the first quarter of 1921, compared with about 8300 tons for the corresponding quarter of 1913.

Canadian Iron Production Very Low

Pig iron and steel production in Canada showed a tendency to increase in the late spring, according to the monthly report of the Dominion Bureau of Statistics. The May production of pig iron and ferroalloys was 57,035 tons, compared with 39,693 in April, an advance of 43 per cent. Basic iron output was nearly trebled, being 44,002 tons compared with 15,971 in April. Steel ingots and castings production was 52,001 tons in May compared with 27,381 in April.

"'Dragging Bottom' is the title of an article which appeared in THE IRON AGE regarding May output of iron and steel in the United States," says the Dominion Bureau bulletin, "and the words seem to express the feelings generally held both in that country and in Canada that iron and steel production can decline no further. The increase in Canadian steel production indicates that conditions are rather more hopeful in this country and it is believed that the demand for steel products will be augmented and that the output both of iron and steel in Canada will continue to advance in the coming months."

Notwithstanding the optimistic view expressed by the Dominion Bureau of Statistics, Canadian iron and steel producers say that business for the past two months has been decidedly backward and since the May report was compiled all pig iron furnaces in Ontario have ceased the production of foundry iron, although the Algoma Steel Corporation, Sault Ste. Marie, and the Steel Co. of Canada, Hamilton, are making basic iron for their own consumption as is the Dominion Steel Corporation, Sydney, N. S.

The Iron Age and Its Readers

In addition to the steady flow of basic statistics of the iron and steel industry of the United States, presented week by week to the readers of THE IRON AGE, an occasional compilation of special interest to some large group of readers is published. An example is the list of electric steel furnaces of all types which has now become a feature of our Annual Review Number.

Last week another compilation was given, this covering the by-product coke ovens of the United States. This rapidly growing industry, with its saving of the valuable hydrocarbons formerly wasted, has now reached an output exceeding 30,000,000 tons of coke in one year. The table on page 264 (July 28) gives the location of the 12.245 by-product ovens built, together with information as to the type and capacity, as well as ownership.

Iron and Steel Markets

PIG IRON BUYING

Larger Business Brings Out New Low Prices

In Finished Material There Is a General Maintenance of Recent Levels

The moderate improvement of the past two weeks in replenishment demand for steel continues, but few successors have appeared to the larger sized orders which lately brought out such keen competition in the Central Western and Chicago districts. Any new price concessions have been in pig iron rather than in finished material.

It is recognized that large business would develop special prices, but on the general run of small orders competitive deviations of more than $1 to $2 from the schedule recently made public by the Steel Corporation are not common.

The rate of steel works operation is substantially unchanged and the same alternation of activity and shutdowns that has obtained at many plants for several months is expected to continue into the fall.

Steel, like pig iron, fell off 20 per cent in July from the output in June. The ingot statistics published this week show 803,376 tons produced by 30 companies last month, indicating 950,000 tons for the whole industry, against 1,190,000 tons in June. The July rate represents about 11,500,000 tons per year, as against a rate of 30,000,000 tons per year in January and an actual output of 40,881,000 tons in 1920.

On larger buying than in many weeks, pig iron in eastern Pennsylvania shows a fresh decline of $1 to $2 per ton. The largest lot was 5000 tons of basic bought by an Eastern steel company at $19 at furnace. Foundry iron also went to a new low level for the year, considerable sales being made at $18.50, eastern Pennsylvania furnace, for No. 2 plain and $19 for No. 2X. Lower quotations are reported also from the Buffalo district, No. 2 iron being offered considerably under $19.

On the other hand, the Chicago district shows a firmer pig iron market after the blowing out of two merchant furnaces. Sellers who have been making concessions there have now taken a stand for $20 at furnace. At Pittsburgh, due to the drastic curtailment of pig iron production, little iron is available, two sellers having withdrawn from the market this week.

The Lackawanna Steel Co., which in good times has been a buyer of pig iron, is now formally in the market as a seller, considerable bookings being reported for the past week.

An example of the wider variations in current prices on desirable business is the placing of 400,000 tie plates, or about 2000 tons, by the Burlington at $40 per net ton Chicago, the next bid being $5 per ton higher.

Cabled information respecting the Bombay water supply pipe line letting indicates that the low bid at $5,300,000, made by a British fabricator and including the laying, is less than one-half the amount of the American bid; but more than that the figures would seem to require the fabrication of the 80,000 net tons of riveted plate work at a delivered price quite a little under 2c. per lb.

Far Eastern railroad business continues to come to the United States, but with more or less complication as to shipping and financing. The General American Car Co. has an order for 700 steel box cars from a Chinese road. The same company is credited with the 14,200-ton rail contract placed by the Pekin & Suiyuan railroad after long negotiation, and is reported to have sublet it to the United States Steel Products Co. Japan has been a buyer of rails also, one order just placed in New York being for 2000 tons.

While German quotations are being made more frequently through the Stinnes office in New York, little or no German steel is coming into this market. Some cotton tie business is pending. Sixty-day deliveries on wire products are offered.

German and other European bids on steel for Japan are well below American prices. French sheet bars have been offered at $34.70 delivered in Japan, or $11 to $12 under anything domestic mills would do.

Pittsburgh

PITTSBURGH, Aug. 9.

Sentiment in the iron and steel trade here is somewhat mixed this week and the idea that the industry has rounded the corner from the depression of the past several months is not quite as uniformly held as was the case a week ago. Since price cutting has not entirely ceased, some of the trade take the position that it is decidedly premature to talk about having turned the corner and say that this condition hardly will be attained until prices have struck a point where there are no further concessions. Actual developments of the week, however, have been favorable rather than otherwise. It is noted, for instance, that in sheets the shading from what are regarded as regular quotations is a matter of cents rather than dollars, and that in the major products, there is better observance of 1.75c., Pittsburgh, for bars, and 1.85c., Pittsburgh, for plates and shapes, than has hitherto been the case. These products sold collectively are commonly quoted at 1.75c., and in some instances are said to have been priced as low as 1.70c. But sold individually the regular prices are the rule. Business in sheets shows definite improvement and orders going on the books of makers generally are more numerous than they have been. Wire products are an exception, as are also nuts, bolts and rivets.

The trade is encouraged by signs of a better demand from the railroads, which is manifested in a rather large inquiry for spikes and tie plates from the New York Central Railroad, and the promise of early

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 9, 1921	Aug. 2, 1921	July 12, 1921	Aug. 10, 1920
No. 2X, Philadelphia‡....	*$19.84*	$21.35	$25.50	$50.90
No. 2, Valley furnace†....	19.50	19.50	20.50	46.00
No. 2 Southern, Cin'ti†...	23.50	23.50	24.50	45.60
No. 2, Birmingham, Ala.†.	19 00	19.00	20.00	42.00
No. 2, foundry, Chicago*..	*18.25*	18 50	19.00	46.00
Basic, del'd, eastern Pa...	*20.26*	21 25	23.50	44.40
Basic, Valley furnace.....	18.00	18.00	19.50	48.50
Bessemer, Pittsburgh.....	21.96	21.96	22.96	48.40
Malleable, Chicago*	18.50	18.50	19.00	46.50
Malleable, Valley	20.00	20.00	21.00	46.00
Gray forge, Pittsburgh...	21.46	21.46	21.46	44.40
L. S. charcoal, Chicago...	*35.50*	35.00	36.00	57.50
Ferromanganese, del'd....	70.00	70.00	70.00	200.00
Rails, Billets, etc., Per Gross Ton.				
Bess. rails, heavy, at mill.	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill.	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh...	30.00	30.00	33.00	60.00
O.-h. billets, Pittsburgh ..	30.00	30.00	33.00	60.00
O.-h. sheet bars, P'gh.....	32.00	32 00	35.00	70.00
Forging billets, base, P'gh.	35.00	35.00	38.00	85.00
O.-h. billets, Phila.....	35.74	35.74	38.74	69.10
Wire rods, Pittsburgh....	42.00	42.00	43.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb...	*1.75*	1.85	2.00	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia...	*2.05*	2.10	2.15	4.75
Iron bars, Chicago.....	1.75	1.75	2.00	3.75
Steel bars, Pittsburgh....	1.75	1.75	1.90	3.25
Steel bars, New York.....	2.13	2.13	2.28	4.02
Tank plates Pittsburgh...	1.80	1.80	1.90	3.25
Tank plates, New York...	2.18	2 18	2 28	3.52
Beams, etc., Pittsburgh...	1.85	1.85	2.00	3.10
Beams, etc., New York...	2.23	2.23	2.38	3.27
Steel hoops, Pittsburgh....	*2.25*	2.40	2 50	5.50

Sheets, Nails and Wire,	Aug. 9, 1921	Aug. 2, 1921	July 12, 1921	Aug. 10, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.50	7.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.50	9.00
Sheets, blue an'l'd, 9 & 10.	2.40	2.40	2.65	6.00
Wire nails, Pittsburgh....	2.75	2.75	2.75	4.25
Plain wire, P'gh.....	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh..	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.75	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$12.50	$12.50	$13.25	$38.00
Carwheels, Philadelphia...	16.00	16.00	16.00	40.00
Heavy steel scrap, P'gh..	**12.50**	12.00	12.00	27.50
Heavy steel scrap, Phila..	**11.50**	11.00	11.00	23.50
Heavy steel scrap, Ch'go..	**10.25**	10.00	10.00	24.50
No. 1 cast, Pittsburgh....	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia..	17.00	17.00	16.00	38.00
No. 1 cast, Ch'go (net ton)	11.50	11.50	12.50	36.00
No. 1 RR. wrot, Phila....	14.00	14.00	13.50	33 00
No. 1 RR. wrot, Ch'go (net)	**9.75**	9.25	9.25	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt.....	$2.75	$2.75	$2.75	$18.00
Foundry coke, prompt....	3.75	3.75	4.00	19.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York...	12.00	12.00	12.75	19.00
Electrolytic copper, N. Y..	11.75	11.75	12.62½	19.00
Zinc, St. Louis	4.20	4.20	4 30	7.80
Zinc, New York	4.70	4.70	4.80	8.15
Lead, St. Louis	4.20	4.20	4.35	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	**27.75**	26.50	28.50	48.00
Antimony (Asiatic), N. Y.	4.60	4.60	4.75	7.25

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 9, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Aug. 2, 1921,	2.364c.
July 12, 1921,	2.493c.
Aug. 10, 1920,	3.974c.
10-year pre-war average,	1.684c.

releases against orders for standard rails from railroads tributary to Pittsburgh. There is very little activity in structural material, but steel fabricators are looking forward hopefully to the letting of a bridge across the Allegheny River at Sixteenth Street, which will take 5000 tons, and bids for which will be opened Aug. 29, and for an addition to the department store of Joseph Horn Co., involving about 3500 tons.

The pig iron market is showing a stronger undertone in all grades, but especially in foundry and Bessemer, production of which has been extremely light so far this year; consumptive requirements though small have been so persistent as to have resulted in a practical exhaustion of supplies. Furnaces supplying this market have almost no iron of the latter grades left and the appearance of sizeable orders might well send up prices.

We note no material change in steel plant operations in this and nearby districts as compared with a week ago, but some of the idle capacity recently started up is likely to go down again unless there is more business shortly.

Pig Iron.—The interesting feature of the situation this week is not in sales or prices but rather in the sold up condition of the merchant producers of foundry and Bessemer grades. Of the four furnace interests which have had foundry iron for sale, two have definitely withdrawn from the market in the past week, and the others have only a very limited tonnage available for the market. Since it is highly improbable that any of the idle merchant furnaces will be relighted on the present basis of costs and selling prices, the indications point to some stiffening of the market before long. One maker, who has some iron, will not consider less than $20 for No. 2 grade. Available stocks in Cleveland are said to be fairly heavy, but to bring iron here from that district would mean a heavy freight charge and naturally would enhance the value of iron produced in the Valley or in western Pennsylvania at least to the extent of the difference in the freight rate. Some of the steel companies undoubtedly could make foundry iron, but there is considerable question that they will do so. A demand of any considerable size for Bessemer iron also would strengthen prices, because so little of this grade is available. There seems to be no shortage of basic iron, but because of high producing costs there is a disposition to ask a little more money than was acceptable recently. Two inquiries involving about 1000 tons of basic iron are before the market. The prospective buyers expect to place the business at less than $19.96, delivered, which would be the price on Valley iron at $18, furnace. The Standard Sanitary Mfg. Co. is reported to have bought a tonnage of foundry grade for its Louisville, Ky., plant, the tonnage being distributed between Alabama and southern Ohio furnaces. The A. M. Byers Co. has under consideration the relighting of its furnace at Girard, Ohio.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00
Bessemer	20.00
Gray forge	18.50
No. 2 foundry	19.50
No. 3 foundry	19.00
Malleab'e	20.00

Ferroalloys.—There has been no increase in business and the desire for orders keeps prices on the down grade. We note one sale of 100 tons of 78 to 82 per cent domestic ferromanganese to a West Virginia steel maker at $70 delivered. English ferromanganese now is being offered at $65 Atlantic seaboard, for spot delivery, equivalent to $70.32 delivery, Pittsburgh. The sale of a carload of 50 per cent ferrosilicon to a Valley steel company is noted at $60, furnace, freight al-

lowed. Makers of spiegeleisen have revised their asking prices, quoting average 20 per cent material at $27 furnace and 16 to 19 per cent manganese content at $25. Sales of the latter material are very few in this district and little inquiry is noted. Recent reductions in prices of Bessemer ferrosilicon and silveries have not stimulated the demand.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent $68; 76 to 80 per cent British ferromanganese $65, c.l.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $27 furnace; 16 to 19 per cent $25; 50 per cent ferrosilicon, domestic, $60, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent $36.50; 11 per cent $39.80; 12 per cent $43.10; 13 per cent $47.10; 14 per cent $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—No important inquiries in these forms of semi-finished steel are before makers in this district, because demands for finished products, to a large extent, are being met from existing stocks and non-integrated manufacturers, owing to the instability of prices in finished lines, seem to believe they will be able to buy billets, slabs and sheet bars at less than to-day's prices. Quotations are nominal and untested.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $32; slabs $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Prices are not at all well defined, because business is so limited. Makers here continue to quote $42, Pittsburgh, for No. 5 common soft rods, but it is believed they would consider at least $2 per ton less on orders which would provide a mill schedule. On export inquiries considerably less than domestic base has been quoted. Prices are given on page 370.

Structural Material.—Reports by fabricating interests here vary somewhat. Some still report inquiry to be lifeless while others note a definite increase. Awards still are of small tonnages. The McClintic-Marshall Co. has taken a bridge across the Wyandotte River at Mann, W. Va., and a building for the Detroit Motor Co. at Washington, Pa., each project requiring 100 tons, and a building for the Acme Chair Co., Reading, Mich., for which about 75 tons will be needed. There is considerable irregularity in plain material prices, but fabricating interests who have tested the market have not found producers in this district willing to go much below 1.85c. on plates and shapes. Prices are given on page 370.

Plates.—An inquiry involving more than 6000 tons is reported, but other details are withheld. Generally the demand is for small lots and not much mill capacity is engaged here. Railroads tributary to Pittsburgh are not doing much car repair work and the companies in this district which would benefit most by such orders are running at a very low rate. On the small inquiries coming out here there is not much disposition to quote less than 1.85c., but this price is being shaded on sizable inquiries.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Steel Skelp.—Prices still are on the down grade because of light demands and the desire of makers for business. As low as 1.75c., Pittsburgh, recently has been quoted and the highest asking price of any of the producers now is 1.90c.

Iron and Steel Bars.—Although there have been quotations of well below 1.75c. on steel bars when quoted in conjunction with plates and shapes, there is no important deviation from this price against individual inquiries for bars. Demand in this district is entirely for small lots for prompt shipment. The market also is dull on reinforcing bars and shows no life in iron bars.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets, 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. to 2.40c. in carloads, f.o.b. mill, Pittsburgh.

Sheets.—Sentimentally, at least, this market is better, although price cutting still is noted. Shipments by the leading interest last week were the best of any week this year, and it also has received, in the past few days, quite a number of releases against suspended orders. Independent companies also seem to be faring better in the matter of orders and shipping instructions, and while general business still leaves much to be desired, the belief gains ground that this branch of the industry is rounding the corner from the extreme dullness of the recent past. Some makers are quoting black sheets at 3.25c. base, galvanized at 4.25c. base, and blue annealed at 2.50c. base. These prices, however, find little or no basis in sales, the more common quotations being 3c., 4c. and 2.40c., respectively. Even the latter prices are being shaded but there is some encouragement in the fact that the concessions are a matter of only 50c. to $1 per ton as against $5 a ton, or more, from regular quotations a short while ago. Prices are given on page 370.

Tin Plate.—The market continues a very limited affair, especially in regard to tin plate for perishable food containers, which, with oil containers, ordinarily account for more than 60 per cent of the country's total production. Orders for production plate readily are placed at $5.25 per base box, Pittsburgh, and it is probable that a really desirable order could be placed for less. Stock tin plate is available at $4.75 per base box, and in view of the fact that current production is in excess of orders and specifications, there is a suspicion that the material moving as stock plate is being "sweetened" with standard stock.

Nuts, Bolts and Rivets.—The market still is dull, unsettled and weak. Conditions are so bad that most makers in this district are shutting down rather than pile up stock at current costs. Present prices show heavy losses, it is claimed, but makers are meeting competition, especially where regular customers are concerned. Prices and discounts are given on page 370.

Iron and Steel Pipe.—Demand for both steel and wrought iron pipe slowly but steadily is increasing, but orders in all cases represent actual needs, and as yet there is no disposition on the part of jobbers to build up stocks. Plant operations show no appreciable increase, although the A. M. Byers Co. this week started up 22 puddling furnaces and a muck bar mill at its Girard, Ohio, plant. Operations of steel pipe furnaces do not average 30 per cent of capacity and are not even that high with the leading interest. Prices on line pipe are not very closely observed, but in other directions the July 7 card is well adhered to, and reports, which have been current in the past week, that the National Tube Co. is about to announce a reduction in prices, are vigorously denied. Discounts are given on page 370.

Wire Products.—Recent improvement in business has not been maintained, all makers in this district reporting the past week as having been an extremely quiet one. Jobbers are moving a good many nails, but are extremely cautious in the matter of replacement, chiefly because of suggestions that present prices will not hold. Prices of nails, and for that matter wire products generally, are being better maintained than most of the steel products and the basis for talk of lower prices is not easily discerned. The only plausible reason advanced is that business is far short of what it should be at this time of the year, and competition for a share of the passing orders is rather keen.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Cold Finished Steel Bars.—Prices still show a wide variation on actual business. The so-called official quotation is 2.60c. base, Pittsburgh, and while some business is being done at this figure, it may be said to be non-competitive. Where buyers scatter their inquiries, concessions of $2 to $4 per ton are known to have developed.

Steel Rails.—Light rails rolled from new billets are no longer quotable at higher than 1.85c., Pittsburgh, because demand is light and competition for orders is sharp. Rerolled old sections have been quoted as low as $32 per net ton, mill, which if applied to a Pittsburgh base, would be equivalent to about 1.50c. This price, however, refers to the lighter sections and 40-lb. rails, for which the demand is best, are not being of-

fered at all freely by mills which reroll old standard rails. Specifications against orders for standard rails still are reported to be light.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c.; rolled from old rails, 1.60c. to 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Spikes.—Inquiries for track fastenings are more numerous and include a large one for spikes and tie plates from the New York Central Railroad as well as smaller ones for spikes from the Erie Railroad and the Norfolk & Western Railroad. Inquiries for spikes are looked upon as real ones in view of the fact that railroads tributary to this center are planning to release considerable tonnages of rails before the month is out. Standard spikes are quoted at $2.75, base, per 100 lb. by all makers. The leading interest still is quoting angle bars at $3.25, Pittsburgh, and is not shading this figure on the ground that to do so would not produce business, as the order for all of the bars required accompanied the rail orders placed early in the year. Prices are given on page 370.

Coke and Coal.—The market for furnace coke seems to have entirely disappeared. Such blast furnaces as are active that are supplied from the Connellsville district are covered by contract and the great bulk of current demands is for tonnages for other than blast furnace use. The more common asking price for standard 48-hr. coke is $3, but supplies still are available as low as $2.75. There is a good steady business in foundry coke, with prices ranging anywhere from $3.75 to $4.50, per net ton oven, most of the business being right around $4.25. The coal market shows considerable strength in the slack grade, which is scarce on account of the fact that due to the light movement to the Lakes little coal is being screened. Steam slack readily commands $1.75 per net ton at mines, and gas slack $1.85. Mine run grade of steam coal is quotable at $1.50 to $2, by-product $1.50 to $1.75, and gas coal $2.25 to $2.50.

Old Material.—The slightly firmer tone recently noticed in the market has crystallized into actual advances in several of the steel works grades. Increased open hearth furnace operations have resulted in some buying by the steel companies, and this has tended to emphasize the shortage of material available for quick shipment. The railroads lately have shown a tendency to hold scrap rather than let go of it at the prices offered, and dealers who have good-sized yard stocks are not inclined to draw from them at current quotations. Up to $13 now is being paid by both dealers and melters for heavy melting steel in this district, and a recent sale in the Youngstown district of 300 tons carried a price of $13.50. Compressed sheets are valued at least 50c. per ton higher than they were a week ago, and it is noted that bids of dealers of close to $15 per gross ton delivered, failed to secure any of the rerolling rails recently offered by the Pennsylvania Railroad, eastern region. The Baltimore & Ohio Railroad will open bids Aug. 15 for 22 cars and 13,670 gross tons of old material, also for 3000 lb. high speed steel and 15,000 lb. wire cable.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$12.50 to $13.00
No. 1 cast cupola size	15.50 to 16.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	14.50 to 15.00
Compressed sheet steel	9.50 to 10.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	8.00 to 8.50
Railroad knuckles and couplers	13.00 to 13.50
Railroad coil and leaf springs	13.00 to 13.50
Railroad grate bars	10.00 to 10.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	16.00 to 16.50
Railroad malleable	12.00 to 12.50
Iron car axles	18.00 to 19.00
Locomotive axles, steel	17.50 to 18.00
Steel car axles	14.00 to 14.50
Cast Iron Axles	13.50 to 14.00
Rolled steel wheels	13.00 to 13.50
Machine shop turnings	7.25 to 7.50
Sheet bar crop ends at origin	11.50 to 12.00
Heavy steel axle turnings	8.50 to 9.00
Short shoveling turnings	8.00 to 8.50
Heavy breakable cast	13.50 to 14.00
Stove plate	11.50 to 12.00
Cast iron borings	7.50 to 8.00
No. 1 railroad wrought	12.00 to 12.50

Hoops and Bands.—Makers quite generally are quoting 2.40c. base on both products but it is frankly admitted that very little business is being done at this figure, and on hoops there are reports that sales recently have been made by some makers at 2.25c. and even as low as 2.15c. Desire for business is strong in some quarters, but in others there is a feeling that a cutting of the so-called regular quotation is likely to discourage rather than encourage purchases.

Hot-rolled and Cold-rolled Strips.—The tendency of the demand is toward improvement, but this is accompanied by a good deal of eagerness on the part of some mills for orders and prices favor buyers. Cold-rolled strips hardly are quotable longer at more than 4c. base and while some mills are disinclined to go below 2.60c. base on hot-rolled strips, on the basis of current costs, others will not let business slip out of their hands at 2.40c. Reports that hoops have sold as low as 2.15c. base are not without effect upon the price ideas of buyers.

British Iron and Steel Market

Some Improvement in Tone—More Blast Furnaces and Tin Mills Now in Operation

(*By Cable*)

LONDON, ENGLAND, Aug. 9.

Seven Cleveland blast furnaces are now in operation, but no further blowing-in of furnaces is anticipated until cheaper fuel becomes obtainable. Cleveland stocks of foundry iron are low. Inferior grades are plentiful but unsalable. Pig iron prices are tending upward, though sales continue of Continental foundry iron at £5 ($18.30) c.i.f. Scotland and basic iron at £4 5s. ($15.56) delivered Tees. French pig iron is quoted at £4 ($14.64) to £4 10s. ($16.47) f.o.b.

There is some slight improvement in general steel business for export, but the volume of orders is insufficent to enable the works to start up again. Home trade buying is in abeyance, very few orders being secured by British works. Prices remain unaltered, but cuts are imminent, owing to keen Continental competition. French billets are quoted at £6 ($21.96) to £6 10s. ($23.79) f.o.b.; German merchant steel bars at £8 (1.31c. per lb.) to £8 2½s. (1.33c. per lb.) f.o.b. German merchant bars sold last week at £8 10s. (1.39c. per lb.) c.i.f. Madras and £7 15s. (1.27c. per lb.) f.o.b., with delivery in 8 to 12 weeks. German plates are now quoted at £8 2½s. (1.33c. per lb.) to £8 5s. (1.35c. per lb.) f.o.b. Belgium is out of the running, and most works are closed, because of scarcity of water, this factor being much more serious than last week.

Further Welsh tin plate mills are now operating, the percentage now being 25, and the usual August holiday week having been abandoned. Stock tin plates have been reduced 2s. ($0.37) basis f.o.b. A fair line of oil plates has been placed at 25½s. ($4.67) f.o.b. There is good demand for wasters, and light weight specifications are scarce.

Norsk Valswerke of Norway has completed the first rolling of Norwegian tin plates and has orders booked ahead for several months for Norwegian packers. It is estimated that the annual output of the works will be 10,000 tons.

India has bought fair lines of galvanized sheets under £22 (3.59c. per lb.) basis f.o.b., and some 24-gage corrugated at £21 15s. (3.55c. per lb.) f.o.b., but general inquiry is slack. Germany is quoting £18 15s. (3.06c. per lb.) c.i.f. for Japanese specifications of black sheets, an advance from the price of £18 5s. (2.98c. per lb.) c.i.f., at which Germany sold black sheets to Japan

(*Continued on page* 373)

Chicago

CHICAGO, Aug. 9.

Sentiment has improved, notably in the pig iron and scrap markets, and there is a tendency among sellers to take a firmer attitude in quoting prices. With the blowing out of a blast furnace at Maysville and another at the Iroquois plant, only one stack, an Inland Steel Co. furnace, is still producing merchant iron in this district. The latter company has advanced its prices to a minimum of $20, furnace, and has announced that it will blow out the furnace rather than accept further business at prices which are far below costs.

There are also some indications of firmness among sellers of finished steel, but not enough to stabilize prices. Current business is going at a variety of prices, depending on the severity of competition and the attractiveness of the order, and sellers themselves admit that there are no ruling quotations. Reports of the abandonment of the Pittsburgh basing point in quoting finished steel are no doubt accounted for by the fact that in some instances delivered prices have figured back to approximately 1.85c. for plates and shapes minus the freight charge from Pittsburgh to Chicago. These exceptionally low prices are not regarded as demonstrating the abandonment of the Pittsburgh basing point but rather as an indication of the extreme limits to which sellers have gone to secure desirable tonnage. After all, the buyer is interested only in the delivered price, and it is immaterial whether he figures it back to Pittsburgh or Chicago.

The wide range of prices at which business is being booked is indicated by the fact that an open letting of structural material by a railroad last week did not bring out a lower figure than 1.85c., Pittsburgh. On the other hand, some orders have been booked at less than 1.75c., Pittsburgh, which is the minimum quotation on plain material published under the structural material paragraph below. The same uncertainty as to prices applies to plates and mild steel bars and to a less extent to sheets. A number of mills are refusing to deviate from the so-called official prices announced a fortnight ago, and in view of losses incurred meeting the sharp competition now prevalent, it would not be surprising if other producers would follow their example. A letting of 400,000 tie plates by the Burlington Railroad last week brought out a quotation of $40 per net ton, Chicago, by a local mill, or $5 a ton under the previously ruling price. Cast iron pipe has been moving at low prices and some observers believe that with the placing of several hundred tons at $31.85, Birmingham, the bottom was reached. Domestic railroads continue to concentrate their attention on the repair of rolling stock. An order for 700 new steel box cars, however, has been received by the General American Car Co. from a Chinese road. This company has also booked 14,200 tons of rails for the Pekin & Suiyuan Railroad, which have been sublet to the United States Steel Products Co.

Mill operations are at about the same rate as heretofore, the Illinois Steel Co. being on a 30 per cent basis and the Inland Steel Co. on a 25 per cent basis.

Pig Iron.—The blowing out of the last two active furnaces represented by the leading merchant has left only one producing stack in this district, an Inland furnace. A coincident development was the announcement by the Inland Steel Co. that it would take no further business at less than $20, base, furnace. The leading merchant interest has also advanced its prices to that level. The sharp competition which has prevailed in this market for months has forced prices down step by step, until they have reached a point where every order was taken at a larger loss. Producers have decided that idleness is preferable to a continuation of this condition. The advance in prices has resulted in closing considerablee business which was pending. Two 1000-ton lots of foundry iron were sold in Cincinnati territory at $18.50, Chicago, while 1000 tons and 200 tons were closed in this district at $18 25, Chicago. The St. Paul Railroad and the Benton Harbor Malleable Foundry Co., which were both in the market for 1000 tons of malleable iron, have bought at least part of the tonnage asked for. While it is true that considerable business was brought to a head by the advance in prices, a genuine increase in orders and inquiries is to be noted. A railroad equipment manufacturer is in the market for 2000 tons of malleable and intimated that as much as 3500 tons may be bought. Orders for 200, 300 and 400 tons are more numerous. That foundry operations are slowly but steadily increasing in this district is indicated by the fact that shipments of coke to melters by the leading interest have doubled within the last ten days. Coke is a better gage of operation than pig iron, because stocks of the former in foundry yards are not large. While it is true that pig iron stocks of some melters are still ample for several months' operation, many foundries which believed their supplies sufficient to carry them through this year are now finding it necessary to enter the market. No sales have yet been reported at the new prices and for that reason they are not yet quoted below. That there are elements of strength in the pig iron market is not denied even by buyers. The leading merchant reports that sales of pig iron thus far this month are at twice the rate of bookings in July. Another seller took orders aggregating 4000 tons within the course of a few days. Stocks on furnace yards are not heavy. The leading seller has about a month's full production on hand, but half of this tonnage is covered by old commitments. Charcoal pig iron is now available at $30, furnace. One hundred tons of 7 per cent silvery has been bought at $30, delivered Milwaukee.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago		$33 50
Northern coke, No. 1, sil. 2.25 to 2.75	18.50 to	19.50
Northern coke foundry, No. 2, sil. 1.75 to 2.25	18.25 to	19 25
Northern high phos	18.50 to	19.00
Southern foundry, sil. 1.75 to 2.25		26.67
Malleable, not over 2.25 sil	18.50 to	19.00
Basic	18.50 to	19.00
Low phos., Valley furnace, sil. 1. to 2 per cent, copper free		30.00
Silvery, sil. 8 per cent		31.82

Ferroalloys.—From 600 to 1000 tons of ferromanganese has been bought within the past week, the principal purchasers being the Griffin Wheel Co. and the American Steel Foundries. The prices paid by these two companies were $71 and $68 respectively, freight allowed. A carload of 50 per cent ferrosilicon has been bought by an Indiana Harbor foundry at $62.50, delivered.

We quote 78 to 82 per cent ferromanganese, $68 to $71 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $35.07 delivered.

Railroad Equipment.—The Chicago Great Western has let repairs on 250 box cars to the Ryan Car Co. The steel involved is negligible. The Illinois Central is asking for figures on the repair of 1250 gondola cars. The St. Paul is repairing 1000 cars in its Milwaukee shops.

Plates.—The price situation is substantially the same as a week ago. Some mills continue to quote 1.85c., Pittsburgh, on tank plates and have booked small tonnages at that price. Other producers are meeting competition, frequently naming 1.75c., Pittsburgh, and sometimes even lower. Reports persist that the business is being taken at 1.85c., Chicago, thus eliminating the much assailed Pittsburgh base, but verification is lacking. While it is true that the market lacks stability, it cannot be said that it has grown weaker since a week ago. On the contrary, a number of makers are taking a firmer attitude in the belief that there is danger of prices being stampeded to levels which would prove ruinous. There is little tonnage in sight, but some mills note a slight increase in the number of small orders. Out of the car repair orders let by the New York Central to Western car builders 1500 steel open top cars to be renovated at Detroit and Madison, Ill., plants of the American Steel Car & Foundry Co. will involve considerable steel, as yet not accurately estimated, which will probably be furnished by a local mill. The box car repairs let to Western car builders

by the same road will call for little steel and in each case the railway will attempt to supply the material from its own stocks before purchases may be made on the open market.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Plain material in attractive tonnages is available at 1.75c., Pittsburgh, but some small lots continue to be booked at 1.85c. Structural business is diminishing in volume. Large projects which could not be gotten under roof before winter are not being undertaken, but small jobs are still numerous. Locally building has been held back by the failure of the arbitrator in the dispute between the contractors and unions to bring about an agreement. Pending a settlement, the old wages for the various crafts remain in effect. On Aug. 11 bids will be taken on the fabrication of 1700 tons for the commercial and technical high school, Omaha. This project will also involve 1000 tons of reinforcing bars. Recent fabricating awards include:

First Baptist Church and office building, Houston, Tex., 1100 tons, to Phoenix Bridge Co., Phoenixville, Pa.

Gallup-American Coal Co., Main tipple and miscellaneous steel for platforms, Gallup, N. M., 270 tops to Kansas City Structural Steel Co.

Illinois State Highway Department, bridges, 200 tons to Decatur Bridge Co.

Arcade Building, Laramie, Wyo., 142 tons to Dunbar Co., Salt Lake City.

Steel viaduct, Lawye Street, Appleton, Wis., Wausau Iron Works, Wausau, Wis., low bidder at $59,800.

Pending business includes:

Addition to Bamberger department store, Newark, N. J., 1300 tons, George A. Fuller Co., New York, general contractor; Jarvis Hunt, Chicago, architect.

Federal Reserve Bank, St. Louis, plans not completed.

The mill quotation is 1.70c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts, Nuts and Rivets.—A slow but gradual improvement in business is noted, but prices still lack firmness. The railroads are putting out some attractive inquiries for bolts, nuts and rivets, and, although it is obvious that they are buying only for immediate needs, their requirements are considerably larger than for several months previous. Jobbers continue to buy sparingly. While prices are irregular, the following discounts are rather commonly quoted and on railroad inquiries of size even better has been done:

Large structural rivets	$2.40
Large boiler rivets	2.50
Small rivets	70, 10 and 10 per cent off list
Large machine bolts	75 and 10 per cent off list
Small machine bolts	65 and 10 per cent off list
Small carriage bolts, rolled threads	70 and 5 per cent off list
Carriage bolts, cut threads, all sizes	65 and 10 per cent off list
Lag bolts	70 and 5 per cent off list
Hot pressed nuts, blank	$5.25 off list
Hot pressed nuts, tapped	$5.00 off list
Cold punched nuts, blank	$5.10 off list
Cold punched nuts, tapped	$4.75 off list
Stove bolts, in packages	80, 10 and 10 per cent off list
Stove bolts in bulk	80, 10, 10 and 2½ per cent off list

An interesting recent development is the fact that some makers are now quoting net prices instead of list as discount.

Bars.—The market on mild steel bars ranges from 1.65c. to 1.75c., Pittsburgh, and even lower quotations are occasionally reported. There continues to be a fair run of construction projects calling for reinforcing bars, the largest being on an Omaha high school, involving 1000 tons. There are some encouraging aspects to the bar iron situation, but bookings are not yet large enough to permit uninterrupted mill operation. It is notable, however, that orders, if not large, are more numerous. An Indiana mill booked more orders for bar iron in July than in any month in its history, but the aggregate tonnage was light. Railroads continue to buy cautiously, but individual orders from them are larger, not infrequently running up to 400 and 500 tons. Bar iron is commonly quoted at 1.75c., Chicago, but there has been some shading under that price. Demand for rail carbon steel bars is still sub-normal and mill operations are intermittent. Some business has been taken at 1.75c., mill, and the ruling market appears to lie between that price and 1.85c., mill.

Mill prices are: Mild steel bars, 1.65c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c. to 1.85c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—The price situation has not changed materially since a week ago. Demand is spasmodic, resulting in fluctuating mill operations. During the current week the local independent is running 14 out of 18 hot mills.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Cast-Iron Pipe.—Recent lettings have brought out low figures, but with the placing of an attractive tonnage at $31.85, Birmingham, many believe rock bottom has been reached, and some are of the opinion that prices are now firmer to the extent of $2 or $3. Manitowoc, Wis., bought a carload at $35, Birmingham, while Milwaukee let 275 tons to the National Cast Iron Pipe Co. at $34.50, Birmingham. Hammond, Ind., took bids yesterday on 3700 tons of 36-in., and Bay City, Mich., took bids on 3000 tons on the same date. The National Cast Iron Pipe Co. has taken the following business: 800 tons from Saginaw, Mich.; 200 tons from Minneapolis; 125 tons from St. Paul; and 100 tons from Detroit.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—Users and sellers are finding it difficult to meet on common ground. Some dealers are buying railroad material at advanced quotations and are holding their stocks in anticipation of a rise in the market. This speculative activity has pulled up the prices which consumers have paid within the past week, but some dealers refuse to sell at the quotations which users are willing to pay. Buying by users is light and the market appears to be passing entirely into the hands of the sellers. Railroad lists include: Baltimore & Ohio, 10,000 tons; Great Northern, 2500 tons; Pere Marquette, 2000 tons; Chicago & Eastern Illinois, 1000 tons; Pullman Co., 600 tons.

We quote delivery in consumers' yards, Chicago and vicinity, all freight and transfer charges paid, as follows:

	Per Gross Ton	
Iron rails	$15.00 to	$15.50
Relaying rails	27.50 to	30.00
Car wheels	12.50 to	13.00
Steel rails, rerolling	12.25 to	12.75
Steel rails, less than 3 ft.	11.50 to	12.00
Heavy melting steel	10.25 to	10.75
Frogs, switches and guards cut apart	10.00 to	10.50
Shoveling steel	9.75 to	10.25
Low phos. heavy melting steel	13.50 to	14.00
Drop forge flashings	6.00 to	6.50
Hydraulic compressed sheet	6.50 to	7.00
Axle turnings	7.50 to	8.00
	Per Net Ton	
Iron angles and splice bars	13.50 to	14.00
Steel angle bars	10.00 to	10.50
Iron arch bars and transoms	13.50 to	14.00
Iron car axles	17.50 to	18.00
Steel car axles	12.50 to	13.00
No. 1 busheling	8.50 to	9.00
No. 2 busheling	5.75 to	6.25
Cut forge	9.00 to	9.50
Pipes and flues	6.50 to	7.00
No. 1 railroad wrought	9.75 to	10.25
No. 2 railroad wrought	9.50 to	9.75
Steel knuckles and couplers	10.75 to	11.25
Coil springs	12.75 to	13.25
No. 1 machinery cast	12.00 to	12.50
Low phos. punchings	11.00 to	11.50
Locomotive tires, smooth	10.25 to	10.75
Machine shop turnings	3.00 to	3.50
Cast borings	4.50 to	5.00
Stove plate	11.00 to	11.50
Grate bars	10.00 to	10.50
Brake shoes	10.00 to	10.50
Railroad malleable	12.00 to	12.50
Agricultural malleable	12.00 to	12.50
Country mixed	8.00 to	8.50

Wire Products.—There is a good demand for wire nails from jobbers and inquiry for barb wire is picking up. Sales to jobbers by the leading interest are now about 80 per cent of normal for this time of the year. Purchases are still small but are increasing in number, indicating that jobbers are turning their stocks fast. The harvesting of crops in Nebraska and Iowa has had

a favorable effect on business from those sections. The railroads are buying nails, barb wire and fencing more freely and an inquiry for two carloads of nails has been received from a carbuilder. The Great Northern recently bought 700 kegs of nails. Prominent among current inquiries is one from a local jobber for 1800 kegs of nails. Prices are holding. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 370.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Rails and Track Supplies.—In a public letting the Chicago, Burlington & Quincy awarded 400,000 tie plates to a local mill at $40, per net ton, Chicago. This price was $5 under the next bid. Track spikes and bolts have declined, the former being available at 2.50c. to 2.75c., Pittsburgh, and the latter at 3.50c. to 3.75c., Pittsburgh.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills. Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Buffalo

BUFFALO, Aug. 9.

Pig Iron.—The Lackawanna Steel Co. has definitely entered the pig iron market as a seller, a campaign to sell surplus iron in progress for the last two months having brought about a decision to become an active factor. A considerable quantity of iron has been sold in the past week, but figures as to the tonnage booked are not available. The price is understood to have been $19 and $19.50 for the base grade, according to the size of the order. Generally feeling is better and improvement in inquiry is noticeable. A national user who is in the market every thirty days and consumes about 1000 tons in the same period is known to have bought about 700 tons here. One interest which reported a slow movement in July finds improvement both in inquiry and sales. Their orders last week were slightly under 1000 tons at $20.50 base. Inquiry is for 5000 tons, a decided increase. A furnace now making basic iron for its own use in another department plans a month's run and conditions at the end of the period will determine the future. The policy of one furnace not to take orders for greater than 60 days' delivery has been of necessity abandoned and business is now accepted only for 30 days' delivery.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—The consensus of opinion with the majority of interests, based on a more diversified inquiry and some slight increase in orders, is that the market is firmer and more stabilized. While no one is ready to say business is good, the general expression is that improvement is real and tangible. Pipe products show a better movement than plates or shapes, and orders in galvanized sheets show improvement. Orders are mostly for carload lots except in plumbing and steamfitting pipe. Generally the buyers are well satisfied with present prices, and there is only remote expectation that further reductions will come. The lowest price on bars is 1.75c., Pittsburgh. Some desirable inquiries in black sheets for 100 tons and greater quantities engage one office and the general prospect of sheet business is better. Bolts and nuts are quiet. An order for reinforcing bars for the Detroit-Belle Isle bridge has been placed with a local maker and the price is said to be 1.75c. Not all the tonnage has been awarded on this job; less than 1000 tons is involved in that portion placed with the Buffalo mill. The same interest has taken an order for 2500 tons of rails for export. Labor troubles still exist as factors in holding up structural jobs, which include desirable tonnages both of bars and shapes. An order for 800 tons of billets has been booked by one interest. One sheet maker is now operating on a 50 per cent basis. Reinforcing bars for two Rochester schools have been placed here.

Warehouse Business.—Sheet prices have been reduced again and a consequent better movement is noticed, particularly in galvanized products. Inquiry has picked up in a very appreciable way and more orders have been filed by one warehouse interest in a week than before this year. The improvement in tonnage per order is small, but the number of orders is greater. Prices now being quoted are generally admitted to be satisfactory and the tendency to buy is more marked than at any time since the depression set in.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.45c.; galvanized steel sheets, No. 28 gage, 5.30c.; black sheets, No. 28 gage, 4.30c.; cold rolled strip steel, 6.40c.

Old Material.—To indicate the lifeless condition of this market one dealer, in normal times perhaps the busiest, has not bought or sold a ton of material. The slight blast furnace and open hearth operation which developed Aug. 1 has not helped the market. The mill interests which have improved their operating schedule find themselves with old contracts unfulfilled, and whatever little material is being shipped applies on these old orders. Governmental decision withdrawing some of the steel offered at Hog Island and other places was a disappointment to one dealer who bid on the various lots.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	15.00 to 16.00
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	5.00 to 6.00
Cast iron borings	5.00 to 6.00
Heavy axle turnings	8.00 to 9.00
Grate bars	9.00 to 10.00
No. 1 busheling	9.00 to 10.00
Stove plate	12.00 to 13.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

New York

NEW YORK, Aug. 9.

Pig Iron.—Strenuous competition has again forced prices lower. About 8000 tons of iron has been inquired for in this district in the past week and about half that amount has been sold. A sale of eastern Pennsylvania iron, both 2 plain and 2X, is reported as having been made at $18.75, furnace, no price distinction being made in the two grades. Another offer on the part of an eastern Pennsylvania furnace was at $18.50, furnace, for 1.75 to 2.25 silicon. An even lower offering of Buffalo iron is reported, the price being $18 at furnace for 2.25 to 2.75 silicon. Sellers who have cut what they believed to be the market price in quoting on an inquiry are surprised later to find that the business has gone elsewhere at a still lower price. The factor of sagging prices is counterbalanced by the greater number of inquiries, which indicate that there is a fairly healthy demand and that some buyers' stocks have been used up. Inquiries are beginning to be made for last quarter delivery, as instanced by the one from a Brooklyn foundry for 100 tons each month over the balance of the year. Another for last quarter calls for 400 tons.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	21.52 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.02 to 21.52
Buffalo, sil. 1.75 to 2.25	23.46 to 24.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	29.16 to 30.16

Ferroalloys.—Considering the inactivity which has prevailed for many weeks the market for ferromanganese shows considerably more life. In the past week sales of 400 to 500 tons are reported for early delivery, most of it stated to have been sold at around $70, delivered, although some may have gone lower. Agents of British producers are authorized to sell the British alloy at $65, seaboard, which is a reduction of about $5 per ton from previous asking prices. The spiegeleisen

market is exceedingly quiet, only two carload lots having been sold in the past week at around the prevailing quotation of $26 per ton, furnace. There has been a little more activity in 50 per cent ferrosilicon, sales of several carloads having been made between $60 and $65, delivered. The market is now regarded as a little firmer, the minimum quotation of one seller being advanced to $65, delivered. There is no demand for high-grade manganese ore and quotations are nominal.

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$65.00
Spiegeleisen, 20 per cent, furnace, per ton...	$26.00
Ferrosilicon, 50 per cent, delivered, per ton..	$65.00
Ferrotungsten, per lb. of contained metal...	55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....16c. to	16.50c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	22.00c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard....$20.00 to	$25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard.....	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....55c. to	60c.

Finished Iron and Steel.—Despite the low bids which are being made on structural steel work, a very limited volume of work is coming into the market. A recent job, involving 400 tons for a savings bank in New York, was taken by an Eastern fabricator at less than $70 per ton fabricated and erected. This compares very favorably with pre-war prices notwithstanding higher costs of steel, freight and labor. A large downtown office building erected in 1907 was taken at $53.50 per ton fabricated and delivered. Its cost, including erection of the steel, was probably $65 a ton or more. An award will probably be made this week of 4000 tons of steel for the Bowery Savings Bank Building, New York, this being the largest project in the market. A hotel at Washington, Pa., requires 600 tons; a school building at Middletown, N. Y., 500 tons; a publishing building at Richmond, Va., 200 tons. The Pittsburgh-Des Moines Steel Co. will fabricate 400 tons for a highway bridge in North Carolina; the Paterson Bridge Co. has been awarded 1300 tons for an apartment building on Riverside Drive, New York, and the Hinkle Iron Co. has been awarded a 300-ton office building by the Broadway-John Street Corporation. The Snare & Triest Co. is general contractor for a $1,000,000 pier to be constructed in Philadelphia. There is no new railroad repair work in the market. Steel prices continue on about the same basis as last week, there being little business of importance to afford further test of the market. Bar iron is now obtainable at 1.70c., Pittsburgh. Plates for export have been quoted as low as 1.65c., Pittsburgh.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.08c.

Warehouse Business.—A much better tone pervades the market. Orders generally are slightly larger, specifying fair tonnages of one size instead of the wide range of sizes that has prevailed for some time. One mill producing cold drawn steel has reduced its price on bars from 2.80c. per lb. to 2.60c. per lb., a drop of about $4 per ton. Business among dealers in wrought iron and steel pipe begins to show a slight improvement. One order totaling several hundred tons of pipe for an addition to a public institution at Central Islip, Long Island, was recently placed and there are some other smaller orders pending. Prices in this field are largely nominal. There is some slight shading of prices in the brass and copper market, but business as yet shows no distinct improvement from the dullness that has prevailed for some time. We quote prices on page 384.

Lapwelded Steel Boiler Tubes

1¾ in.	+ 6
2 and 2¼ in.	—12
2½ to 3¼ in.	—26
3½ to 4½ in.	—32

Seamless steel boiler tubes, cents per ft.: 1½-in., 19c.; 1¾-in., 24c.; 2-in., 20c.; 2¼-in., 22c.; 2½-in., 26c.; 2¾-in., 30c.; 3-in., 33c.; 3¼-in., 33c.; 3½-in., 34c.; 3¾-in., 37c.; 4-in., No. 10 gage, 43c.; 4-in., No. 9 gage, 47c.

High Speed Steel.—The market is dull and prices are unchanged. Quotations continue nominal at 90c. to $1 per lb. for 18 per cent tungsten high speed steel, with some sales reported at lower prices.

Cast-Iron Pipe.—The chief inquiry of a municipal nature is that for seven miles of pipe for Scarsdale, N. Y., the business to be handled by a contractor. Buying by private companies continues in fair volume. We quote per gross ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30 with $4 additional for Class A and gas pipe.

Old Material.—Inasmuch as the chief buying of heavy melting steel is to fill an order placed by the Bethlehem Steel Co. in July at a good price and as the freight rates are favorable the f.o.b. New York quotation has been raised accordingly. Two other eastern Pennsylvania mills have bought steel, the dealers' buying prices being $11.50, delivered. Sentimentally the market is better and prices are tending upward.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.50 to	$8.50
Rerolling rails	9.00 to	10.00
Relaying rails, nominal	37.50 to	40.00
Steel car axles	10.00 to	11.00
Iron car axles	16.00 to	17.00
No. 1 railroad wrought	10.50 to	11.00
Wrought iron track	7.50 to	8.50
Forge fire	5.00 to	5.50
No. 1 yard wrought, long	9.00 to	9.50
Light iron	2.00 to	2.50
Cast borings (clean)	4.50 to	5.00
Machine-shop turnings	2.50 to	3.50
Mixed borings and turnings	2.50 to	3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to	8.50
Stove plate	8.50 to	9.00
Locomotive grate bars	8.50 to	9.00
Malleable cast (railroad)	8.50 to	9.00
Car wheels	10.50 to	11.00

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to	$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to	16.00
No. 1 heavy cast, not cupola size	14.00 to	15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to	10.50

Cincinnati

CINCINNATI, Aug. 9.

Pig Iron.—There are evidences that melters are getting short of iron, and sellers are having less difficulty in interesting buyers for current and future needs. The past week, by comparison with many of the preceding ones, was unusually active; and it is estimated that nearly 7000 tons were disposed of in Cincinnati and adjacent districts. Among the sales made was one to a Kentucky manufacturer of 2000 tons of Southern iron, equally divided between No. 2 and No. 2 soft, at a reduced price of $19, Birmingham, for each grade. The same interest bought in the vicinity of 1000 tons of Northern iron, silicon, 2.25 to 2.75 per cent, at a price reported to be under $18.50, Chicago. Other sales reported include 900 tons to a Western manufacturer, and 700 tons to an eastern Ohio melter. An Eastern pipe manufacturer is reported to have bought 500 tons of Virginia iron, and 400 tons of Southern Iron were sold into the St. Louis district. Several 100-ton lots were also taken by melters in this territory on the basis of $18, Chicago, and $20, Ironton. Interest in silveries, following the price reductions, was evidenced by the placing of a number of carload orders. There are few inquiries current, two from the Pittsburgh district totalling 800 tons. A Chicago district producer, who has been a very active seller, has advised that prices will be advanced 50c. to $1 a ton, and requests that all quotations outstanding be closed or withdrawn by Tuesday morning. The feeling in the trade is that prices have about reached bottom, and this view is held not only by sellers but by many melters.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—The improvement noted in July dwindled somewhat in the past week. Carload orders for immediate shipment is the prevailing activity. There were no exceptional sales made and while rumors of even lower prices are being heard, there is ap-

parently no basis for these in the small sales. A plate inquiry from a Louisville manufacturer for 900 tons is still pending. A few orders for sheets, some involving 100 tons, have been placed at the current schedules. There are reports that prices on galvanized sheets are being shaded and it is said that 3.85c. has been done. In the structural field several projects are up. The Big Four Railroad has taken bids on 400 tons of bridge replacement work and is inquiring for 900 tons for track elevation work in Indianapolis. There have been no lettings of prominence during the week. Some orders have been placed for wire and wire products. It is reported that plain wire has been sold at 2.25c., Pittsburgh, and rumors are current that other reductions may be made within the next week or so. Plant operations during the week will be practically unchanged, although the Ashland Steel Co. will operate its rolling mills during the next two weeks. The American Rolling Mill Co. at Middletown, operated 15 sheet mills and three jobbing mills in the past week and it is expected that they will continue for the present week. The Andrews Steel Co. and the Newport Rolling Mill Co. will be idle.

Warehouse Business.—Local jobbers report considerable improvement. This, no doubt, was stimulated by the lower prices quoted, jobbers having reduced their prices $3 per ton. New prices in effect are as follows:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—There has been some activity in the coke market, one seller reporting an order for 750 tons. Another booked 500 tons. Single carloads of Connellsville foundry have brought $5 per net ton at ovens. Wise County coke is unchanged at $5 to $6, and New River $1 lower at $7.50 to $8.50.

Old Material.—The local scrap market is dull, although dealers report some activity in other districts. Prices are unchanged.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

Boston

BOSTON, Aug. 9.

Pig Iron.—Considerable eastern Pennsylvania pig iron was sold in New England in the past week, and some Buffalo iron, in instances at materially lower prices. Three eastern Pennsylvania furnaces are actively bidding for business, one on a basis of $18.50 furnace for No. 2 plain, another on a $19 basis and the third on a $20 basis, and a Buffalo producer has offered No. 2 plain iron at $18.50 furnace in several, and in one instance at $18.25 or $23.71 delivered. Direct furnace representation is noted in competition with brokers who have the same iron for sale, consequently full details regarding transactions are more often than not lacking. For instance, the Gurney Heater Co., Framingham, Mass., has again purchased, this time 1500 tons, half No. 2 plain, and the remainder No. 2X, at a price understood to be well under $20 furnace, but details are lacking. A Bridgeport, Conn., foundry bought 500 tons No. 2 plain and 100 tons malleable, and the Saco-Lowell Shops, Boston, textile machinery, 500 tons No. 1X and 200 tons No. 2 plain, it is understood from direct furnace representatives. A Providence, R. I., foundry took 400 tons No. 2X eastern Pennsylvania at about $19.50 furnace or $23.56 delivered; the Framingham Foundries, Framingham, Mass., 200 tons No. 1X at less than $24 delivered, or about $20 furnace, and a Maine melter 200 tons eastern Pennsylvania No. 2X at less than $20 furnace, while a southern Massachusetts foundry purchased 100 tons of No. 2X on a firm offer at $20, a greater Boston textile machinery maker 100 tons No. 2X at $20.50 furnace, and the Griffin Car Wheel Co., Chelsea, Mass., 250 tons Buffalo at approximately $19 furnace. Otherwise sales were in car lots and included one of malleable to a Massachusetts foundry at $19.50 furnace. The aggregate sales for the week are in the neighborhood of 4500 tons. Further inquiries are in the market, the total tonnage involved being about 2000 tons. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$23.06 to	$24.56
East. Penn., silicon 1.75 to 2.25	22.56 to	24.06
Buffalo, silicon 2.25 to 2.75	24.46 to	25.96
Buffalo, silicon 1.75 to 2.25	23.96 to	25.46
Virginia, silicon 2.25 to 2.75	31.08 to	33.08
Virginia, silicon 1.75 to 2.25	30.58 to	32.58
Alabama, silicon 2.25 to 2.75	30.16 to	31.16
Alabama, silicon 1.75 to 2.25	29.66 to	30.66

Warehouse Business.—Local warehouse prices on soft steel and reinforcing bars, structural shapes and plates and steel bands have been reduced very slightly. Stocks are smaller than they have been in months, and in some instances broken, yet dealers appear in no hurry to cover for future requirements. Prices on bolts and nuts, due to large stocks being carried, are still in favor of the consumer. It now develops that local stocks of wire nails are larger than heretofore supposed. These were purchased at prices considerably above ruling mill prices.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81¼ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—New England producers of coke are quoting spot and contract foundry fuel at $10.66 delivered where the local freight rate does not exceed $3.40 a ton. New business, however, is coming in very slowly, the number of firms having signed up on contracts still being more than 40 per cent less than it was a year ago. Those foundries not having signed contracts are in no hurry to do so, and spot shipments show a slight falling off, if anything, in view of the fact that the aggregate weekly foundry melt in New England is not much in excess of 15 per cent of normal.

Old Material.—A central Massachusetts textile machinery maker paid $19.50 delivered for 1000 tons selected No. 1 machinery cast, and a few car lots of general run were purchased at 60c. per 100 lb. by dealers the past week. Otherwise the market on machinery cast is unchanged, foundries and yards being at a deadlock on prices, the former not being willing to sell at ruling prices and the foundries only willing to purchase at concessions. Four cars of chemical borings were taken by a dealer at $4.10, f.o.b. shipping point, for Pennsylvania delivery, and a small tonnage of cotton ties at $5 shipping point for Maine delivery. A round tonnage of shafting is under negotiation, but at the moment buyer and seller are quite far apart on prices. Little, if any, interest is shown in heavy melting steel by anybody.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$16.50 to	$17.00
No. 2 machinery cast	15.00 to	15.50
Stove plate	14.50 to	15.00
Railroad malleable	12.50 to	13.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to	$6.00
No. 1 railroad wrought	10.50 to	11.00
No. 1 yard wrought	8.50 to	9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	6.50 to	7.00
Machine shop turnings	2.50 to	3.00
Cast iron borings, rolling mill	3.00 to	3.50
Cast iron borings, chemical	3.50 to	4.00
Blast furnace borings and turnings	2.50 to	3.00
Forged scrap and bundled skeleton	5.00 to	5.50
Street car axles and shafting	12.00 to	12.50
Car wheels	11.50 to	12.00
Rerolling rails	9.00 to	10.00

Cleveland

CLEVELAND, Aug. 9.

Iron Ore.—Receipts at Lake Erie ports for the past month were only 2,793,955 tons compared with 7,076,357 tons for July, 1920, and shipments to furnaces were 1,960,565 tons compared with 4,348,496 tons in July of last year. The receipts for the season to Aug. 1 were 7,249,435 tons compared with 17,407,792 tons to Aug. 1, 1920. Shipments to furnaces for the season to Aug. 1, 1921, were 5,707,232 tons compared with 12,597,009 tons for the preceding year. Despite the light receipts, the balance on dock Aug. 1, 1921, was greater than it was a year ago, the tonnage being 8,840,824 tons compared with 7,917,109 tons on Aug. 1, 1920. The receipts for the month at other than Lake Erie ports were 1,092,598 tons compared with 2,588,846 tons for July, 1920. Sales are very light and shipments continue to be held up on contracts. It is now estimated that the entire movement by lake for the season will be about 25,000,000 tons, or about a million tons less than the movement to Aug. 1, 1920.

We quote delivered lower lake ports: O'd range Bessemer, 55 per cent iron $6.45; Old range non-Bessemer 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Favorable developments are not pronounced, but some encouragement is found in the larger number of releases on deferred shipments and in the increased number of small inquiries. Some important melters have not taken any iron on contract since last November. Inquiries range from a carload to 500 tons and all are for prompt shipment. The rule is for buyers to insist upon immediate delivery. As to prices, some concessions are being made when buyers agree to receive shipments of high priced iron. Except under such conditions, however, the usual selling price is $20, Cleveland, for No. 2 foundry. A sale has been made as low as $19.50 and reports are still heard of quotations of $19. Owing to the very large accumulation of stocks in Cleveland furnace yards, it does not seem probable that there will be any advance in price for many months, but sellers are entertaining the hope that prices will not be much, if any, lower.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.00 to 20.50
Southern fdy., sil. 2.25 to 2.75	26.92
Ohio silvery, sil. 8 per cent	30.56
Standard low phos., Valley furnace	36.00 to 36.25

Finished Iron and Steel.—The moderate improvement in sentiment and orders reported last week continues and is a little more pronounced. Inquiries cover a wider range and show much more interest on the part of buyers, but buying is still light. The most talked about business taken recently is still the 6900 tons contracted for by the Mt. Vernon Bridge Co. for the Ohio State University stadium and other work, consisting principally of shapes, and the eagerness displayed by the mills in this case shows what can be done when considerable tonnage appears. It is now generally believed that a large part of the material went to one company at 1.60c., Pittsburgh, and the remainder to another company at 1.65c. On plates the usual quotation is 1.75c., but it is evident that 1.70c. can be done. On steel bars some business is being placed at 1.75c., but reports of shading are persistent. On hot rolled strips 2.25c., or $5 per ton below recent Pittsburgh quotations, has been done. No large structural contracts are pending and the only business in prospect is for school buildings in several northern Ohio cities. On wire products the demand is light, but $2.75 for wire nails and $2.50 for plain wire are firmly adhered to by the leading interest, and little is heard of shading by the independents. An interesting phase of the extreme dullness in the oil market is that it is necessitating the storage of large quantities of oil and it is expected that many large tanks will be built for this purpose.

Warehouse Business.—Cleveland jobbers have reduced warehouse prices on black and galvanized sheets $5 per ton and on blue annealed from $3 to $4 per ton, following the recent reductions on steel bars, plates and shapes.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.25c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Bolts, Nuts and Rivets.—A number of orders releasing shipments on contracts have been received from the South. This is considered a very favorable indication. There is also a moderate improvement in inquiries. Regular quotations remain unchanged. The manufacturers say that fully 90 per cent is being done at these prices, although concessions are sometimes made for very desirable business. Local rivet manufacturing is at very low ebb, but no disposition is shown to meet the extremely low quotations reported in other markets.

Sheets.—The fact that the automobile manufacturers have continued to operate at a greater rate than was expected is having a favorable influence on the market for sheets, but it is generally believed that the present rate of consumption by the automobile companies will not continue and there is no prospect of other important buyers contributing to any large extent to the demand. If there is any change in quotations, it is toward firmness, the usual prices being 3c. for No. 28 black, 4c. for No. 28 galvanized and 2.25c. to 2.40c. for No. 10 blue annealed.

Coke.—The first inquiry for any tonnage on contract has been received but the amount is not large. The market continues inactive. The usual price for standard Connellsville coke is $4.50 per net ton at oven, but $4 has been named.

Old Material.—The scrap market is showing some signs of improvement. On limited sales, heavy melting is quoted $1 to $1.25 higher while advances are noted in a number of other grades. Important customers, however, still have very large accumulations, amounting in some cases to 50,000 tons.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.00 to $12.25
Steel rails, under 3 ft.	12.00 to 12.25
Steel rails, rerolling	13.50 to 14.50
Iron rails	11.00 to 11.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	6.75 to 7.25
Machine shop turnings	5.00 to 6.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	7.00 to 7.25
Railroad wrought	10.50 to 11.00
Railroad malleable	11.50 to 12.50
Light bundled sheet stampings	4.00 to 4.50
Steel axle turnings	8.50 to 9.00
No. 1 cast	15.50 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	12.75 to 13.00
Pipes and flues	6.00 to 7.00

Birmingham

BIRMINGHAM, Aug. 9.

Pig Iron.—From what can be gathered from various sources a business of 6000 tons was done in Birmingham pig iron in the first week of August. Heading the list was a sale of 1500 tons to a pipe interest. Others were mostly in 100-ton lots. Southern Pacific was in the market for 800 tons and all bids over $18 were not considered, whereupon several Birmingham makers withdrew bids. A 100-ton lot of 2.75 to 3.25 per cent silicon brought $19.50, reading back to base of $18.50, with 50c. for silicon additions, but the average sale was at $19 and at the end of the week that was stronger than in the beginning. Only one yard in Alabama has any No. 2 soft. Ill-assorted stocks are proving a positive handicap to melters and tend to harden prices. There seems no likelihood of lower prices. The Woodward Iron Co. blew in its second stack on merchant iron on account of bare state of yards, there being no iron on hand. Some inquiries for fourth quarter have been received. Makers will not quote for that period except at an advance of $1 and over above present levels. A high authority makes

the statement that 80 to 85 per cent of the pig iron that is being sold and moved from Birmingham is for delivery in the South and the Southwest with some to the Pacific Coast. Present freight rates to the Middle West and the East are an embargo on Birmingham iron business in those directions. All iron and steel interests admit a positive although gradual betterment, and figure something substantial within thirty days.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	32.00

Finished Material.—It is announced with authority that the finishing mills of the Tennessee company and its auxiliary, the Chickasaw Shipbuilding & Car Co., are on 50 per cent of capacity production. The rail mill is operating at normal, producing 6000 tons a week, the car works are putting on speed, the tie-plate plant is doubling capacity, all based on a monthly production of 55,000 tons of basic iron and 50 per cent of ingot production. Gulf States Steel Co. orders are larger and wire mills are on a five-day turn. Structural steel mills are active. Conners-Weymann Steel Co. continues operation of hoop and band mill at Woodlawn.

Cast-Iron Pipe.—New Birmingham base of high pressure pipe is $35 to $36 for 6 in. and upward. This marks another decline of $5 a ton. National Cast Iron Pipe Co. reports 80 to 90 per cent of capacity production. The leading interest operates two shops with two idle. Sanitary pipe is fairly active with a 50 per cent production and base of $40 with $3 for extra heavy pipe. Prices are firm.

Coal and Coke.—Steam coal production is increasing and competition has cut prices to almost one-half of last year's. Standard foundry coke is at $6. A large business in car lots for rush shipment is being done.

Old Material.—The scrap market is beginning to see a rift in the clouds with betterment in the steel market and promise of larger foundry operations, but no improvement has yet taken place. Prices are nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

St. Louis

ST. LOUIS, Aug. 9.

Pig Iron.—The market continues extremely dull, trading being confined to scattered lots of one car to 100 tons, all for prompt shipment. Job foundries report the demand for castings at a low ebb, with new business so small that it can be dispatched with from one to two heats per week. Virtually all the stove plants, the largest consumers of pig iron in this district, are down. The leading blast furnace interest continues in blast and is storing a goodly part of its product. Sales in the week included 100 tons to a stove plant; two cars to a job foundry; one car to an Iowa implement interest and one car to a Quincy melter. There is an inquiry before the market for a car of Bessemer ferrosilicon from a local steel plant. The leading local blast furnace interest is quoting $21.25 for 1.75 to 2.75 per cent silicon and states that it will meet all competition.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$21.30 to $21.80
Northern malleable	21.30 to 21.80
Basic	21.30 to 21.80
Southern foundry, sil. 1.75 to 2.25	24.74 to 25.74

Finished Iron and Steel.—Warehouse interests report that the recent price reductions have failed thus far to stimulate buying. The spurt of activity which featured the closing weeks of July has spent itself, leaving the market inert and featureless. About the only buying is by the railroads, which are taking fair tonnages of materials for repairs to equipment. Shops of several Western roads have resumed activities on full time, including the chief shops of the Missouri Pacific at Sedalia, Mo. Specifications for the structural steel for the new Federal Reserve Bank's eight-story building and two buildings of the Board of Education will be made public during the next two weeks:

For stock out of warehouse we quote: Soft steel bars 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon, blank, $3.25; and tapped, $3.00 off list.

Coke.—Outside of the sale of an occasional car of foundry coke for prompt shipment, the market is dead. Leading melters have stocks piled or under contract to carry them along for some months at the present rate of activity. Furnace coke is unsalable, the only plant in blast being that of the St. Louis Coke & Chemical Co., which manufactures its own fuel. The by-product plants have liberal accumulations in their storage yards. A small tonnage of foundry coke manufactured here has been sold to Pacific Coast melters and is being shipped regularly. Standard Connellsville foundry coke is quoted at from $4 to $4.50 ovens, with special brands as high as $5.25. The furnace product is about $1 lower. The leading by-product producer is selling its domestic sizes at $8.50 per ton delivered in St. Louis.

Old Material.—A much better tone has come into the market for scrap iron and steel, with prices taking a sharp upward slant. The industries, while mainly idle at the moment, are looking about with the view of acquiring material. The American Car & Foundry Co., which has business booked sufficient to keep all its local plants busy from Sept. 1 to the first of the year, purchased 3000 tons of rolling mill stock this week. The American Steel Foundries is seeking rerolling rails and special steel scrap. An inquiry is before the market for 2000 tons of 60-lb. relaying rails. Other plants are quietly picking up bargains wherever they appear. Railroad offerings include the following lists: Mobile & Ohio, 425 tons; Missouri, Kansas & Texas, 950 tons; Pennsylvania, Southwestern Division, 5100 tons; Union Pacific, 750 tons and Pullman Co., 350 tons. An electric railway interest is asking bids on 1200 tons of 60-lb. relaying rails.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.00 to $12.50
Steel rails, rero'ling	11.00 to 11.50
Steel rails, less than 3 ft	10.50 to 11.00
Relaying rails standard section	28.00 to 30.00
Cast iron car wheels	11.00 to 11.50
No. 1 railroad heavy melting steel	10.50 to 11.50
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	10.50 to 11.00
Ordinary bundled sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	$5.50 to $6.00
Iron angle bars	10.50 to 11.00
Steel angle bars	9.00 to 9.50
Iron car axles	16.00 to 16.50
Steel car axles	11.50 to 12.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	10.00 to 10.50
Steel couplers and knuckles	10.00 to 10.50
Locomotive tires, 42 in. and over, smooth inside	8.50 to 9.00
Cast iron borings	5.50 to 6.00
No. 1 busheling	10.00 to 10.50
No. 1 boilers cut in sheets and rings	5.00 to 5.50
No. 1 railroad cast	12.00 to 12.50
Stove plate and light cast	10.50 to 11.00
Railroad malleable	8.50 to 9.00
Agriculture malleable	8.50 to 9.00
Pipes and flues	7.00 to 7.50
Heavy railroad sheet and tank	5.00 to 5.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	7.50 to 8.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.50 to 8.00
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.00 to 8.50

Philadelphia

PHILADELPHIA, Aug. 9.

For the first time in a year or more there has been a slight flurry of pig iron buying in this market. A sale of 5000 tons of basic by two furnaces to an Eastern steel company is the first transaction in steel-making iron of that size in a considerable time. Probably 10,000 tons or more of foundry iron has been sold within the week, mostly at prices which proved so attractive to consumers that some took more than their immediate requirements called for. One maker of foundry iron made prices as low as $18.50 on No. 2 plain and $19 on No. 2X to move a tonnage quickly. Other furnaces have not quite met these prices, but are within about $1 of them.

Pig Iron.—Sales of pig iron in this market within the past week have totaled upward of 15,000 tons, the best record in many months. All of this business, however, was taken at the expense of prices, which are off from $1 to $2 a ton compared with last week's quotations. The largest purchase was 5000 tons of basic by an Eastern consumer, the tonnage being divided about equally between two furnaces. The price paid was $19, furnace, which is a new low record on this grade of iron. Foundry iron also struck new low levels, $18.50, furnace, for No. 2 plain and $19, furnace, for No. 2X. Sales at this price were made by one furnace, which placed a block of 10,000 tons in the hands of a leading selling agency with which it is not regularly identified with instructions to convert it quickly into cash. The first offerings were on the basis of $19 for No. 2 plain and $19.50 for No. 2X. One sale of 1500 tons of No. 2 plain was made at $19, furnace, and other smaller sales, including one of 500 tons, were made at the same prices. Then another half dollar was lopped off to bring out more buyers. The selling agency handling the iron has offices in Boston, New York and Philadelphia, hence the offerings have been freely made throughout the whole Eastern territory. Other Eastern furnaces have not gone to such low levels but have passed up considerable tonnage which they might have had by meeting competition. One furnace which is quoting $20, furnace, on either No. 2 plain or No. 2X, is for the first time this year willing to sell for forward delivery and has taken some business running into fourth quarter. A few sales of copper bearing low phosphorus iron have been made at $35, furnace. A leading maker of standard low phosphorus now quotes $36.50, furnace, on that grade. Gray forge has been sold at about $22, delivered.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	19.84 to 21.26
Virginia No. 2 plain, 1.75 to 2.75 sil.	29.74 to 31.74
Virginia No. 2X, 2.25 to 2.75 sil.	30.74 to 32.99
Basic deliv. eastern Pa.	20.26
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Coke.—Considerable variation in coke prices, according to grades, is noted. Foundry coke of ordinary quality is obtainable at $3.75, Connellsville, while some of the better grades are selling for $4.50 and $5. Furnace coke of ordinary grade can be had at $2.60, Connellsville, though a better quality sells for $3.

Ferroalloys.—Eastern producers of ferromanganese now quote $70 per ton for delivery as far west as the Pittsburgh district and $75, delivered in the Chicago district. Reports of resale ferromanganese at as low as $65, delivered, are not confirmed. The lowest quotation reported on imported ferromanganese is $67.50, Atlantic seaboard. Spiegeleisen is quoted at $27, furnace, for 18 to 22 per cent, with some lower grade material available at $25.

Semi-Finished Material.—There is practically no inquiry for billets, which are nominally quoted at $30, Pittsburgh, for rerolling and $35 for forging quality. Eastern mills find it impossible to compete on sheet bars, which are reported to have been sold below $30, Youngstown.

Plates.—On the ordinary small lots which constitute the sole activity in the present market mills are quite uniformly quoting 1.85c., Pittsburgh.

Structural Material.—Reports of shading on plain material are commonly heard, but are difficult to confirm as the mills are making a determined effort to hold the price at 1.85c., Pittsburgh. Small orders are being booked at this figure; large tonnages might bring out lower quotations. Bids have gone in on an office building for Heymann & Brothers, Philadelphia, 300 tons, and for a bank building at Atlantic City, 300 tons.

Bars.—Though reports of 1.70c., Pittsburgh, on steel bars are heard, Eastern mills generally assert that their minimum is 1.75c. Very little business is being booked. Spring steel is selling on the bar base plus 15c. per 100 lb. Cold drawn steel can be had at 2.50c., Pittsburgh. Bar iron has been quoted at 1.70c., Pittsburgh, or 2.05c., Philadelphia, but buyers are taking little interest.

Railroad Supplies.—Railroad spikes are being bought by Eastern roads on the basis of 2.75c., Pittsburgh. Track bolts are quoted at 4c. to 4.25c., Pittsburgh.

Bolts, Nuts and Rivets.—Large machine bolts are being quoted by Eastern makers at 65-10-5 per cent off list, but this does not appear to be the minimum. Structural rivets are 2.50c. to 2.85c., Pittsburgh, and boiler rivets 2.60c. to 2.75c., Pittsburgh.

Sheets.—Ruling quotations on sheets are 2.25c. for blue annealed, 3c. on black and 4c. on galvanized, but these prices, particularly on black and galvanized, are being shaded at least $2 or $3 a ton.

Warehouse Prices.—Local warehouses have marked up bar iron $2 a ton in line with steel bars, but this is the only price change of the week. Business shows no expansion. We quote for local delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.75c.; round edge iron, 3.05c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black steel sheets, No. 28 gage 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in. inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 6.50c.; toe steel, 4.50c.

Old Material.—Scrap prices show an upward trend whenever the slightest demand springs up from any quarter. An Eastern mill came into the market a few days ago for cast iron borings, forcing an advance of 50c. per ton. Owing to the great curtailment in machine-shop operations borings are not being produced in sufficient volume to create a surplus. An Eastern steel mill came into the market for steel scrap at $11, but apparently has not been able to obtain any at that price. Another mill has offered $11.50 for small lots and that price appears to be the bottom at the moment. Advances of 50c. a ton are also recorded on machine-shop turnings and wrought iron and steel pipe. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.00 to 7.50
Mixed borings and turnings (for blast furnace use)	7.00 to 7.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	11.00 to 12.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80 000 lb. On the latter item the rate applies to a minimum of 50.000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46 000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets....$2.65
Large boiler rivets....$2.75
Small rivets....65, 10 and 10 per cent off list
Small machine bolts, rolled threads.70 and 7½ per cent off list
Small sizes in cut threads....65 and 10 per cent off list
Longer and larger sizes of machine bolts, 65 and 10 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter, rolled threads.65 and 10 per cent off list
Cut threads....60 and 10 per cent off list
Longer and larger sizes....60 and 10 per cent off list
Lag bolts....70 per cent off list
Plow bolts, Nos. 1, 2 and 3 head....60 and 5 per cent off list
Other style heads....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅝-in. x 4-in.:
Smaller and shorter....60 and 5 per cent off list
Longer and larger sizes....60 per cent off list
Hot pressed sq. or hex. blank nuts....$4 60 off list
Hot pressed nuts, tapped....$4.25 off list
C.p.c. and t. sq. or hex. nuts, blank....$4.60 off list
C.p.c. and t. sq. or hex. nuts, tapped....$4.25 off list
Semi-finished hex. nuts:
½ to 9/16 in. inclusive U. S. S...80, 10 and 10 per cent off list
Same sizes S. A. E....80, 10, 10 and 10 per cent off list
⅝ to 1 in. inclusive U. S. S. and S. A. E., 70,10, 10 and 10 per cent off list
Stove bolts in packages....80 and 10 per cent off list
Stove bolts in bulk....80, 10 and 2½ per cent off list
Tire bolts....65, 10 and 10 per cent off list
Track bolts....3.80c. base

Square and Hex. Head Cap Screws

½ in. and under....70 per cent off list
9/16 in. to ¾ in....70 per cent off list

Set Screws

½ in. and under....70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in....70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.75 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅜-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $3 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.80 base per 100 lb. Tie plates, $2 to $2.05 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C. $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	41	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.30	Nos. 11 and 12	2.50
Nos. 9 and 10 (base)	2.40	Nos. 13 and 14	2.60
		Nos. 15 and 16	2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb		Cents per Lb.	
Nos. 17 to 21	2.70	No. 28 (base)	3.00
Nos. 22 to 24	2.75	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.15
Nos. 22 to 24	3.55	No. 30	4.30

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
3	12.00	11.75	25.87½	4.40	4.20	4.70	4.20
4	12.00	11.75	26.25	4.40	4.20	4.70	4.20
5	12.00	11.75	26.50	4.40	4.20	4.70	4.20
6	12.00	11.75	.....	4.40	4.20	4.70	4.20
8	12.00	11.75	27.75	4.40	4.20	4.70	4.20
9	12.00	11.75	27.75	4.40	4.20	4.70	4.20

New York

NEW YORK, Aug. 9.

A better feeling pervades all the markets and buying is in larger volume. Sellers of copper willing to do business at present levels report a fair business with the market firmer. Demand for tin continues moderate with prices higher. The lead market is slightly firmer but quiet. Inquiry for zinc is increasing and prices are steady.

Copper.—There has been more inquiry in the past week from consumers who have been bidding 11.75c., delivered, for electrolytic copper with practically no success and it is stated by one or two sellers that buyers are now willing to pay 12c., delivered, and that there is a fairly good business both for domestic and foreign accounts. It is acknowledged that over 1,000,000 lb. of copper was sold last week to a large consumer at 11.87½c., delivered, or ⅛c. below the market price, but this is considered to have been a "freak" sale, the seller being compelled to dispose of it for cash. It is declared impossible to buy electrolytic copper below 12c., delivered, and some of the large producers are out of the market at this level. While demand is better it is not large, but interest on the part of consumers is improving. Ocean freight rates have been reduced from $9 to $5.50 per ton, which, it is hoped, will stimulate foreign trade.

Tin.—The middle of last week business aggregating about 350 tons of Straits tin for shipment from the East was sold at prices ranging from 26.25c., delivered, down to 25.75c. f.o.b. New York. Aside from that the market has been inactive. Yesterday prices took a sharp advance, due to a rise in London of sterling and the advance in rates for sterling exchange. At the new level a fair business was done in this market at 27.25c. to 27.75c. for future shipment. Spot Straits tin to-day is quoted at 27.75c., New York, and the London market is about £4 per ton higher than a week ago, with spot standard at £162 10s., future at £164 10s. and spot Straits at £163 5s. Arrivals thus far this month have been 360 tons with 4010 tons reported afloat, which is regarded as unusually large under the circumstances.

Lead.—The market is steady and featureless. Some sellers report more inquiry and a tendency to firmness, but quotations are unchanged at 4.40c., New York, or 4.20c., St. Louis, in the outside market, with that of the leading interest still 4.40c., both New York and St. Louis.

Zinc.—Sellers of prime Western report inquiry on the increase and of a decidedly better character than in some weeks. Both galvanizers and brass makers, largely the former, are showing more interest and some sales have been made for August shipment at 4.20c. to 4.25c., St. Louis, or 4.70c. to 4.75c., New York, and also some for September shipment at about five points above the August price.

Antimony.—There is no change in the market with wholesale lots for early delivery quoted at 4.60c., New York, duty paid.

Aluminum.—The leading interest continues to quote virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 24.50c. f.o.b. plant. Importers of the same grade are asking from 21c. to 23c., New York.

Old Metals.—Business is still impossible with the market slowly declining. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6 75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.75
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

AUG. 9.—Copper has declined, while tin and lead are higher. Tin has been very low and reacted upward, as was expected in many quarters. Lead is in a better position than most other metals, because consumption has been heavier and stocks are generally low. White lead plants, for example, have been quite busy until recently, reflecting a substantial demand for paint this summer. Old metal prices are unchanged. We quote Lake copper at 12.50c. in carload lots; tin, 29c. to 29.50c.; lead, 4.37½c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 9.—The market for lead and slab zinc remains dormant, the usual consumers showing absolutely no interest either in futures or spot. Producers are marking time, and making no effort to press their metal for sale. Independents declare they are losing money on every pound they sell at present prices. Lead is quoted at 4.20c. and zinc at 4.20c., car lots. We quote Lake copper car lots at 12.73c. to 12.98½c.; tin, 27.36c., and antimony, 5.38½c. On old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c., and aluminum, 9c.

Belgian Blast Furnaces Operating

The following list shows the furnaces in operation in Belgium July 1, 1921:

Forges of Halanzy: 1 furnace producing 90 tons of foundry pig iron per 24-hr.

Forges of Espérance Longdoz: 2 furnaces producing 300 tons.

Forges of Angleur: 2 furnaces producing 200 tons.

Cockerill Works: 1 furnace producing 170 tons of foundry iron and 76 tons of steel-making iron.

Forges of Clabecq: 1 furnace producing 180 tons of steel-making iron.

Forges of Providence: 2 furnaces; one producing 207 tons of foundry iron; the other 155 tons of steel-making iron.

Usines du Hainaut: 1 furnace producing 120 tons of foundry iron.

Sambre et Moselle: 3 furnaces producing 450 tons of steel-making iron.

Output has still further been curtailed and two or three furnaces have been blown out in the districts of Liège and Charleroi.

The Société Franco-Belge de Matériel de Chemins de Fer in Raismes has practically finished the reconstruction of its works. It is reported that the output of the reconstructed works will reach 100 locomotives per year, compared with a pre-war capacity of 60 locomotives. Works and sheds are planned with a capacity of 200 passenger cars and 3000 trucks.

PERSONAL

Bradley Stoughton, Engineering Societies' Building, 29 West Thirty-ninth Street, New York, having resigned after more than eight years as secretary of the American Institute of Mining and Metallurgical Engineers, will resume his practice as a consulting engineer, making a specialty of financial investigations and reports to bankers, investors, directors, trustees and examining accountants on industrial plants, engineering enterprises, iron and steel plants, etc.

Joshua A. Hatfield, president American Bridge Co., sailed recently to Europe on business and pleasure.

B. D. Lockwood has resigned as chief engineer of the Pressed Steel Car Co., Pittsburgh, and J. F. Streib, formerly assistant chief engineer, has been named to succeed him.

Isaac Harter, assistant to the president Babcock & Wilcox Co., New York, boilers, stokers, etc., has been appointed general superintendent of the company.

J. A. Henry has been appointed Western district manager of the Warren Iron & Steel Co., Warren, Ohio, with offices at 1810 Continental & Commercial Bank Building, Chicago, 'phone Harrison 2541. Mr. Henry has been Cincinnati district manager for the American Rolling Mill Co. and general manager of the Indiana Rolling Mill Co.

Robert R. Carter, covering the southern Indiana territory for the Van Camp Hardware & Iron Co. for six years, has resigned to accept a position as manager for the Weber Tire & Accessory Co., Evansville, Ind., southern Indiana distributor for the Lee Tire & Rubber Co.

Joseph W. Powell, until recently vice-president of the Bethlehem Shipbuilding Corporation, has been appointed by Chairman Lasker of the United States Shipping Board to take charge of the financial, accounting and sales department of the Emergency Fleet Corporation. Mr. Powell, who will serve the Government without salary, will devote several months of his time to bringing about a complete and business-like reorganization of the department which he heads. In commenting upon the appointment Chairman Lasker said that Mr. Powell some time ago had been tendered the position of senior vice-president and general manager of the Emergency Fleet Corporation at a large salary, but found it impossible to accept. He was prevailed upon, however, to assist in the board's proposed reorganization of the Fleet Corporation and will join the organization about Sept. 1. Mr. Powell is 44 years of age, a Naval Academy graduate, and was a member of the construction corps of the navy when he resigned in 1906 to accept a position with the William Cramp & Sons Ship & Engine Building Co. In 1914 he became president of the Fore River Shipbuilding Corporation and in 1917 was put in charge of the five shipbuilding properties belonging to the Bethlehem interests. He organized and operated these properties throughout the war, and until his retirement early this year.

Arthur R. Markel has been transferred by the Columbus McKinnon Chain Co., Columbus, Ohio, from the position of secretary to that of assistant to the president. Don S. Brisbin, formerly assistant sales manager of the McKinnon Industries, Ltd., St. Catharines, Ont., goes to Columbus as director of sales.

Dr. Richard Moldenke last week was a guest at luncheon of the Worcester, Mass. members of the New England Foundrymen's Association, at the rooms of the Worcester Metal Trades Association, that city. H. P. Blumenauer, general manager Arcade Malleable Iron Co., presided. Dr. Moldenke spoke on foundry costs and on his observations of conditions in Europe, gathered during a trip from which he recently returned.

Ross C. Purdy, formerly director of research Norton Co., Worcester, Mass., and for the past two years consulting ceramist in Buffalo and elsewhere, has been made permanent general secretary of the American Ceramic Society, of which he was president in 1909 and 1910.

H. W. Thompson, 503 Mining Exchange Building, Denver, Colo., has been appointed sales representative in that territory for the M. H. Detrick Co., 155 East Superior Street, Chicago, maker of arches and steam jet ash conveyors.

I. F. Baker, general superintendent Lynn Works, General Electric Co., is convalescing following a minor operation, performed recently.

Harvey J. Mallory has been elected vice-president of the Buick Motor Car Co., Flint, Mich., succeeding C. S. Mott, who was recently made chairman of the advisory committee of the General Motors Corporation. Mr. Mallory will also continue his former duties as controller of the Buick company.

S. V. McLeod has been appointed purchasing agent for the Algoma Steel Corporation, Sault Ste. Marie, Ont.

Homer A. Pardee, general manager of the Halcomb plant of the Crucible Steel Co. of America, Syracuse, N. Y., has been appointed manager of the Park works of the company at Pittsburgh, succeeding George I. Page, who has resigned his position at the Park works. Assistant Manager James A. Scott of the Park works has also resigned.

Robert B. Woodworth, sales statistician and advertising manager of Carnegie Steel Co., will have completed 24 years affiliation with that company on Aug. 16 and on the following day retires from active participation in the steel business. He has occupied an unique position with the Carnegie company in that he directly supervised all technical publications of the company, was the author of many of them, had charge of all the advertising copy and also was the originator of the all-steel drilling rig, steel derrick, sheet steel piling driving caps and steel timbers for mines. He also worked out the details for some of the earliest examples of fireproof partitions in office buildings, built with sheet steel studding and expanded metal laths. He devised and installed for the Carnegie Steel Co. a system of trade records covering the consumption and production of all kinds of heavy rolled steel products in the United States, classified by lines of trade down to the individual requirements of separate purchasers. This system, since improved and extended, is believed to be the most complete in the industry. During the war he was in Washington, where he helped develop the American standard practice for ordering ship steel which was adopted by the Emergency Fleet Corporation and the observance of which by American shipbuilders is said to have increased the production of ship plates at least 10 per cent. Mr. Woodworth was born April 28, 1868, in Winchester, Va. He was educated in the schools at Burlington and Moorefield, W. Va., and entered Hampden-Sidney College as a junior, from which he was graduated in June, 1886. In 1893 he was awarded a master of arts degree by Princeton University, where he pursued a post-graduate course. Prior to entering the service of the Carnegie Steel Co. he had been with the West Virginia Central Railroad, now the Western Maryland Railroad, the Brown-Ketchman Iron Works, Indianapolis, the Elmira Bridge Co., Elmira. N. Y., and the Central Bridge & Engineering Co., Peterborough, Can. He entered the employ of the Carnegie company as a draftsman and was successively chief draftsman and engineer to the general sales department, having oversight of orders for fabricated structural materials. Since Oct. 1, 1917, he has been advertising manager and sales statistician.

Committee A1 on Steel of the American Society for Testing Materials is planning to extend its activities to include the study of tests and specifications for sheet steel. Inquiries received by the society have indicated a need for information concerning this product. A representative sub-committee is being organized.

Changes in Republic Sales Organization

Wilber B. Topping, general manager of sales of the Republic Iron & Steel Co., Youngstown, Ohio, announces the following changes in the sales organization of the company, effective Sept. 1. Charles S. McKinley has resigned as assistant manager of sales and will be succeeded by Walter W. Hall of the Pittsburgh office, who will become assistant to the general manager of sales, and be located in Youngstown. Frank Welsh, formerly with the Republic company, will succeed Mr. Hall as assistant manager of sales in the Pittsburgh office. Frank L. Rownd has been transferred from the operating department at the Niles, Ohio, sheet mills to the sales department, in the sheet division.

Mr. McKinley will become associated with his brother, A. E. McKinley, a professor at the University of Pennsylvania, in the management of the McKinley Publishing Co., Philadelphia, and will assume active charge of the business. The company produces school supplies, maps and other printed products. He has been associated with the Republic company since 1913, starting in the Philadelphia office where he remained for two years, when he was transferred to Pittsburgh and became manager of sales in that district. On Jan. 1, 1919, he was transferred to Youngstown as assistant manager of sales.

Except for a period of slightly more than two years when he was associated in the Columbia Steel & Shafting Co., Pittsburgh, Mr. Hall has been continuously identified with the Republic company since 1899. He was originally located in the Chicago office of the Republic company and was subsequently transferred to Pittsburgh.

Mr. Welsh previously was connected with the sales department of the Republic company for seven years, resigning Dec. 1, 1917, to engage in the export business in New York. He later became manager of the New York office of the Hickman-Williams Co. His most recent affiliation was the Detroit Graphite Co., which he represented in the Pittsburgh district.

Mr. Rownd has been with the Republic company for two years in various operating capacities in the Niles sheet mill works.

British Iron and Steel Market

(*Continued from page* 361)

last week. Welsh works have secured orders from the Far East at £21 (3.43c. per lb.) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.66 per £1 as follows:

Durham coke	£2 2		$7.69
Cleveland basic	7 7½	& £7 10*	26.99 & $27.45
Cleveland No. 1 foundry	7 0		25.62
Cleveland No. 3 foundry	7 0	& 7 5*	25.62 & 26.54
Cleveland No. 4 foundry	7 0	& 7 5*	25.62 & 26.54
Cleveland No. 4 forge	5 17½		21.50
Hematite	7 0*		25.62
East Coast mixed	8 0	& 7 5*	29.28 & 26.54
Ferromanganese	18 0	& 14 10*	65.88 & 53.07
Rails, 60 lb. and up	10 10	to 14 0	38.43 to 51.24
Billets	9 0	to 9 10	32.94 to 34.77
Sheet and tin plate bars, Welsh	9 0	to 9 10	32.94 to 34.77
Tin plate base box	1 3	to 1 5½	4.21 to 4.67
			C. per Lb.
Ship plates	14 0	to 15 0	2.29 to 2.45
Boiler plates	19 0	to 21 0	3.10 to 3.43
Tees	14 0	to 15 10	2.29 to 2.53
Channels	13 5	to 14 15	2.17 to 2.41
Beams	13 0	to 14 10	2.12 to 2.37
Round bars, ¾ to 3 in.	13 0	to 13 10	2.12 to 2.21
Galvanized sheets, 24 g.	22 0		3.59
Black sheets	17 10		2.86
Steel hoops	17 0		2.78
Cold rolled steel strip, 20 g.	26 10		4.33

*Export price.

Fuel Cost Retarding Resumption of Blast Furnaces—Continent Getting Most Business

LONDON, ENGLAND, July 27.—The long-looked for revival does not show yet any evidence of having arrived. There seems to be more activity in certain of the overseas markets, particularly in the East, and a good deal of miscellaneous inquiry is appearing. It is generally noticeable, however, that the business is slow to mature.

The universal cry is that fuel is too dear to enable manufacture of iron, steel or any other products to be carried on at such a price as would enable producers to compete with the continent. It looks as if, after the first rush for coal supplies is satisfied, the market for fuel will become dull and perhaps eventually prices will, by that means, come to an economic level.

A few furnaces have been started on pig iron, but as a rule, iron-masters seem determined to keep the blast furnaces idle until fuel comes to such a level that pig iron may be made at a profit. What this level is, it is difficult to say, but the general feeling seems to be that pig iron at 120s. per ton cannot be made without loss unless coke can be had at a price of 30s. per ton, delivered. As the present price of coke is about 42s. 6d., it will be seen that a considerable reduction is necessary. On the other hand, continental foundry iron is obtainable at about 100s. c.i.f. Middlesbrough, so that it looks as if fuel would need to come down even lower than the figure mentioned, as 120s. for pig iron is obviously not a competitive figure. At the moment stocks of good grades of foundry iron are scarce. There is no No. 1 to be had and for Nos. 3 and 4, 135s. has to be paid. The market has a temporary appearance of firmness therefore due to a slight demand arising from the resumption of work at the foundries.

In finished steel the general tendency of manufacturers is to go slow in resuming. There is a fair amount of business being done, but the continent is getting nearly all the orders. Although there is some inquiry, the aggregate does not look as if it would keep British works going very long.

It is reported that William Jessopp & Sons, one of the largest makers of crucible steel in Sheffield, have decided to close indefinitely during the present depression. This affects about 1500 employees. The firm's customers have been asked to place their requirements elsewhere for the present.

The shipbuilding position is far from satisfactory owing to the scarcity of new orders, but the shipping under construction in the United Kingdom at the end of June amounted to 789 vessels of 3,530,047 tons. The tonnage now under construction is less by about 268,000 tons than that being built at the end of the March quarter and about 48,000 tons less than that under construction 12 months ago. It is pointed out, however, that the figures can only be regarded as nominal, as the total includes a considerable amount of work which has been suspended owing to the decline in demand for tonnage, also a large quantity the completion of which has been postponed owing largely to the stoppage of work by the joiners' and the coal trouble. The tonnage on which work has been suspended amounts to 735,000 tons and the shipping which has been delayed in completion to 444,000 tons. These figures have to be deducted in order to enable a comparison to be made with figures for normal times. There is thus given a real total of 2,351,000 tons under construction in the United Kingdom.

OBITUARY

FRANK ERNEST WOODWARD, Wellesley Hills, Mass., died Aug. 5 at the New England Deaconess Hospital, Brookline, from the effects of an accident with which he met the previous week. Mr. Woodward was born in Damariscotta, Me., Jan. 2, 1853. At the age of 18 years he entered the employ of the Magee Furnace Co., Boston, became a member of the corporation in 1887, and in 1895 was in charge of the heating and ventilating department. In 1905 he organized the firm of Frank E. Woodward & Co., heating and ventilating engineers.

WILLIAM WILSON LIGHTHIPE, manager of the general service department of the Otis Elevator Co., died at the Long Island College Hospital, Aug. 7, aged 44. Mr. Lighthipe attended Trinity School and graduated from Columbia University in 1898. He was a member of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers, Sons of the American Revolution and other organizations.

SLIGHT LULL IN EXPORTS

Far Eastern Buying Somewhat Less—Foreign Ore Imports Possible in a Few Months —Japanese Rail Inquiry

NEW YORK, Aug. 9.—There has been a slight lull in new inquiries for iron and steel from the Far Eastern markets. While South American markets are buying small tonnages of various materials, a large portion of these orders is being placed with European sellers, because of the lower prices and better credit terms. Importations of foreign pig iron, chiefly of Belgian origin, while profitable at present for Pacific coast consumers, cannot be done in competition with Eastern furnaces on the Atlantic coast. Importers in New York believe, however, that with declining European prices, in a few months it may be possible to put down foreign iron ore at Atlantic coast ports sufficiently cheap to interest American consumers. Ores considered the most favorable for such importation are those from Spain and northern Africa, which should be available at from 8c. to 10c. per unit.

Japanese Buying Light

Japanese buying continues on a slightly smaller scale. Orders for copper are still being placed in this country, one New York exporter having booked an order during the past week for 200 tons of electrolytic copper to a Japanese buyer. The South Manchurian Railroad continues to buy lightly and an inquiry is being handled by one Japanese export house for about 5 miles of 60-lb. rails and 5 miles of 75-lb. rails. An inquiry is in the hands of the American subsidiary of a French interest, calling for about 40 passenger cars for a Chinese railroad.

Mexican Situation Improves

According to the report of the representative in Mexico of a large American bank, economic and political conditions there are good and progress under the present administration rapid. Train schedules throughout Mexico are greatly improved and receipt of the locomotives and rolling stock purchased in the United States recently is expected to relieve all congestion at the ports. He adds that the administration is preparing to make payments on all foreign debts.

The Bombay water supply pipe line bids show a great divergence. It is understood that one American bid for the pipe line, fabricated and set in place, was somewhat over $11,000,000, while the bid of Braithwaite & Co., West Bromwich, England, was something over $5,000,000. This low bid was for riveted pipe, while the American bid was for the lock bar construction. Allowing in the case of the English bid some $2,000,000, which it is estimated will be less than the cost of laying the pipe, there is left over $3,000,000 for the material fabricated delivered. As there are about 80,000 net tons of material involved, it would appear that the unit cost of the fabricated steel pipe is about 2c. a lb. delivered. These figures are as yet unofficial. It may be added that the work will take 2½ to 3 years for completion.

IMPROVEMENT IN GERMANY

Price Trend Is Generally Upward—Ore Prices Decline—Jobbers Cut—Associations Formed

(By Aerial Mail to London)

BERLIN, GERMANY, July 25.—It is now generally admitted that a considerable betterment in the tone of the market has taken place and with prices exhibiting a strong upward tendency and a steadily increasing volume of business, the activity of the past fortnight augurs well for the future. Warehouse stocks are being rapidly cleared away and short-term deliveries are difficult to obtain, about 4 weeks being named for beams and girders and 8 to 16 weeks for bar iron and light plates. The Tube Convention has decided upon price advances for gas pipes and boiler tubes averaging 5 per cent and there are rumors of the establishment of a tube syndicate.

Ore Prices Declining

The Berg- und Hüttenmännische Verein, according to a report from Wetzlar, has reduced prices for Lahn red iron stone for the third quarter of 1921 from 238 m. to 214.30 m. per ton for 45 per cent ores and from 173 m. to 147.05 m. for 40 per cent, all f.o.b. mine head. This reduction was caused by foreign competition. Because of the precarious situation of the mining industry, representatives of labor have been urging the Government to compel smelting works to accept a certain percentage of the output of Lahn ores. Smelters have refused on the grounds that foreign ores are offered at considerably lower prices and that the poor quality of the expensive Lahn ores has resulted in losses. The Lahn red iron stone of 40 per cent iron and lower has a high silicon content which renders it, even at low prices, rather unprofitable. The Siegerland mines report improved demand. Prices for crude sparry ores and roasted ores have been reduced by 30 m. per ton as from July 1.

No important changes are noted in the pig iron market. French and Luxemburg foundry iron No. 3 are offered as low as 180 to 190 fr. per metric ton, and producers are willing to make remarkable concessions on large spot orders.

Price Cutting by Jobbers

Heavy price fluctuations in rolled material have been a feature of the market in the past week. While mill quotations continued firm, jobbers were cutting the mill prices with a view to eliminating competition. Despite fluctuations prices are on the upward trend, and for the present there is no indication of a halt. The larger works are well stocked with orders, some even operating at capacity, and new orders in some lines will not be accepted for at least 6 weeks.

Bar iron was quoted at 1850 to 1900 m. per ton, a price not reached for some time past. Concrete bars fetched 1900 to 2000 m., while offerings of jobbers were at about 1800 m. Demand for semi-finished material also shows a notable improvement, with prices recovering. We quote billets 1490 m. and sheet bars around 1480 m. Slightly higher prices ruled for open-hearth material. The sheet market is finally showing signs of an improvement. The heavy demand for rails also formed a feature of the market.

Quotations are as follows:

	Per Metric Ton, Marks
Tees and channels	1 800
Angles, rounds, flats	1,850
Hoop iron, cold rolled	3 600
Rails, standard sections	2 350
Rails, for mines	2,300
Sheets, heavy	1,800
Sheets, medium	1,850
Plates, light	1,950

The German Iron Merchants Association at Düsseldorf has increased prices for bar iron, hoop iron and sheets for that district an average of 10 m. per 100 kg., bar iron now being quoted at 240 m. and hoops at 290 m. per 100 kg. The Bar Iron Merchants Association at Cologne has abolished the so-called guidance prices hitherto in force and fixed minimum base prices.

The Deutsch-Luxemburgische Bergwerks-und Hütten Aktien Gesellschaft in conjunction with the Bochumer Verein für Bergbau und Gusstahlfabrikation Aktien Gesellschaft and the Stahlwerke Brünninghaus Aktien Gesellschaft have established a joint sales organization under the name of Vereinigte Edelstahlwerke G.m.b.H. with the main office at Dortmund. As indicated by the name, this organization will handle the sale of refined steel produced by these works.

The two principal machine tool dealers associations are about to amalgamate. It is reported that Rhenish-Westphalian coal companies have opened negotiations with interested groups in Denmark, Sweden and Norway for the shipment of coal and coke on a large scale as soon as all reparation shipments have been concluded.

LONG WAIT ON THE TARIFF BILL

Much Senate Opposition—New Tax Legislation Likely to Come First

WASHINGTON, Aug. 9.—Among manufacturers opinion is growing in favor of the American valuation plan as the basis of ad valorem rates in the permanent tariff bill and in the membership of the Senate Committee on Finance there is a similar tendency. Importing interests are showing increasing opposition to the proposed system. It is now believed that if the plan as embodied in the bill passed by the House is not adopted in full it will be reported to the Senate in a modified form. The latter alternative appears to be the more likely outcome.

More Favor for American Valuation

The situation was summed up in substantially the above terms to-day by a prominent member of the committee, who added that he continues to have an open mind on the question. It was reiterated that in any event many rates in the House bill will have to be examined and revised downward, and it was indicated that the metal schedule will share in the changes that are to be made. It is uncertain when the hearings before the Senate committee will be completed, and consequently when the measure will be ready to be reported to the Senate. Treasury experts have prepared a modification of the American valuation plan which is said to follow the lines suggested by George C. Davis, in charge of the comparative value report bureau, customs division, Treasury Department. This would require the American producer to prove the comparability of his article with that which is imported and in competition with the domestic product. Considerable opposition to this suggestion has developed, however, and it remains to be seen what disposition will be made of it by the committee.

The Treasury experts, according to present plans, are to go into executive session to-morrow with the committee to consider the basis of fixing ad valorem rates and also to discuss the proposed dyes embargo. These matters were to have been taken up in executive session last Thursday, but owing to the great number of witnesses who desired to be heard on the embargo, hearings have been devoted to this issue.

It is hoped by the committee to act finally on both the embargo and American valuation questions by the latter part of this week and then to begin hearings as to rates in the tariff bill, with the probability that each witness will be given only a few minutes. Opportunity to submit briefs has been granted, however. It is uncertain when the metal schedule will be reached, but if the present program is followed it is expected that it will be taken up some time next week. On this basis it would seem to be the intention of the committee to report the bill to the Senate early in September, although it has been stated that no safe prophecy can be made.

Opposition to Tariff Bill

So much opposition to the bill has developed that it is thought it will be the object of vigorous attack in the Senate and that it will be held before that body for a long period. One Senator has said that the "snow will fly" before the bill is passed. The opposition apparently is not confined to Democrats, but some Republicans, it has been declared, show "less protective tendencies than heretofore."

Whether the tariff or the revised tax bill will take precedence depends upon the progress made with each. Chairman Fordney of the Ways and Means Committee now hopes to have the tax bill ready to report within 10 days and to dispose of it in the House within a week after it is taken up in that branch.

This would mean that the tax bill would reach the Senate late in August, and probably before the tariff bill is reported. Inasmuch as the Senate Committee on Finance has held hearings on internal revenue, but devoted principally to the sales tax, it is believed that it would give early attention to tax legislation and might act on it before taking up the tariff. This suggestion is strengthened by reason of the insistence from the country that tax legislation be given preference.

Wide Variance on the Tax Bill

The difficulties of framing a tax bill are as great as are those of preparing the tariff bill. While there still is a strong opinion that proposals of the Treasury Department for revised taxation will be adopted in general, they are meeting with much opposition from several sources. It is known that some members of the House Committee on Ways and Means are not favorable to the program of Secretary of the Treasury Mellon, which would eliminate the excess profits tax, increase first class postage to 3 cents, allow an exemption of $2,000 on corporation income with an increase from 10 to 15 per cent on corporation taxes, place a graduated tax on automobiles, reduce the transportation tax, repeal soft drink taxes, and fix a tax of two cents on bank checks, besides one or two other changes.

Agricultural and labor interests are opposed to eliminating the excess profits tax and many business interests favor a sales tax. The Chamber of Commerce of the United States and the National Association of Manufacturers are among organizations that have advocated a turnover tax. But indications are that the excess profits tax will be eliminated and that a turnover tax will not be considered further. It is realized that the excess profits tax has served its purpose, and in view of the deflation and liquidation in industry it would no longer produce the desired revenue.

Intervention in the Pittsburgh-Plus Case May Be Permitted

WASHINGTON, Aug. 9.—Representatives of independent steel interests who were informed that the Federal Trade Commission would not permit them to intervene in the Pittsburgh-plus proceedings are now hopeful that they may be granted this privilege. A statement has been issued by the commission that it "has not ruled against intervention in the complaint against the United States Steel Corporation, on the part of independent producers." The information previously current, that it had been decided not to allow intervention and that the proceedings would be directed solely against the Steel Corporation, was considered so authoritative that independent producers had given up the idea of making formal application to intervene. It now is understood that such application will be made. When Acting Chairman Gaskill was asked if the statement just given out by the commission implied that intervention would be permitted he replied that it could not be so interpreted and that the only way to obtain a formal ruling from the commission would be through the filing of an application.

Sharp Cut in Shovels

The Hubbard shovel manufacturing interests, Pittsburgh, have made a radical move by taking independent action in reducing the prices on all shovels, spades and scoops $3.40 per doz., making the present quotation $8.50 per doz. on the fourth grade polished goods and the same pro rata reduction on other goods. There has been no previous change in prices of shovels, spades and scoops for about a year.

Machinery Markets and News of the Works

BUYERS GET CONCESSIONS

Machine-Tool Orders Placed on Basis of Negotiated Prices

Slight Improvement Is Noted in Some Markets but Business Is Still at Low Point

Machine-tool users who are really in earnest about placing orders are finding no difficulty in obtaining attractive price concessions from many tool builders. Official prices have been changed in only a few instances, but each transaction is subject to special negotiation, with the buyer usually being able to name, within reason, his own figure.

The only business of importance is coming from vocational schools. The Alliance, Ohio, board of education has bought 14 tools—eight lathes, two drills, two grinders, a shaper and a hack saw. No action has been taken on the 25 tools required for the Canton, Ohio, schools, bids for which went in on July 29.

The Japanese Government has bought a few lathes at Cincinnati. The International Nickel Co. is in the market for some special machinery for its new plant at Huntington, W. Va. Otherwise the Cincinnati market is extremely dull.

The Phoenix Metal Stamping Co., Philadelphia, is in the market for new or used power punch presses, a rumbler and an electric welder.

New York

NEW YORK, Aug. 9.

The sale of three machines at about $20,000, made by a New York firm last week, is considered unusually good business, so dull is the machine-tool trade. Among prospective buyers are the street railroads of New York and some vocational schools in New York and Brooklyn. The Erie Railroad is asking for two lathes and the New York Central has inquired for a 42-in. lathe and a 48-in. planer. One New York seller has been asked for eight grinders by two prospective purchasers. The American Sugar Refining Co. is expected to close shortly for the machines on its list. The inquiry of the Bethlehem Steel Co. for tools for working on materials for the New York-Jersey City vehicular tunnel is still pending.

A 15 per cent reduction in sensitive drills became effective Aug. 1.

Sales of cranes are reported from other territories than the New York district, but conditions here remain quite as dull as for some time past. Decision has been made by the city of New York to exclude all but American builders in the bidding for the 34 cranes to be erected on the piers for the Pan American Terminal & Dock Co. being built at Stapleton, S. I. Openings on the two 3-ton portal cranes for Gowanus Canal will take place Aug. 18. Among recent sales are: Cleveland Crane & Engineering Co., a 5-ton, 50-ft. span overhead traveling crane to the Centre Iron Works, 608 East 137th Street, New York; Philip T. King, 30 Church Street, New York, a second-hand 20-ton, 40-ft. boom, 8-wheel Ohio locomotive crane with 1-cu. yd. clamshell bucket to the Brooklyn Eastern District Terminal Co., Brooklyn, N. Y. The 15-ton electric traveling crane for which the Equipment Corporation of America, Pittsburgh, has been in the market is reported to have been purchased from the Chesapeake Iron Works, Baltimore.

The Reeves Domestic Utilities Co., 50 East Forty-second Street, New York, desires information on equipment for a wire goods department in a factory it expects to open in Tulsa, Okla.

The A. C. Chesley Co., Inc., 277 Rider Avenue, New York, manufacturer of fireproof doors and windows, is having plans prepared for its new two-story plant, 100 x 210 ft., on East 132nd Street, extending through to East 133rd Street. P. S. Murray, Tuckahoe, N. Y., is architect.

The Stone Mfg. Co., Brooklyn, has been incorporated with a capital of $250,000 by W. C., H. C. and A. G. Stone, Brooklyn, to manufacture loading and unloading machinery and kindred equipment. It is represented by F. V. Winters, 1133 Broadway.

The Typo Re-Inker Co., New York, has been chartered under State laws to manufacture inking machines and parts. The incorporators are J. F. Markey, A. K. Dohrmann, and G. F. Allison, 115 Broadway.

A new two-story power house, 52 x 68 ft., will be erected by the Artistic Dyeing Co., 100 Jewel Street, Brooklyn, at Moultrie and Meserole avenues. Plans have been completed.

The I. B. Kleinert Rubber Co., 725 Broadway, New York, manufacturer of rubber specialties, has awarded a contract to the White Construction Co., 95 Madison Avenue, for a four-story and basement plant, at Fifth Avenue and Eighteenth Street, College Point, L. I., to cost about $150,000, including machinery.

The Lake Champlain Pulp & Paper Corporation, Plattsburgh, N. Y., has been incorporated with a capital of $200,000 to manufacture pulp and paper products. The principal incororator is Thomson Douglas, 4 Elk Street, Albany, N. Y.

The Croton Development Co., New York, has been chartered under State laws to manufacture power machinery and parts. The incorporators are H. R. McKenzie, A. M. Barbe and E. M. Davidson. It is represented by Miller, Bretzfelder & Ruskay, 302 Broadway.

Special machinery, transmission equipment, electric motors and other electrical machinery will be installed in the new four-story plant, 198 x 204 ft., to be erected by the P. Lorillard Co., 119 West Fortieth Street, New York, tobacco manufacturer, at Avenue A and Seventy-first Street, estimated to cost about $500,000, with equipment. Ground will be broken at once.

The Amory Garage & Auto Repair Co., New Brunswick, N. J., has been incorporated with a capital of $125,000 by William Goodwin and Klemmer Kalteissen, 101 Albany Street, to operate a machine and repair works, parts manufacture, etc.

The Kennedy Valve Mfg. Co., 95 John Street, New York, manufacturer of valves and other steam specialties, with plant at Elmira, N. Y., has acquired the factory of the Ellis-Smith Mfg. Co., Elmira, manufacturer of automobile jacks, etc., as an extension to its plant for the production of malleable iron castings.

The Beacon Lighting Fixture Co., New York, has been chartered under State laws to manufacture electric and gas fixtures. The incorporators are L. E. McMahon and E. A. Reilly. It is represented by O'Brien, Malevinsky & Driscoll. 1482 Broadway.

The Fordham Plaza Auto Co., Inc., 1856 Bath Avenue, Brooklyn, is having plans prepared for its three-story and basement automobile service and repair works, 100 x 155 ft., on Webster Avenue, New York, estimated to cost about $150,000. Charles W. Clark, 441 Tremont Avenue, New York, is architect.

The Delaware, Lackawanna & Western Railroad Co., 90 West Street, New York, has rejected all bids recently received for electrical equipment for the electrification of a

section of its line in the anthracite district of Pennsylvania. It is expected to advertise for new bids at an early date. Gibbs & Hill, Pennsylvania Terminal, are consulting engineers.

The Blueblaze Motor Specialties Corporation, Long Island City, N. Y., manufacturer of automobile equipment, has leased the two-story building on Seventh Avenue, near Webster Avenue, for the establishment of a new plant.

The A. L. Nichols Mfg. Corporation, Poughkeepsie, N. Y., has been incorporated with an active capital of $50,000 by J. W. Allgaze and C. F. Malcolm, Poughkeepsie, to manufacture electrical products. It is represented by F. E. Hamilton, 61 Broadway, New York.

Charles F. Rattigan, superintendent of State prisons, Capitol Building, Albany, N. Y., will receive bids until 2 p. m., Aug. 16, for the erection of an addition to the power house at Sing Sing Prison, Ossining, N. Y. L. F. Pilcher, Capitol Building, Albany, is architect.

L. H. Redner, 200 West Seventy-first Street, New York, is taking bids for a two and three-story automobile service and repair works, on West Sixty-ninth Street, estimated to cost about $125,000. Charles B. Meyers, 31 Union Square, is architect.

The Radio Corporation of America, Woolworth Building, New York, will build a new wireless plant at Warsaw, Poland, to cost about $3,000,000. The station will consist of 10 steel towers, each 400 ft. high, and the transmitting aerial lines will be about two miles in length. The Polish Government is interested in the project.

The Tidal Osage Oil Co., 11 Broadway, New York, a subsidiary of the Tide Water Oil Co., same address, operating oil refineries, has arranged for a bond issue of $3,500,000, for extensions, betterments, general operations, etc.

The United Oil Producers Corporation, 347 Madison Avenue, New York, a subsidiary of the Middle States Oil Corporation and the Imperial Oil Corporation, same address, has disposed of a bond issue of $4,000,000, for extensions, improvements and general operations of oil refineries, etc.

The Kearny Foundry Co., Kearny, N. J., has been incorporated with a capital of $25,000 by Robert Douglas, William Baskerville and Colin D. Matier, Kearny, to manufacture iron and other metal castings. Clyde D. Souter, 31 Clinton Street, Newark, N. J., represents the company.

L. Cohn & Sons, 101 East Twenty-first Street, Bayonne, N. J., ship chandlers, have had plans prepared for a new one-story building, 100 x 125 ft., at Richmond Terrace and Lafayette Street, Port Richmond, S. I. Bids will be asked at an early date.

The Ferguson Co., Millville, N. J., has construction under way on a new plant at North Millville, for the manufacture of automobile springs and kindred products. It is proposed to commence production early in the fall.

The North Jersey Steel Co., Rockaway, N. J., will install equipment at once in its new mill, and proposes to have the plant ready for service early in the fall. The present small mill will be dismantled, and the machinery removed to the new works.

Reorganization plans are being arranged for the Stanwood Rubber Co., Newark Avenue, Elizabeth, N. J., manufacturer of automobile tires, now being operated under a receivership. While the plant has been placed on the market, it is said that future arrangements will be made for a resumption of manufacture. John P. Kirkpatrick is receiver. C. O. Corry is superintendent at the plant.

The Standard Underground Cable Co., Washington Street, Perth Amboy, N. J., has made application to the Board of Aldermen for permission to extend the railroad trackage at its works, as a preliminary to the enlargement of the plant. Plans are now being developed for extensions in a number of buildings, to provide about 100,000 sq. ft. of additional floor space. The main cable plant will be increased in height from two to three stories. The entire project is estimated to cost close to $250,000, including equipment. C. C. Baldwin, vice-president, is in charge.

The Magna Metal Corporation, 227 High Street, Newark, has acquired about eight acres at Port Newark for the erection of a new factory. Plans will be prepared at an early date.

The American Bit Co., 55 New Jersey Railroad Avenue, Newark, has filed notice of organization, to manufacture bits and other hardware products. Edward Scherrek, 126 South Parkway, and Harry Scherrek, 122 South Parkway, both East Orange, head the company.

The Campbell Foundry Co., Millville, N. J., has completed plans and will break ground at once for a new one-story foundry at East Millville for the manufacture of iron castings.

Freight-handling machinery, including cranes, conveying equipment, etc., will be installed on the three piers to be constructed at Port Newark, Newark, by the Bureau of Docks. The structures each will be 200 ft. wide and 1200 ft. long, and will be part of a program, costing over $5,000,000. Arthur J. Simpson is engineer.

The Universal Stamp Works, Inc., Newark, has been incorporated with a capital of $100,000 by Elmer J. Herman, and John H. Van Court, 252 Market Street, to manufacture metal specialties.

Robert J. Metzler, Inc., Newark, has been incorporated with a capital of $100,000 by Samuel Kaufman, A. MacMillan, and Robert J. Metzler, 165 Park Avenue, East Orange, to manufacture machinery and parts.

The John S. Norton Co., 70 Hudson Street, Jersey City, N. J., metal products, has completed plans for a new one-story building, 50 x 100 ft., to cost about $17,000.

New England

BOSTON, Aug. 8.

The local machine tool market, which a week ago was more active than in several previous weeks, has suffered a relapse. Sales, which have been few, included a profiling machine to the United Shoe Machinery Corporation, Boston; a 2½-ft. radial drill to the Eastern Mfg. Co., South Brewer, Me., and a 13-in. x 6-ft. lathe and 21-in. drill to a Winthrop, Mass., garage. The J. Spaulding & Sons Co., Inc., Manchester, N. H., fibre counters, is in the market for one 16-in. and one 20-in. shaper, December or January delivery, and for one 16-in. x 8-ft. and one 14-in. x 8-ft. lathe for its new Tonawanda, N. Y., plant. Several prospects considered good and included in those reported last week are still under negotiation. One Western manufacturer of drills has issued a new price list showing slight declines on some equipment, no change in others, and an advance of $15 on at least one tool, while a maker of drilling and of horizontal boring and milling machines has cut prices 10 per cent. Lower prices, however, have been named recently on prospective business.

At the auction sale of the equipment of the Industrial Research Corporation, New Haven, Conn., Aug. 4, comparatively few buyers attended. The machines went slowly and generally at new low prices for the year. Practically half the tools were as good as new, having been installed in the plant last winter and operated from then until late in April only, when operations ceased. Of the industrial interests represented at the sale, the local gas company, the Somerville Mfg. Co., Somerville, Conn., the National Woodworking Machinery Corporation, Dover, N. H., and Johnson & Bassett, Worcester, Mass., machinists, were the largest buyers. Dealers from Pawtucket and Providence, R. I., and from Bridgeport and Hartford, Conn., took considerable equipment. Some tools were purchased for a California interest, and a New York concern bought a large press.

Two Reed-Prentice high-speed ball bearing sensitive drills sold for $50 each, and two Myers 14-in. sensitive drills at the same price. Johnson & Bassett, Worcester, purchased a 20-in. Barnes camel back upright drill, built within two years, at $90. A 22-in. Barnes upright drill was bid in at $130 for the California interest, the highest price paid for any drill offered. A five-spindle Taylor & Fenn high-speed sensitive drill went to a Hartford, Conn., interest at $80. A Myers No. 1 upright bench sensitive drill sold for $17.50, and a similar machine at $20, the latter to the New Haven gas company.

The National Woodworking Machinery Co. bought a Brown & Sharpe No. 3 universal cutter and reamer grinding machine for $105, while a Hartford interest paid $200 for a No. 103 Rivett internal cylindrical grinder. Other grinding machines sold at very low prices. For instance, a Pratt & Whitney contour cutter grinder went for $65; a J. G. Blount wet tool grinder, $35; a No. 10 Builders Iron Foundry, $15; a Browne & Sharpe No. 2 type automatic surface grinder, $125; a Myers bench double grinder, $15, and two others at $20. A United States Electric Tool Co. portable electric tool post sold for $12.50 and a Universal automatic face grinder, $25.

The Somerville Mfg. Co. paid $862 for a No. 2 Cincinnati miller, which cost the Industrial Research Corporation $1,600 last January. J. E. Conant & Co., about seven months ago, sold a similar machine, not in as good condition, however, for $1,890. A No. 1½ American plain milling machine brought $300; No. 2 Brown & Sharpe plain miller $362.50 and a No. 13 Pratt & Whitney Co. Lincoln type, extra size and extra heavy miller $200, the latter going to the Pacific Coast interest. The same company took a No. 2 Brown & Sharpe universal milling machine at $500, which cost the New Haven concern $950 f.o.b. shipping point. A Pratt & Whitney full automatic thread miller went for $20 and a similar machine for $35, while a Pratt & Whitney 4-in. automatic spline miller brought $30. A No. 3½ Fox knee type plain miller sold for $55, another for $35 and two others to

one company for $30 each. A Pawtucket, R. I., dealer paid $45 for a Utility milling appliance and dividing head, which recently was quoted at better than $200 in the open market.

The highest price paid for a lathe was $412.50 by the Somerville Mfg. Co., which was a 21-in. x 11-ft. Waterville Iron Works Roulsted, costing the company $1,200. A heavy type 22-in. x 11-ft. Reed screw cutting engine lathe sold at $287.50 and a 19-in. x 9-ft. machine made by the same concern at $237.50, while two 10-in. x 4-ft. Seneca Falls Star lathes brought $135 each, a Bridgeport interest taking one and a New Haven the other. The two latter lathes cost the company $235 each. A 16-in. x 6-ft. South Bend sold for $135, and a 15-in. x 6-ft. $300; while $45 was the best bid for a 14-in. Reed stud lathe, $20 each for two 13-in. x 6-ft. Pratt & Whitney plain turning lathes, $70 for a No. 3½ Stark precision bench, and $30 for a G. Boley watchmaker's 4 x 14-in. lathe.

A Steptoe crank shaper with a 20-in. stroke was taken at $97.50; Gould & Eberhardt gear-crank shaper with a 24-in. swing, $137.50; three Pratt & Whitney shaving machines, $12.50 each; an M. A. Co. heavy-type vertical swinging straightening press, $25; two No. 2 B Cochrane-Bly cold saws, $25 and $30, and the New York manufacturer paid $950 for a 400-ton Woods hydraulic press with pump equipment, sold subject to the court's order, which cost the company $3,600 to install. The local gas company bought a Steward standard No. 0 muffle gas furnace connected with a pressure plower and bench, anvil, galvanized iron bench 80 x 28 x 34-in., a model 162 Bristol electric pyrometer, together with other hardening furnace equipment, all for $40.

A Chisholm-Moore Cyclone one-ton chain hoist sold at $20, four new Boyer pneumatic hammers at $19 for the lot, and five No. 5 Parker mechanics' vises, $4 each. Spring chucks sold at the rate of $5 per dozen and less, speed drills for a few cents each, some as low as 5c. and high-speed milling cutters 10c. each and less.

The Chapman Valve Co., Springfield, Mass., recently purchased a 60-in. sand blast barrel weighing more than 12 tons for its new foundry.

The McKinnon Vacuum Trolley Harp Co., Holyoke, Mass., has been granted a Massachusetts charter to manufacture mechanical equipment. Allan McKinnon, 279 Walnut Street, Holyoke, is president, and Henry E. McElwain, 209 Linden Street, Holyoke, treasurer.

Contract has been awarded for the erection of a two-story U-shaped plant, 60 x 200 ft., by the Ansonia Electric Co., Ansonia, Conn.

A contract has been let by the Boston & Maine Railroad Co. for the erection of a roundhouse containing 28 stalls, and other buildings, at Concord, N. H.

The Stanley Works, New Britain, Conn., has incorporated a part of its rule making plant under the name Upson Rule Co., with an authorized capital of $50,000 divided into 2000 shares, par $25. C. F. Bennett is president.

The Wallace-Barnes Co., Bristol, Conn., special screw machine products, flat and wire springs, etc., in the near future will open a Canadian manufacturing plant. Treuman B. Norton will be plant superintendent and Eric E. Waldo his assistant.

The American Grinder Co. division, Greenfield Tap and Die Corporation, Greenfield, Mass., is being moved from Worcester to the latter city. According to present plans, the grinder company will be housed in a plant in close proximity to the Greenfield company, the two divisions to be operated as separate units and not consolidated, as originally planned.

The Connecticut Rubber Co., Hartford, Conn., has bought the Slade Co. plant, Oakville, Conn., in which automobile tire tubes and tube protectors will be manufactured.

The Bell Tone Mfg. Co., Bridgeport, Conn., has been incorporated with a capital of $250,000 by Charles Gardner, T. R. Adkins, and Frank Dieli, 40 Court Street, to manufacture automotive equipment and other products.

The J. D. Crosby Co., Pawtucket, R. I., is perfecting plans for rebuilding its steel fabricating plant, recently destroyed by fire with loss in excess of $50,000. The work will include a new machine shop and annealing plant.

The Richard H. Long Co., Framingham, Mass., has filed plans for the construction of a two-story, reinforced-concrete plant on property recently acquired on Millbrook Street, Worcester, Mass., for the manufacture of automobile bodies and other automotive equipment, estimated to cost about $65,000. Plans have also been filed for a one-story power house.

The Director of Public Works, New Haven, Conn., will receive bids until 10 a.m., Aug. 15, for center bearings, track segments, bogie wheels and other mechanical equipment for the Ferry Street bridge over the Quinnipiac River, E. S. Nettleton is city engineer.

The Builders' Iron & Steel Co., Garvey Street, Everett, Mass., has filed plans for a new one-story factory to cost about $65,000. A one-story storage building will also be constructed. Contract for erection was awarded recently to the Blake & Pope Co., 15 Beacon Street, Boston.

The Chapman Valve Co., Indian Orchard, Mass., has had plans prepared for a one-story addition to cost about $15,000, supplementing the new foundry now in course of construction. The Associated Architectural & Engineering Co., 145 State Street, Springfield, Mass., is architect.

Plans are under way for a merger of the Fisk Rubber Co., Chicopee, Mass., with the Federal Rubber Co., Cudahy, Wis., and its subsidiary organization, the Ninigret Co., all devoted to the manufacture of automobile tires and tubes. The property will be taken over in the Fisk company name, and a bond issue of $10,000,000 to carry out the consolidation is being arranged.

A one-story power house and boiler plant to cost $60,000 will be erected by the Cambridge Gas Light Co., Cambridge, Mass.

Chicago

CHICAGO, Aug. 8.

While formal orders for the machine tools recently selected by the Illinois Central have not been issued from the purchasing department of that railroad, this is believed to be merely a matter of routine and orders are expected shortly. There is nothing else of importance in the market. Sales are few and confined almost wholly to single machines and few of these. Inquiries are likewise scarce. None of the business which has been pending for some weeks or months seems to show any promising signs of life.

Reports from machine-tool manufacturing centers, such as Cincinnati and Rockford, Ill., indicate an almost complete shut-down of machine tool plants. In some factories even the foremen have been discharged and there is nothing to indicate when operations may be resumed. Most machine-tool plants have fairly good stocks on hand and these will have to be absorbed before production of more tools is begun.

Prices remain unchanged, except that concessions have been made on special transactions, such as the Illinois Central purchases. The question of price is regarded with seeming indifference by most of the local dealers because of the belief that even substantial reductions would not be effective now in bringing out any business.

The Northern Boiler & Iron Works is a new industry at Houghton, Mich. The plant is being started by King Brothers, formerly of Marquette, Mich. It will make a specialty of boiler repairing and acetylene welding.

Hale Dunham has purchased the interest of his partner in the Nash garage at Fond du Lac, Wis., and intends installing machines for garage repair work.

The Ampco Metal Products Co., Springfield, Ill., has completed the erection of its initial factory and has begun the manufacture of brass and aluminum castings. The building cost about $40,000. B. F. Hayden is president. Later a complete machine shop will be erected and equipped.

The United States Lock Nut Corporation, 400 North Michigan Avenue, Chicago, has increased its capital stock from $1,000,000 to $2,000,000 for the purpose of providing funds for the erection of a new plant, probably in the Pittsburgh district. Present plans provide for starting work about Jan. 1. The plant will cost about $500,000 and will be equipped with special nut making machinery, mostly of the company's own design.

The Champion Wrench Mfg. Co., 928 West Huron Street, Chicago, has increased its capital stock from $50,000 to $200,000 to provide for the purchase of new special machinery for wrench manufacture.

The Machinery & Supply Corporation, Joplin, Mo., has completed a new plant in that city for rebuilding second-hand machinery. Some time ago it bought the United Iron Works, Inc., Joplin. D. C. Morrow, Kansas City, Mo., is president. Offices of the company are at 317½ Joplin Street, Joplin.

The Standard Safety Equipment Co., 168 North Michigan Avenue, Chicago, has recently been organized to manufacture standard safety equipment and supplies. C. A. Kingsbury is president; F. L. Hurlbutt, treasurer, and L. E. Dickson, secretary. An Eastern office in the Clinton Building, Newark, N. J., with A. U. Barnes as manager, and a Detroit office at 414 Grand River Avenue, that city, have been opened.

The Briskin Mfg. Co., 215 South Hoyne Avenue, Chicago, manufacturer of sheet metal products, etc., has rejected bids for its two-story addition, 50 x 80 ft., and will call for new bids on revised plans. Dubin & Eisenberg, 139 North Clark Street, Chicago, are architects.

The Marquette Electric Co., 222 Austin Street, Chicago, manufacturer of electrical specialties, has filed plans for a new factory at 1401 Center Street, to cost about $40,000.

The Owens Motor Sales Co., 713 University Avenue, St. Paul, Minn., has rejected bids for the addition to its service building and repair works, estimated to cost close to $100,000. New bids will be asked at a later date. Toltz, King & Day, 1410 Pioneer Building, are architects.

The American Tar Products Co., 208 South LaSalle Street, Chicago, is having plans prepared for the construction of a new refinery at Thirty-ninth Street and Fifty-second Avenue, one and two-stories, estimated to cost in excess of $800,000, with machinery.

The H. McFarlane Co., 532 South Canal Street, Chicago, manufacturer of wagons and parts, has awarded a contract to the Adams Construction Co., 111 West Washington Street, for its new three-story and basement plant on Green Street, estimated to cost about $400,000, with machinery. J. L. McConnell, 105 West Monroe Street, is architect and engineer. H. F. McFarlane is president.

Philadelphia

PHILADELPHIA, Aug. 8.

The Hurley Motor Co., Broad and Race streets, Philadelphia, has filed plans for a new 10-story manufacturing plant at 219 North Broad Street, reinforced concrete, 80 x 100 ft., estimated to cost about $350,000.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, will use its Essington Works, near Philadelphia, for the manufacture of a large part of the electrical machinery and equipment for the Midi Railway, France, order for which, totaling $1,200,000, was recently received.

The Silencer Mfg. Co., Philadelphia, is being organized by Theodore F. Rose, Jr., John H. Moran and John J. Baker, to manufacture telephone attachments and other mechanical devices. It is represented by John Weaver, Commercial Trust Building. Application for a State charter will be made on Aug. 18.

The Perfection Auto Specialty Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Frederick Weirman, Charles A. Pierce, Philadelphia, and W. Hallam, Jr., Phoenixville, Pa., to manufacture automobile equipment. The company is represented by the Colonial Charter Co., Ford Building, Wilmington, Del.

The Philadelphia Automobile Lamp & Radiator Repair Co., 1304 Callowhill Street, Philadelphia, is completing plans and will soon take bids for a new three-story works, 16 x 95 ft., at 1329 Poplar Street, to cost about $30,000.

John Evans' Sons, Inc., Philadelphia, is being organized by William, John H. and Robert Evans, to manufacture iron and steel products. It is represented by Edward J. Gallagher, Jr., 405 Lincoln Building. Application for a State charter will be made on Aug. 20.

The Bush Hill Electric & Supply Co., Philadelphia, has been incorporated under Delaware laws with capital of $50,000 by Walter M. Fixter, Robert B. Yohey and Walter F. Secules, Philadelphia, to manufacture electrical fixtures and supplies. It is represented by the American Guaranty & Trust Co., Philadelphia.

The Biddle-Crane Motor Car Co., Philadelphia, has been incorporated with a capital of $600,000 under Delaware laws to manufacture automobiles. The company is represented by the Corporation Trust Co., du Pont Building, Wilmington, Del.

The Progressive Tile & Cement Works, Pottsville, Pa., is planning for the construction of a new branch plant at Hazleton, Pa.

Herman Olden, 1455 Broadway, Camden, N. J., has preliminary plans under way for a new one-story foundry, 60 x 100 ft., and estimated to cost $30,000.

The Delaware, Lackawanna & Western Railroad Co., coal mining department, Scranton, Pa., has awarded a contract to the Industrial Construction Co., 514 Union National Bank Building, for the erection of a new machine and forge shop at its Storrs Colliery, one-story, 50 x 200 ft., and estimated to cost about $60,000. It will also build a one-story addition to its coal-washing plant at this point to cost about $35,000. A new electric power station and hoisting engine house will be constructed at the Bellevue colliery.

The Board of Education, Camden, N. J., will receive bids until 2 p. m. Aug. 22 for equipment for machine and forge shops, sheet metal shop, foundry and wood-working shops. Specifications may be had upon application to the board, City Hall, Camden.

Leroy A. Goodwin, P. A. Stewart and J. L. Blandy, members of the board of directors of the Chamber of Commerce, Gloucester City, N. J., are interested in the establishment of a plant for the manufacture of news-print paper, utilizing the former buildings of the Argo Mills, manufacturer of textile products. A company capitalized at $1,000,000 is being formed by Frank J. Hummell, owner of the mill property, and associates. A list of machinery has been arranged, and it is proposed to have the plant ready for service by the end of the year.

Pittsburgh

PITTSBURGH, Aug. 8.

Machine tool inquiry generally is better, but manufacturers in their eagerness to secure orders practically are allowing buyers to name their own figures and the latter, fearing they will not buy at the bottom, are very slow to close. It is said that a salesman who recently called at a plant where some new equipment was necessary, on account of an order just booked, named a price of $18,000 on the tools wanted and following a meeting of the officers of the company was told that the price was too high. The salesman asked the prospective buyers to name what they considered a fair price and $15,000 was mentioned. The salesman then sought to get the order immediately and lopped off $1,000 from the price the buyers were willing to pay. He was instructed to call the next morning for his answer and was then told that it had been decided to postpone the purchase for a time. Some makers of machine tools who have not announced price cuts recently have offered to take 10 per cent off for cash. There is little business in cranes, the only award recently made being a 10-ton overhead by the Greenville Steel Car Co., Greenville, Pa., to the Cleveland Crane & Engineering Co., Wickliffe, Ohio. The original inquiry for this crane was put out almost a year ago. The Pittsburgh Bureau of Water is in the market for a 35-kw. direct current, turbo-generator unit.

The Resilient Safe Wheel Co., Inc., 121 Sixth Avenue, Pittsburgh, has acquired the plant of the American Axe & Tool Co., Glassport, for a new works. It consists of 21 buildings, on a 20-acre site, and was secured for a consideration said to be $850,000. A number of improvements will be made and it is planned to equip the works with machinery now in the plant at Los Angeles. It is proposed to give employment to about 500 operatives, beginning production early in the coming year. The company, a Delaware corporation, recently has increased its capital from $1,000,000 to $3,000,000. The Glassport plant has not been in operation for about two years.

The Scientific Specialty Co., Pittsburgh, is being organized by Joseph C. Keaney, C. D. Stewart and C. L. McCobb, Pittsburgh, to manufacture light hardware products, metal kitchen utensils, etc. It is represented by C. L. McCobb, 425 Wabash Building.

The North Pole Ice Co., Carson Street, Pittsburgh, is clearing the site for its new ice-manufacturing plant, and ground will be broken at an early date. It will be one-story, 60 x 100 ft., and is estimated to cost about $50,000.

The Conewango Car Co., Warren, Pa., recently organized to take over the plant and business of the Allegheny Foundry Co., has completed plans for rebuilding the former Allegheny works, recently destroyed by fire, to consist of a main car works, 50 x 150 ft.; machine shop, 50 x 140 ft.; and general building, 22 x 40 ft. Construction will begin at an early date.

Fire, Aug. 3, destroyed the press mill at the plant of the duPont Powder Co., Uniontown, Pa. It will be rebuilt.

The Regent Auto Service Co., Pittsburgh, is being organized by Ernest H., Frank W. and E. R. Heinrichs to manufacture automobile parts and equipment and operate general machine works. It is represented by J. Weinman Cratty, 1412 Berger Building. Application for a State charter will be made on Aug. 29.

George Griffith, Johnstown, Pa., has completed plans and will take bids at once for a new two-story machine shop, 50 x 100 ft. H. B. Raffensperger, News Building, is architect.

The Standard Electric & Radio Corporation, Pittsburgh, is being organized by David Rose, Torrance H. Lewis and Clarence O. Fisher, Pittsburgh, to manufacture electrical equipment and radio apparatus. Benjamin P. Brasley, Bakewell Building, represents the company. Application for a State charter will be made on Aug. 22.

Material-handling and hoisting equipment, loading and unloading machinery, etc., will be installed at the new plant to be established by the H. Miller & Sons Co., Pittsburgh, building contractor. The company has purchased property at Fifth Avenue and Robinson Street, 220 x 460 ft., and 100 x 120 ft.

The E. E. White Coal Co., Glen White, W. Va., is planning for the construction of a new tipple at its properties. A one-story power house will also be constructed, with boilers equipped with automatic stokers. E. E. White is president and general manager.

The International Harvester Co. of America, Harvester Building, Chicago, has had plans prepared for a two-story and

basement addition to its building at Parkersburg, W. Va., 43 x 75 ft.

The Maryland-New River Coal Co., Winona, W. Va., will install new loading equipment, shaker screens and other mechanical apparatus at its local plant.

Buffalo

BUFFALO, Aug. 8.

The Lamson Co., Lowell, Mass., manufacturer of pneumatic tubes, merchandise carriers and other conveying equipment, has concluded arrangements with the Chamber of Commerce, Syracuse, N. Y., for the establishment of a plant and the removal of its Lowell works to the new location. Property has been secured in the Eastwood section, and plans will be under way at an early date for the erection of a general metal-working plant, machine shops, assembling works, etc. The change in location is being made primarily for expansion purposes, and considerable new machinery will be installed. It is said that the new plant will give employment to more than 700 operatives, and is estimated to cost in excess of $1,000,000. William F. Merrill is president. The present headquarters are at Boston.

The Houde Engineering Corporation, 1392 West Avenue, Buffalo, manufacturer of shock absorbers and kindred products, has awarded contract to William Henrichs & Son, 193 Spring Street, for a new two-story factory, 37 x 100 ft., on West Avenue, to cost about $40,000. Ground will be broken at once.

The Buffalo Automotive Specialty Co., Buffalo, has been chartered under State laws to manufacture automobile equipment and parts. The incorporators are E. J. and M. H. Schork, and E. M. Allen. It is represented by T. W. Van Arsdale, attorney, Buffalo.

The Bradley Pattern Works, Inc., Buffalo, has been chartered under State laws to manufacture metal and wood patterns, and kindred products. The incorporators are J. W. Bradley, F. Leney and H. Scheibel, Buffalo. It is represented by Ferguson & Magavern, attorneys, Buffalo.

The Madison Power Co., Solsville, N. Y., has made application to the Public Service Commission for permission to build a new local electric light and power plant.

The Doman Mfg. Corporation, Elbridge, Onondaga County, N. Y., has been incorporated with a capital of $200,000 to manufacture electrical and mechanical equipment. A. E. Doman, Elbridge, is the principal incorporator.

The Georgetown Electric Lighting Co., Georgetown, N. Y., has plans under way for a new electric light and power plant.

Joseph M. Lang, 142 Dutton Street, Buffalo, has filed plans for the erection of a sheet metal shop.

The Adria Motor Car Corporation, Cleveland, has acquired the buildings in Evans Street, Batavia, formerly occupied by the Gray Tool & Machine Co., for a new plant.

Fire, Aug. 5, destroyed $50,000 worth of machinery in the ice and cold storage plants of the New York Central Railroad, Babcock and William streets, Buffalo.

George C. Riley, 714 Ellicott Square, Buffalo, represents the newly organized Memorial Highway Tire Corporation which has incorporated with a capital of $25,000. It will manufacture automobile accessories.

Cleveland

CLEVELAND, Aug. 8.

Activity in the machinery market is largely confined to purchases by schools. During the week the Board of Education, Alliance, Ohio, placed an order for equipment covered in a list of 14 machines sent out several weeks ago, which included eight lathes, two drilling machines, two grinding machines, a shaper and hack saw. One local dealer took seven machines and other local houses took the remainder. The Canton, Ohio, Board of Education has taken no action on its list of 25 machines, for which bids were received July 29. A few machines were purchased the past week for a vocational school in Marion, Ohio and it is reported that these were placed directly with manufacturers at very low prices. An order for two 24-in. lathes was placed by the Arctic Ice Machine Co., Canton, Ohio. Dealers report quite a few sales in single machines, largely second-hand. As a whole, the demand is about the same as during the past few weeks.

There is increasing evidence of price cutting and some dealers look for further reductions within the next few weeks, particularly on some of the larger types of machines. An Eastern builder has announced a reduction of 10 per cent for a 30 day period on his line of 27 to 60-in. lathes. Considerable rebuilt machinery is being offered at apparently attractive prices by machine tool builders who have surplus machinery of various types in their plants and are furnishing employment for their men in rebuilding these machines for sale. Local foundries show no change in operations, now running on an average of about 25 per cent capacity or about the same as for the past 60 days.

The Cleveland Cold Drawn Steel Co., organized some time ago to establish a plant for the manufacture of cold drawn steel, has decided to select a site in some other city and is considering the erection of its plant in Chester, W. Va., across the river from East Liverpool, Ohio. However, the final selection of this site depends upon financial assistance to be offered by Chester. Frank B. Kew of East Liverpool, formerly superintendent of the cold drawn steel department of the Crucible Steel Co.'s plant at Midland, is temporary president of the company.

The Massillon Wire Basket Co., Massillon, Ohio, has purchased the business and equipment of the Scio Wire Crate Co., Scio, Ohio, which it will remove to Massillon.

The Canton Oxygen Co., Canton, Ohio, will shortly begin the erection of a plant for the manufacture of oxygen, involving an expenditure of $50,000 or more for building and equipment. It has a capital stock of $250,000. William L. Stolzenbach and others are interested.

The Canton Metal Products Corporation, Canton, Ohio, has taken an order for steel doors, door frames and other steel building material for inside finish for the new Cleveland City Hospital. The contract amounts to about $250,000.

The Lucius Mfg. Co., Urichsville, Ohio, has been incorporated with a capital stock of $150,000 by C. W. Lucius and others to manufacture welded steel tanks.

Baltimore

BALTIMORE, Aug. 8.

The Greenmount Iron Mfg. Co., 833 Greenmount Avenue, Baltimore, has had revised plans prepared for its foundry addition to cost about $15,000, and will call for construction bids at an early date.

The Department of the Interior, Washington, F. M. Goodwin, assistant secretary, will receive bids until 2 p. m., Aug. 18, for four sets of stokers for installation at the Freedman's Hospital power plant, Washington. Plans and specifications are on file at the office of the chief clerk of the department.

The Brosvik Sales Co., Inc., 418 East Clement Street, Baltimore, has been incorporated with a capital of $100,000 by Bertel B. Brosvik, Arthur Fredericks and Leo Connor, to manufacture can openers, nippers, wrenches, and other metal products.

The Bogdan Cushion Wheel Hub Co., Wilmington, Del., has been incorporated with a capital of $1,200,000 to manufacture special wheel hubs and kindred parts for automotive service. It is represented by Arley B. Magee, 33 South State Street, Dover, Del.

The Vitalis Products Co., Wilmington, Del., has been incorporated under State laws with a capital of $13,000,000 to manufacture electric storage batteries and other electrical equipment. The company is represented by the Corporation Trust Co., du Pont Building, Wilmington.

The Hampton Roads Equipment Co., 251 Arcade Building, Norfolk, Va., has been incorporated with a capital of $150,000 to manufacture road-building machinery, contractors' equipment, etc. J. M. Sherrod is president, and W. L. Duncan, secretary, treasurer and general manager.

The Bureau of Yards and Docks, Navy Department, Washington, has had plans prepared for a new power house at Alexandria, Va.

The Williston Ice Co., Williston, S. C., is planning to rebuild its ice-manufacturing and refrigerating plant, recently destroyed by fire.

The Hampton Roads Ship Repair Corporation, Norfolk, Va., has been incorporated with a capital of $50,000 to operate a local shipbuilding and repair plant. William H. Johnson is president, and E. C. Davison, Richmond, Va., secretary.

The Common Council, Donalds, S. C., is arranging for a bond issue for the installation of a municipal electric lighting plant. B. H. Carleton, commissioner of public works, is in charge.

The Bristol Aero Co., Bristol, Va., will establish a parts manufacturing shop and repair works in connection with its new airplane hangar, to be constructed on a local site. A. E. Fuller is president, and George Furrow, secretary and general manager.

The Fitch Vending Machine Co., Buchanan, Va., has been organized with $15,000 capital stock. The officers are J. F. Fitch, president; A. B. Land, secretary, and O. E. Obenshain, treasurer.

The Floatless Carburetor Corporation, 916 Munsey Building, Baltimore, has been incorporated with $100,000 capital stock to manufacture automobile accessories and devices. The incorporators are F. Strattner Orem, Claude R. Hays and R. Contee Rose.

Cincinnati

CINCINNATI, Aug. 8.

A slight improvement was noted in the machine tool market the past week but business is still at a very low point. The Maxwell Motor Car Co. bought several tools, and it is stated that further purchases will be made, as it is the intention to replace old equipment with the latest production machinery. The International Nickel Co., is in the market for several special machines for its Huntington, W. Va., plant. Some buying is also reported for the Japanese Government, a local firm booking orders for several lathes. An Eastern manufacturer of shapers is said to have reduced prices approximately 15 per cent, which will probably be met by manufacturers in this district.

The Globe Metallic Works, Gest Street, Cincinnati, manufacturer of metal specialties, has purchased property at 917 State Avenue and has plans for a new factory, 40 x 95 ft. Kunz & Beck, Cincinnati, are architects. H. M. Schau is president of the company.

The Abel Magnesia Co., Columbus, Ohio, recently incorporated with a capitalization of $400,000, will shortly commence the erection of a plant at Cedarville, Ohio. The main structure will be 65 x 65 ft., five stories, and the dryer building 60 x 160 ft., one story. Operations are expected to begin by January. The estimated cost is $250,000.

The Bauer Brothers Co., Springfield, Ohio, operating a foundry and manufacturing farming machinery, has been authorized to increase its capitalization from $450,000 to $550,000. The company has been extending its plant and enlarging its facilities for several years and further additions are in contemplation. Charles L. Bauer is president.

The Norton-Broadway Machinery Co., general machinery dealer, Cincinnati, is in the market for a rock crusher, or pulverizer and portable cement mixer; No. 4 or 5 Gates gyratory crusher; 12-in. pipe machine; 8 x 8 and 10 x 10 belt driven air compressors; 24-in. shaper; No. 60 Heald grinder; three 12-in. and 13-in. light engine lathes; 1½-in. bolt cutter; 75 hp. fire box boiler; three 16-in. x 8-ft. or 10-ft. engine lathes; punch presses; one 12-in. sand pump with vertical shaft; one 5000 and one 10,000 gal. oil tank, and one 6 or 7-ft old style, single head vertical boring mill.

Detroit

DETROIT, Aug. 8.

A slight improvement in the demand for tools is noted in this district. The fact that most plants, however, are operating only at part capacity gives rise to the belief that no general recovery is in sight immediately. Automotive production in Detroit is better so far this month than last.

According to officials of the new Rickenbacker Motor Co., Detroit, it has contracted with the Murphy Chair Co., Detroit, for its plant site. The company has received permission to sell $4,000,000 worth of stock.

The Acason Motor Truck Co., Detroit, has purchased the property of the David Buick Carburetor Co., Wyandotte, Mich., and will remove its plant to that location.

The Detroit Automatic Scale Co., has moved its factory and general offices to Dayton, Ohio. It has been consolidated with the Computing Scale Co. of America, of which the Detroit concern has been a subsidiary.

The Kroff Mfg. Co., Lansing, Mich., will resume operations this month. The plant was recently damaged by fire but has been rebuilt and much of the machinery has been salvaged and is being repaired. It manufactures metal voting booths and other steel articles.

Headquarters have been opened at 5739 Michigan Avenue, Detroit, by the Hydraulic Hoist Mfg. Co., St. Paul, Minn., manufacturer of St. Paul hoists and Superior bodies. The local establishment is a factory branch and is in charge of Robert E. Kilgrove. It will handle Michigan and Ohio business.

The Northern Engineering Works, Detroit, recently sold a 10-ton traveling crane to the Kansas State University.

The Kuhlman Electric Co., Twenty-sixth Street, Bay City, Mich., manufacturer of electrical apparatus, is completing plans for a one-story addition, 50 x 80 ft., and will break ground at an early date. John C. Hewitt is president.

The Detroit Automatic Machine Co., Detroit, has been chartered under State laws to manufacture automatic screw machine products and other equipment. The incorporators are Henry Holland, Horace W. Peters and Jay L. Wells, 3016 Kirby Avenue, West.

The Campbell Mfg. & Foundry Co., Muskegon, Mich., has filed notice of change of name to the Muskegon Castings Co. It will operate with a capital of $100,000.

The Detroit Bumper Corporation, Detroit, has been chartered under State laws to manufacture automobile bumpers and similar metal products. The incorporators are Henry Gardner, Charles M. Phillips and Hugo Stark, 4839 McClellan Avenue.

The Rathbun Mfg. Co., Muskegon, Mich., has been incorporated with a capital of $25,000, to manufacture automobile equipment and appliances. The incorporators are Milo D. Rathbun, H. O. Belk and Harris E. Galpin, Muskegon.

Indiana

INDIANAPOLIS, Aug. 8.

C. & G. Potts & Co., 816 West Washington Street, Indianapolis, Ind., manufacturers of brick-making machinery, etc., have excavation work under way for their new one-story foundry addition at Washington and Blake streets, 60 x 130 ft., estimated to cost about $45,000. The Builders Construction Co., 540 North Meriden Street, has the contract. The company formerly was known as the C. & A. Potts Co.

Officials of the United States Automotive Co., Connersville, Ind., operating the Lexington Motor Co., for the manufacture of automobiles, have organized the Fayette Painting & Trimming Co., with capital of $500,000, for the production of automobile bodies for the parent company. It is proposed to develop a capacity of 50 bodies per day. Frank B. Ansted is president, and Frank M. Crawford, vice-president and general manager.

The Elwood Pattern & Castings Co., Elwood, Ind., has leased buildings heretofore used by the Union Traction Co., and will remodel and improve the structures for a new foundry and pattern works. Charles P. Rush and John P. Ritchie head the company.

The Martin Parry Corporation, Indianapolis, manufacturer of commercial automobile bodies, is arranging for the establishment of new assembling plants, at Philadelphia, Pittsburgh, Cleveland, Detroit, St. Louis, Kansas City, Mo., and Newark, N. J.

The Horace F. Woods Transfer Co., 216 North Meriden Street, Indianapolis, has rejected bids for its proposed automobile service and repair works, and will call for new bids at an early date. The structure will be three-stories and basement, 61 x 100 ft., and is estimated to cost about $80,000.

The Resistant Alloy Casting Co., Gary, Ind., has been incorporated under Delaware laws with capital of $300,000, to manufacture iron and other metal castings. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Central South

ST. LOUIS, Aug. 8.

The St. Charles Garage Co., St. Louis, has plans under way for a four-story service and repair building, 130 x 160 ft., at St. Charles and Eleventh streets, to cost about $300,000, including equipment. N. B. Howard, Arcade Building, is architect. T. S. Kirkpatrick, 5510 Cates Avenue, is one of the heads of the company.

Fire, July 28, destroyed a portion of the works of the Joplin Iron & Metal Co., Joplin, Mo., with loss estimated at about $25,000. It will be rebuilt.

The Louisiana & Arkansas Railroad Co., Stamps, Ark., is having plans prepared for a new one-story locomotive repair and machine works, estimated to cost about $150,000, with equipment. Harrington, Howard & Ash, Orear-Leslie Building, Kansas City, Mo., are architects and engineers.

The Arkansas Hydroelectric Co., Boyle Building, Little Rock, Ark., will commence the immediate construction of its new hydroelectric generating plant on the Red River, to have an initial capacity of 22,000-hp. J. E. Sirrine, Greenville, S. C., is consulting engineer. E. T. Stanfield is vice-president and general manager.

The Enterprise Foundry & Machine Co., Bristol, Tenn., has acquired a local building for the establishment of a new foundry for the production of iron and steel castings. The structure will be remodeled and equipment installed at a cost of about $45,000.

The Prest Machine Works Co., Oklahoma City, Okla., has been incorporated with a capital of $40,000 to manufacture machinery and parts, and operate a repair works. Barr S. Prest is president.

The Henry Vogt Machine Co., Tenth Street and West Ormsby Avenue, Louisville, manufacturer of ice-making and refrigerating machinery, has awarded a contract to the Struck Construction Co., Garden Street, for a three-story addition, 50 x 162 ft., to cost about $60,000. Construction will begin this month.

The Common Council, Claremore, Okla., is planning for the installation of a municipal electric-lighting plant. J. M. Davis, mayor, is in charge.

Milwaukee

MILWAUKEE, Aug. 8.

The machine-tool market continues quiet, and while developments the past week or two have been more encouraging than for at least 60 days, volume is lacking. A few orders come from scattering sources and usually specify immediate shipment. The automotive industries are the best source of new business. Inquiry is slack but gives promise of some fair buying shortly. Locomotive and car building and repair shops which have been closed are now resuming work, while those which have been running at very small capacity are enlarging forces.

The Oshkosh Tractor Co., Oshkosh, Wis., incorporated recently with a capital stock of $2,000,000, has purchased eight acres for its proposed new works on Harrison Street. Ground will be broken Aug. 15 for a machine shop and assembling floor, 150 x 375 ft., one story, of brick and steel, to cost about $175,000. Contracts for the substructure have been let. The architects are Auler & Jensen, Oshkosh. The new corporation takes over the entire assets, equipment and stock of the LaCrosse Tractor Co., LaCrosse, Wis., for $850,000. A. D. Paine, 276 Main Street, Oshkosh, is president and general manager of the new corporation.

The Highway Trailer Co., Edgerton, Wis., sustained a loss of about $30,000 by fire in its main machine shop on July 29, which was the second fire believed to be of incendiary origin within the month. On July 4 the main warehouse and storage building, 190 x 960 ft., was totally destroyed, the loss being estimated at $260,000. The works of the Continental Axle Co., an affiliated concern, was located in the burned structure. Repairs and replacements of tools will be made immediately. James W. Menhall is president and general manager.

The Badger Excavator Co., Milwaukee, is a new corporation organized with a capital stock of $150,000 to manufacture excavating machinery and contractors' equipment. The incorporators are Lloyd H. Draeger, 780 Fourth Street; J. Jaeckle, and Hugo J. Trost, attorney, 425 East Water Street. Plans of the company will be announced fully within a short time.

The Tomahawk, Wis., Steel & Iron Works broke ground Aug. 3 for a new foundry and machine shop, on a new site, to supplant the works which was totally destroyed by fire in April. The investment will be about $75,000. Practically all foundry and machine shop equipment will be new and orders are now being placed.

The Board of Education, Clear Lake, Wis., has engaged Edwins & Edwins, architects, 911 Northwestern Building, Minneapolis, to design a new union high school, with vocational training departments, to cost $100,000. Bids will be taken about Sept 1. F. E. Enderholm is secretary of the board.

The Mid-West Industrial Supply Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture shop and factory equipment, supplies and accessories. The incorporators are Joseph W. Hoffmann, R. J. Haszucla and Lewis J. Brabant, attorney, 221 Grand Avenue.

The Oliver Mfg. Co., Chicago, and the Barth Mfg. Co., Milwaukee, both manufacturing lifting jacks and other automotive accessories and malleable parts, have been consolidated under the name of the Oliver-Barth Jack Co., with factory and offices at 348 352 Milwaukee Street, Milwaukee. Interests identified with the Northwestern Malleable Iron Co., Milwaukee, acquired the Oliver company last November and now have taken over the Barth company. The officers are: President and general manager, Helmus B. Wells, secretary Northwestern Malleable Iron Co.; vice-president, William H. Oliver, Chicago; secretary and treasurer, Mackey Wells; directors, Pearson Wells, Detroit, and Frederick L. Sivyer, president Northwestern Malleable Iron Co.

The Automotive Machine & Tool Co., Janesville, Wis., has installed a new cylinder grinding machine and other metal-working equipment. Further purchases will be made from time to time, according to Delbert Harder, general manager.

The Star Mfg. Co., Lomira, Wis., will start work soon on the erection of a factory for the manufacture of milking machines and other farm equipment and devices. It has recently been reorganized and is marketing $50,000 of capital stock to finance construction, equipment and manufacturing. The officers are: President, Peter Wolf; vice-president, Otto Krueger; secretary, Alois Schmidt; treasurer, L. H. Zaun; director, Thomas Purtell.

Langlade County, Wis., is erecting a building, 56 x 80 ft., on the county fair grounds at Antigo for the highway department for the repair and storage of equipment. It will be equipped with a 5-ton traveling overhead crane and miscellaneous tools. C. J. Nash is commissioner.

The Drop Head Projector Co., Fond du Lac., Wis., manufacturer of portable motion picture and stereopticon machines, has reorganized with larger capital and absorbed the Cinematic Service Co., its foreign connection. H. R. Thompson has resigned as president and is succeeded by T. B. Earle, Edgerton, Wis. A. T. Earle has been made general manager. The plant, which was erected some time ago, is now in production. A large order for die castings has been placed with the Doehler Die Casting Co.

California

LOS ANGELES, Aug. 2.

The American Aluminum Metal Products Co., Los Angeles, has plans under way for the construction of its new plant on property recently acquired at Burbank. It will comprise several one-story buildings and is estimated to cost in excess of $50,000. Richard D. King, 519 Van Nuys Building, is architect.

The Pacific Shovel Co., Long Beach, Cal., has been incorporated with a capital of $100,000 by E. J. Williams, H. E. Comstock and E. B. Yost, Long Beach, to manufacture shovels and kindred products. The company is represented by Dento & Hart, 309 Long Beach Bank Building, Long Beach.

The Angelus Sanitary Can Machine Co., Los Angeles, has awarded a contract to the Austin Co., Pacific Electric Building, for its new one and two-story, brick, steel and concrete plant, at Forty-eighth Street and Pacific Boulevard, Huntington Park, near Los Angeles.

The W. B. Bastian Mfg. Co., Los Angeles, has filed notice of organization to manufacture ranges, heaters, etc. W. B. Bastian, 2983 Leeward Avenue, heads the company.

The Southern California Edison Co., Los Angeles, has arranged for a bond issue of $6,000,000, the proceeds to be used in connection with its proposed hydroelectric generating plants. The company has had plans prepared for a new power house at 7125 South Western Avenue, two-stories, 49 x 55 ft.

The Oil Well Equipment Co., Los Angeles, has plans under way for a new one-story plant, 50 x 80 ft., at Fiftieth Street and Santa Fe Avenue. Construction will commence at an early date. Gordon LaBarr and F. A. Noyes, 524 West Ninth Street, are architects.

The Gulf States

BIRMINGHAM, Aug. 8.

The Panther Machine Co., Fort Worth, Tex., is planning for the erection of new works for the manufacture of castings and machined products, to include foundry for brass, bronze and aluminum castings, machine shop, welding works, and grinding department. S. Johnson, F. & M. Bank Building, is president and general manager.

The Brady Compress Co., Brady, Tex., is planning to rebuild the portion of its cotton compress plant, destroyed by fire, July 28, with loss estimated at about $100,000, including machinery.

The Golden Star Refining Co., Mexia, Tex., is planning for the construction of a new local oil refinery, with initial output of about 5000 bbl. per day.

The Home Ice & Cold Storage Co., Austin, Tex., has preliminary plans under way for the erection of a new cold storage plant. The company has increased its capital from $125,000 to $175,000.

The Nu-Tex Brick & Tile Co., Tampa, Fla., has been incorporated with a capital of $200,000 to manufacture brick, tile and kindred products. Plans are under way for the erection of new works with equipment to provide for a daily output of about 30,000 brick. W. B. Coarsey is president and general manager.

The Hardee County Power & Ice Co., Wauchula, Fla., recently organized with a capital of $200,000, has plans under way for the erection of an electric power plant, and ice-manufacturing and cold storage plant. J. G. Fancy, Fort Meade, Fla., is president.

P. P. Vail, Jackson, Miss., and associates, are planning the erection of a new ice-manufacturing and cold storage plant to cost $150,000.

The Hartselle Machine Co., Hartselle, Ala., is planning to rebuild the portion of its plant recently destroyed by fire with loss of about $25,000.

Electrical equipment, transmission and operating machinery and other mechanical apparatus will be installed in the new plant to be erected by the Birmingham Flour Mills, Birmingham, Ala., to be 140 x 150 ft., and estimated to cost about $150,000.

The Texas Dressed Beef Co., Fort Worth, will build a meat-packing plant to cost $40,000. A. H. Boswell, H. B. Kahn and R. C. Brauer are the principal stockholders.

The Corpus Christi Light & Power Co., Corpus Christi,

Tex., plans to install a new unit and rehabilitate its electric light and power plant at a cost of about $200,000.

According to W. J. Doyle, industrial commissioner for the Gulf Coast Lines and the Houston Belt & Terminal Co., Houston, W. M. Bancroft, sugar mill machinery manufacturer, and associates plan to build a refinery at Houston to cost $1,250,000. A site of 20 acres has been purchased.

Canada

TORONTO, Aug. 8.

Inquiries for various lines of equipment continue the main feature of this market. Machine-tool buying, however, is at a standstill, with only a limited number of sales in woodworking equipment. Many users are in need of tools for replacement purposes, but are not buying on account of the uncertainty of industrial conditions. Dealers, however, look for more activity in the fall as it is likely that many inquiries now in the market will ultimately turn into sales. Small tools are moving quietly. The Westinghouse Electric & Mfg. Co., Hamilton, Ont., announces a 10 per cent reduction on prices of practically all industrial motors and motor control apparatus, including all direct current generators and motor generators.

The Adanac Motor Syndicate, Lachine, Que., has been incorporated to manufacture motor trucks, etc. The head office is at 163 St. Joseph Street. The directors include Gordon A. Elmslie, H. Milton Purnell and B. H. T. McKenzie.

The general contract for the construction of a $5,500,000 power plant at Point Du Bois, Man., for the Winnipeg Electric Railway, Winnipeg, Man., has been let to the Northern Construction Co., Union Bank Building, Winnipeg.

London, Ont., will have plans prepared for erection of pump house to cost $50,000. H. A. Brazier is engineer.

The F. Bowden Lumber Co., Greenwood Avenue, Toronto, is preparing to build a planing mill to cost about $60,000.

Molsons Brewery, 906 Notre Dame Street East, Montreal, has awarded the general contract for a boiler house to cost $80,000 to E. G. M. Cape & Co., Ltd., 10 Cathcart Street, Montreal.

Belleville Motors, Ltd., Belleville, Ont., have been incorporated with a capital stock of $40,000 by Charles E. Wilmot, Earl F. Chapman, and others to manufacture automobiles, bicycles, trucks, parts, etc.

The Canadian Automatic Boiler Cleaner Co., Ltd., Kingston, Ont., has been incorporated with a capital stock of $50,000 by Knud Lund, Gananoque, Ont.; Francis J. Lachance, Howe Island, Ont.; John E. Kane and others of Kingston, Ont., to manufacture boilers, engines, tools, etc.

H. G. MacDonald, 612 Tegler Building, Edmonton, Alta., has the general contract for the erection of power house to cost $40,000 for the Department of Public Works, Provincial Government, Calgary, Alta.

Plans of New Companies

The Oilgear Co., Milwaukee, which was incorporated a short time ago to manufacture transmission devices and specialties, has increased its capital stock from $100,000 to $300,000 preferred stock and 25,000 shares of common stock without par value.

The McCabe Co., Inc., 119 West Freemason Street, Norfolk, Va., authorized to manufacture and sell the McCabe automatic water heater, wishes to contract with some company to manufacture for it. Its officers are: Allen E. McCabe, president and treasurer; W. L. Ewing, vice-president and general manager, and W. J. Fielder, secretary. This is a stamping job, requiring automatic stamping machinery, as the device is made of either sheet copper or brass with a small collar stamped from black iron. The company is in the market for range boilers and hot water tanks of various sizes, and wants quotations on copper and brass tubing of 4 in. and 5 in. diameter and on sheet copper or brass of 18 and 20 gage. It is also looking for a location for an assemblying and shipping plant in Eastern or Central States.

The Lane Signal Accessories Co., Sayre, Pa., recently incorporated, will manufacture relays, indicators, switch boxes, lightning arrestors and other accessories to an automatic system of signals and will sell principally to the railroads. The company proposes to have its own plant to manufacture all the articles it will sell. It will equip the plant with machinery for this purpose and will be in the market for equipment, comprising automatic and hand screw machines, drill presses, milling machines, etc.

The S. P. Brick Co., recently incorporated, has been in operation for the past 10 years. The only change is that the firm has been incorporated.

IRON AND INDUSTRIAL STOCKS

Net Changes in Prices for the Week Are Not Significant

General sentiment in most sections of the country is more cheerful than it has been, yet this fact is not reflected in the movement of prices quoted for iron and industrial stocks the past week. Early in the week the price tendency was upward, but when call money at New York rose from 3½ to 6 per cent a damper was put on investment buying and prices sank back to about their level of a week ago. Thus the net change in the market value of the average security does not amount to much.

Some investors maintain securities have not discounted good business this or early next year. A comparison of securities values, however, shows that on the average they are higher than they were two, three and four months ago. The recovery has been slow, however, and not noticeable to many.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	30½- 32	Int. Har. com...	72½- 75¹
Am. Can com....	26⅜- 28½	Int. Har. pf....	99¼-100⅝
Am. Can pf.....	.. - 82	Lackawanna Stl.	39½- 40
Am. C. & F. com.	124 -125½	Midvale Stl.....	23¾- 25⅛
Am. C. & F. pf..	108 -109⅜	Nat.-Acme	14½- 14⁷
Am. Loco. com..	82 - 85½	Nat. E. & S. com.	48 - 48½
Am. Loco. pf....	100 -102¼	Pressed Stl. com.	58 - 61⅝
Am. Stl. F. com..	25¼- 26	Ry Stl. Spg. com.	76 - 80
Bald. Loco. com.	76⅜- 80⅛	Replogle Stl.	20¾- 23
Beth. Stl. com...	48½- 50⅛	Republic com....	46¾- 49¼
Beth. Stl. Cl. B..	50 - 52¾	Republic pf.....	.. - 85
Beth. Stl. 8% pf.	98¾- 99	Sloss com.....	34¼- 35⁷
Chi. Pneu. Tool..	49 - 50	Un. Alloy Stl....	.. - 25
Colo. Fuel	22¾- 23⅝	U. S. Pipe com..	15 - 15⅜
Cru. Stl. com....	54½- 57¾	U. S. Stl. com...	74⅜- 76
Gen. Electric....	117½-120	U. S. Stl. pf.....	107¾-109
Gt. No. Ore Cert.	27¼- 28"	Vanadium Stl....	29 - 30
Gulf States Stl..	33 - 36½	Westingh'se Elec.	43 - 48½

Industrial Finances

Involuntary bankruptcy proceedings have been filed against the Shuler Axle Mfg. Co., Louisville, Ky., the petition setting forth that assets are $250,000, with liabilities of $385,000. The Steel Products Co., Cleveland, and two other creditors brought the action, alleging that the company had preferred other creditors, among which was the First National Bank of Louisville. Officers of the company claim that assets are tied up in material and securities which can't be liquidated at this time.

The United States Tack Co., New Bedford, Mass., has converted the 1000 outstanding shares of common stock, par $100., into 1000 shares of no par value, and has issued 11,000 additional common shares, no par value, as well as 1000 shares 8 per cent preferred stock, par $100. All of the preferred stock and part of the common will be offered for subscription and part of the common distributed to holders of original shares.

The Bridgeport Hydraulic Co., Bridgeport, Conn., has sold to banking interests $1,750,000 5 per cent gold notes, dated June 1 and maturing in 1925. These notes are a part of a $5,000,000 authorized issue.

It was announced in New York in the past week that the issue of $5,000,000 of Otis Steel Co. first mortgage, 20-year, 8 per cent sinking fund gold bonds, put out through Blair & Co., had been taken up promptly. The purpose of these bonds is to pay off approximately $3,500,000 current indebtedness and to provide additional working capital. It was stated that after giving effect to the proposed bond issue, current assets as of June 30, 1921, were $8,366,189 and current liabilities $981,845. The company's plants at Cleveland have an approximate annual capacity of 360,000 tons of pig iron, 275,000 tons of plates, 140,000 to 150,000 tons of light plates and sheets, 30,000 tons of steel castings, 10,000,000 lb. sulphate of ammonia, 3,500,000 gal. tar, 1,250,000 gal. crude benzol and toluol and 600,000 lb. sodium ferrocyanide.

The Virginia Iron, Coal & Coke Co., Roanoke, Va., reports gross earnings for the three months, ended June 30 last, amounting to $212,094. Interest, taxes, etc., amounted to $111,020, thereby making the net earnings for the second quarter $100,073, as contrasted with $471,356 for the three months, ended March 31. Net earnings for the six months, ended June 30, were $571,430.

The Two-In-One Signal Lamp Corporation, 152 Temple Street, New Haven, Conn., recently incorporated with a capital of $50,000 to manufacture electrical lamps and signal devices, is having its work done by C. Cowles & Co., New Haven, Conn. The lamp takes the place of the ordinary tail light and in addition it is a signal device, operated automatically from the brake, cable reaching from the break-rod to the lamp, and the cover slides up when the brake is brought into action. The lamp is made of brass with a high lustre nickel finish.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.25c.
No. 16	4.50c.
Nos. 18 and 20	4.65c.
Nos. 22 and 24	4.80c.
No. 26	4.95c.
No. 27	5.10c.
No. 28	5.25c.
No. 30	5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	19 c. to 20 c.
Copper tube, seamless	22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 21¾c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20	
		Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		
		80 lb....	$6.80 $6.55
		90 lb....	6.90 6.65
		100 lb....	7.00 6.75
IC..	$10.60 $9.50	IC...	7.20 6.95
IX..	11.80 10.75	IX...	8.10 7.85
IXX..	13.60 12.25	IXX...	9.10 8.85
IXXX..	15.60 14.25	IXXX...	10.50 10.25
IXXXX..	17.20 16.00	IXXXX...	11.50 11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	30c. to 32c.

Old Metals

The market is easy. Business is at a standstill. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.75
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

New York, August 18, 1921

ESTABLISHED 1855 VOL. 108: No. 7

Cutting Costs in a Drop Forge Shop

Trolley System Used for Handling Work Between Hammers and Furnaces—Features Include Water Reclaiming Plant

BY F. L. PRENTISS*

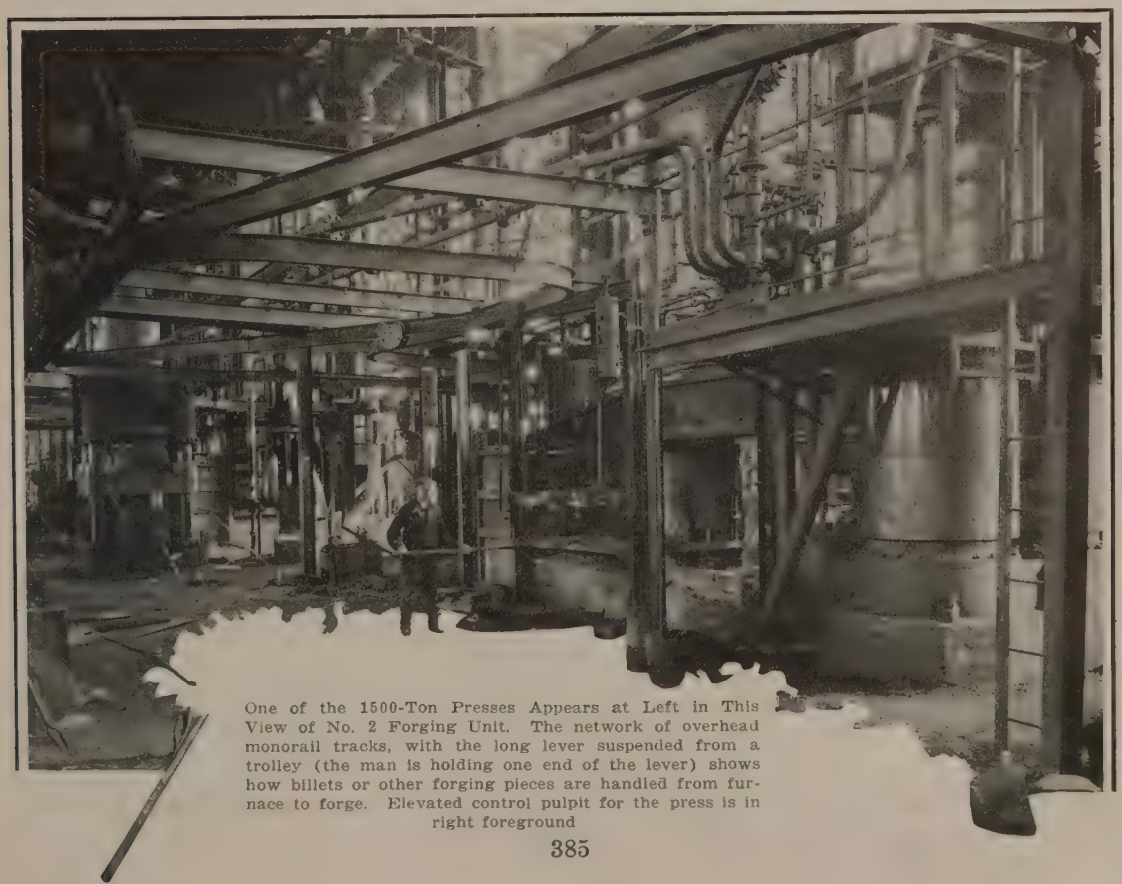
THREE separate adjoining forging units, each unit having two heating furnaces connected to waste-heat boilers, and the units arranged with monorail tracks located in front of the hammers, presses and furnaces for handling work in process of manufacture, form the predominating features of the new drop forge plant of the Champion Machine & Forging Co., Cleveland. While the three units were designed particularly for forging large crank shafts, they can be used for any commercial work in the larger forgings. They were laid out and provided with the monorail system to conserve labor, permit quicker handling of work from furnace to hammer, and to secure the maximum production from a given amount of forging equipment.

The units are so arranged with the monorail tracks reaching from one to another that, should the operations require moving the work from one unit to another, this can be done readily by transferring it to the monorail in the adjoining unit. In forging crank shafts, successive operations are performed in the three units.

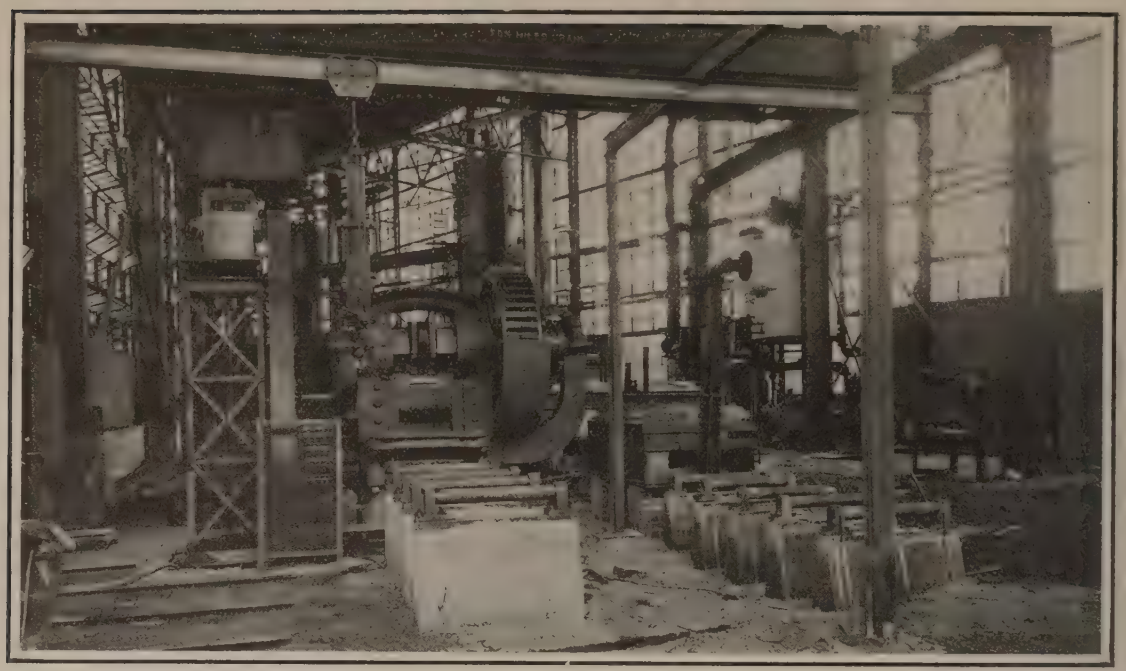
Each monorail unit has a number of hand-operated trolleys from which a carrier is suspended, this being a long lever attached to the trolley by a chain. The work is moved between furnace and hammer on the lever, being guided by a pair of tongs. Only two men are required to handle the piece, the heater and the hammer man, one to push the trolley and the other to handle the tongs. The use of the trolley permits the hammer man to swing the work around in place under the hammer without doing much walking. The trolley rests on an 8-in. 18-lb. trolley I-beam, the top of which is 12 ft. above the floor. The monorail and carriers were supplied by the Richard Wilcox Co.

Waste heat from the heating furnaces is utilized

*Resident editor of THE IRON AGE, at Cleveland.



One of the 1500-Ton Presses Appears at Left in This View of No. 2 Forging Unit. The network of overhead monorail tracks, with the long lever suspended from a trolley (the man is holding one end of the lever) shows how billets or other forging pieces are handled from furnace to forge. Elevated control pulpit for the press is in right foreground



Raw Material Is Handled on These Rollers, Either into the Shears in Center or into the Small Heating Furnace at Right of Shears. The traveling crane places stock on the rack in left foreground, and the air hoist shown on monorail deposits it on the rollers

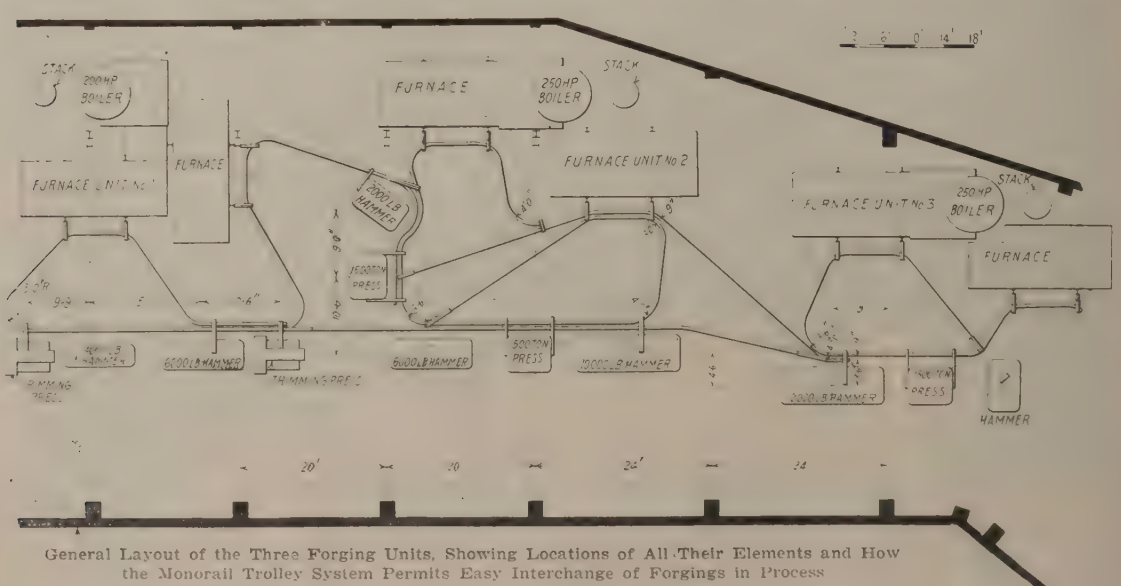
to supply steam for the plant through the waste-heat boilers. Each unit has two furnaces connected to a Wickes standard waste-heat water tube boiler. One is a 200-hp. boiler and the others are 250-hp. each. The forging equipment for the most part is located in a straight line, but an irregularity in the building line required somewhat of an irregular arrangement of the furnaces. The two furnaces are located on opposite sides of each boiler.

Limited space made it impossible to connect all the furnaces directly to the boiler setting. Three are direct connected, but for the other three it was necessary to use underground connecting flues. The flues are carried in a straight line and discharged directly into the boilers. Each boiler has a self-supporting steel stack extending up through the roof of the building and held in a saddle trussed to the building columns, eliminating the use of guys. Two stacks are 120 ft. high and 46 in. in diameter, and the third is 110 ft high and 42 in. in diameter.

Though the heating furnaces, which were designed by the company, are normally oil fired, they are also arranged for coal firing. They have water-cooled welded steel plate doors, and the arch supports and jambs are also water cooled, the latter being provided to protect the buckstays. The use of a water-cooling system is a departure from the usual practice in a forge shop heating furnace.

All furnaces have wide openings, only 1 ft. in height, and split doors. The two furnaces of No. 1 unit have hearths 5 ft. 3 in. wide and 7 ft. 6 in. long, and the other four furnaces have hearths 6 ft. 6 in. wide and 8 ft. long. The water-cooled doors were designed by the Blaw Knox Co. to fit the type of furnace used.

After the furnaces had been placed in operation and it was found that the water cost was excessive, water reclaiming equipment was installed which, it is stated, has resulted in a net saving of $10 per day, after deducting the cost of maintenance. The water



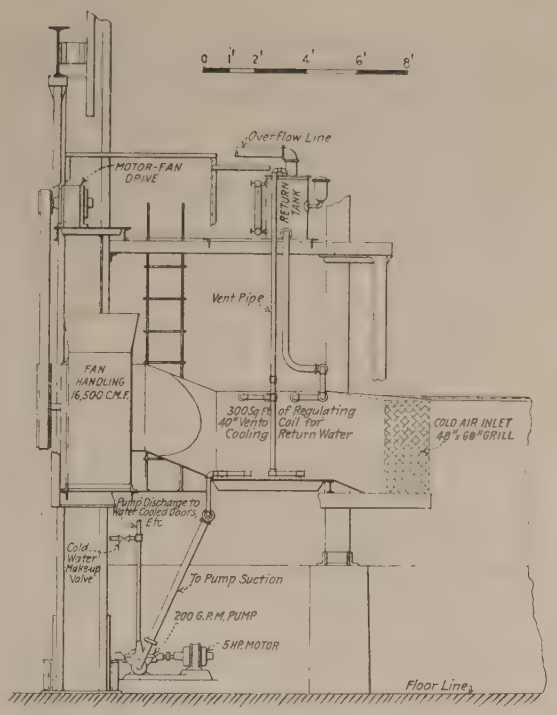
General Layout of the Three Forging Units, Showing Locations of All Their Elements and How the Monorail Trolley System Permits Easy Interchange of Forgings in Process

is carried in five individual discharge lines, ranging from ¾ in. to 1¼ in. in diameter, from the water cooled parts of each furnace, there being two lines from the doors, two from the jambs and one from the arch. These lines discharge through a gooseneck into a sheet metal funnel and from the funnel into a 6-in. open line located 18 ft. above the floor and running the length of the waste-heat plant. Discharge into the main line through the funnel is provided, so that it can be readily seen by glancing into the funnel whether the water is circulating properly through the water-cooled units.

The 6-in. line connects through an automatic feed to a Cochrane feed water heater of 2000-hp. capacity located near the waste-heat boilers, and approximately 200 ft. from the main power plant. The feed water heater was placed in the new forge shop because the company contemplates the erection of a new power plant on a site across the street from the new forge shop.

Surplus hot water, not utilized through the feed water heater, is delivered to the water reclaiming plant, and if the supply is beyond the capacity of the reclaiming plant it passes into the sewer. The discharge from the 6-in. line is into a small tank provided with a water level regulator. From this tank the hot water is circulated through 450 sq. ft. of cooling coils, and from the coils a motor-driven re-circulating pump delivers it into a 3-in. line which carries it back to the water-cooled parts. The coils have a capacity for cooling 200-gal. of water per min., by passing over 16,000 cu. ft. of air per min.

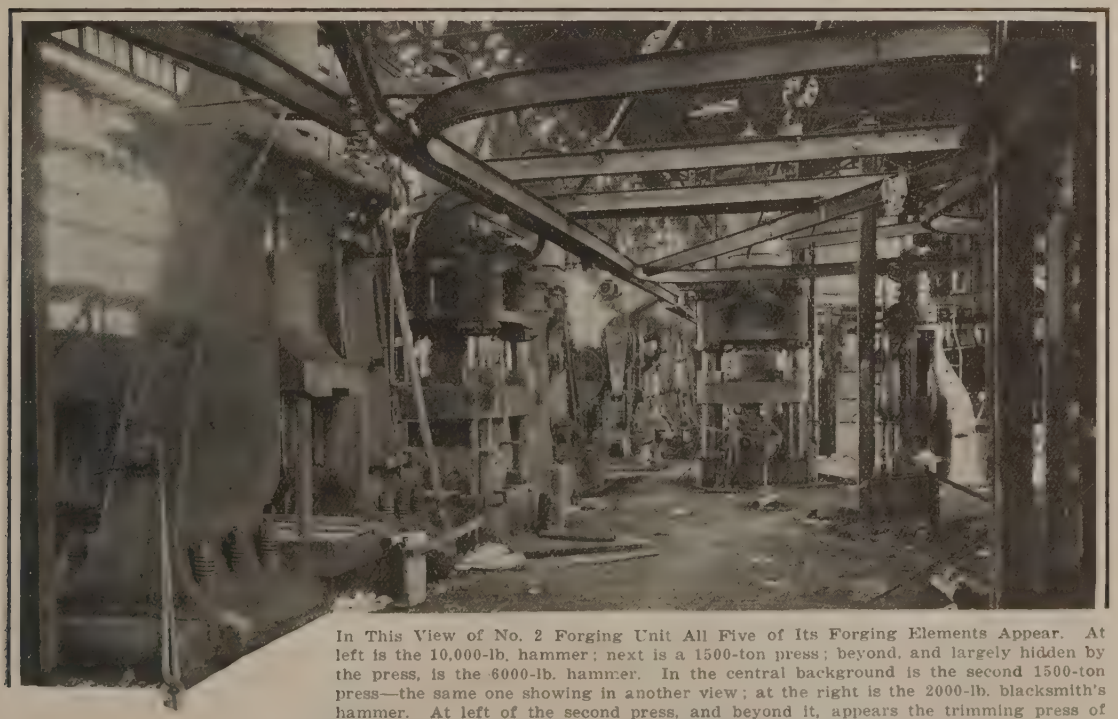
With the elimination of a feed water heater in the power house, an economizer will be installed in each boiler setting to boost the temperature of the entering feed water from the feed water heater. The waste-heat boilers discharge into the main steam lines, there being an automatic cutout on each boiler to shut off the boiler from the steam line when not in use. The connection between the boilers and the main steam lines is through a 10-in. overhead main connecting to the three boilers, and two 10-in. drop lines that extend down to the steam lines located in tunnels under the forge shop floor. The main steam line and exhaust


0 1' 2' 4' 6' 8'
Overflow Line
MOTOR-FAN DRIVE
RETURN TANK
Vent Pipe
FAN HANDLING 16,500 C.M.F.
300 Sq. Ft. of Regulating Coil for 40° Vento Cooling Return Water
COLD AIR INLET 48"x66" GRILL
Pump Discharge to Water Cooled Doors, Etc.
Cold Water Make-up Valve
To Pump Suction
200 G.P.M. PUMP
5 HP. MOTOR
Floor Line

Arrangement of the Water Reclaiming Equipment, Showing Method of Handling the Water

lines are looped together in the tunnels, so that any part of the forge shop can be shut down without affecting the other parts.

No. 1 forge shop unit has a 4000-lb. and a 6000-lb. steam hammer and two electrically driven mechanically operated Toledo trimming presses. Unit No. 2 has two 1500-ton Southwark hydraulic presses and a 6000-lb. Chambersburg and a 10,000-lb. Niles hammer. The third unit is equipped with a 12,000-lb. Niles hammer and a 1500-ton Southwark press, space being provided for a second press. Between No. 1 and No. 2 units is a 2000-lb. blacksmith hammer and a smaller hammer



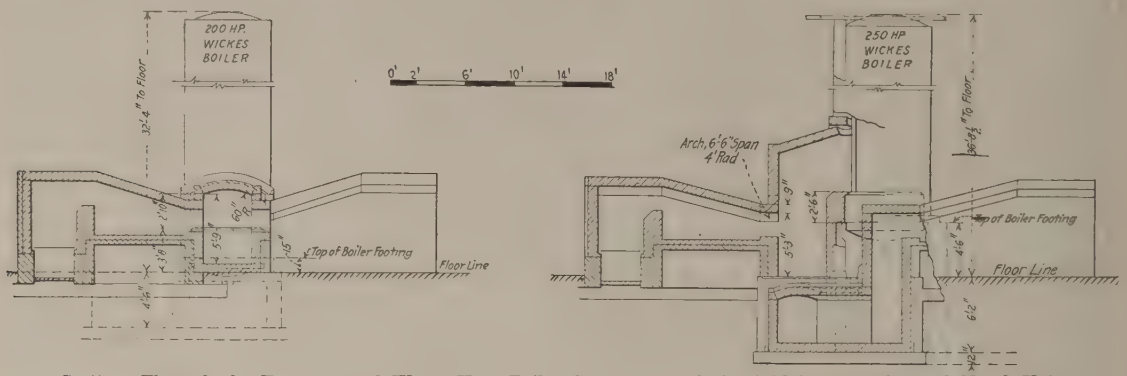
In This View of No. 2 Forging Unit All Five of Its Forging Elements Appear. At left is the 10,000-lb. hammer; next is a 1500-ton press; beyond, and largely hidden by the press, is the 6000-lb. hammer. In the central background is the second 1500-ton press—the same one showing in another view; at the right is the 2000-lb. blacksmith's hammer. At left of the second press, and beyond it, appears the trimming press of No. 1 unit

is located in the No. 3 unit. In addition to the regular carriers for handling material between the furnaces and press and hammer equipment, the monorail is provided with two chain hoists for handling billets during the operations at the blacksmith hammers .

All the hydraulic presses are operated by two Southwark steam hydraulic intensifiers connected together. One is a high-pressure intensifier that operates the presses at 3800 lb. per sq. in. water pressure, giving 1500 tons pressure on each press for forging work.

vant blowers are connected to a header, from which blast lines are gated so that the system can be operated on any one of the blowers. The blowers are located in the basement in the center of the building, the blast lines being carried in tunnels under the forge shop and in the leanto that houses the waste-heat boilers.

The forge shop, of steel and glass construction, is unusually high, being 52 ft. to the peak of the roof, which is of the Pond truss type. The windows are of



Sections Through the Furnaces and Waste Heat Boiler Connections of No. 1 Unit (at Left) and No. 2 Unit

The low-pressure intensifier provides 850 lb. per sq. in. water pressure, giving 300 tons pressure for trimming and bending operations. The intensifiers, which take the place of a pump and accumulator, also do away with the necessity of high-pressure water operating valves at the presses, the valves being located at the intensifier and operated only at low pressure. One man in a pulpit at the intensifier operates all the presses.

Built in 1918 and adjoining the company's old plant, the first unit of this plant was 160 ft. long and 54 ft. wide. Later this was extended 160 ft. with a 15-ft. leanto in the extension for the waste-heat boilers. The steel frame-work of the building is carried 152 ft. further to cover the steel yard, which is served by a railroad switch track. This steel yard extension provides a runway for a 10-ton Niles alternating current electric traveling crane, equipped with a direct current lifting magnet which serves the steel yard and the lower part of the forge shop. A motor generator set mounted on the crane supplies current for the magnet.

The plant is conveniently arranged for the handling of material. Heavy stock is unloaded from cars with the traveling crane and stored out in the steel yard, or on shear racks built of 8-in. I-beams embedded in a concrete base and raised far enough to permit the placing of a crane hook under the stock. From the racks it is picked up with an air hoist with a capacity of 1000 lb. and placed on a set of four steel pipe rollers 33 in. wide, 4 in. in diameter and on 30-in. centers. These rollers are located in front of a Cleveland shear, having a capacity for cutting stock up to 5½ in. square.

Other racks are provided for alloy steel, and near these racks is an oil-fired heating furnace for heating alloy steel bars. A similar set of rollers is provided in front of the furnace for handling bars.

Owing to an angle in the building, two overhead cranes are required, a jib crane serving to transfer between the two sections. One of the traveling cranes serves an inside shipping platform at the end of the plant farthest from the stock yard. This is a motor truck platform used for handling both stock and outgoing forgings. In addition to the use of overhead cranes, electric trucks operating on concrete runways 8 ft. wide throughout the building are provided for distributing and collecting stock and finished forgings.

Blast for the furnaces is provided by three Sturtevant blowers that deliver air at a pressure of 12 oz. per sq. in., and a General Electric high-pressure blower providing a pressure of 2 lb. per sq. in. The Sturte-

ribbed wire glass. Nearly all the window sections are set in chain-operated swinging sash, that can be set at any desired angle, depending on weather conditions, thus providing good natural ventilation.

Steel Corporation's Orders Decrease

Unfilled orders on the books of the United States Steel Corporation July 31 were 4,830,324 tons, compared with 5,117,868 tons on June 30. This is a decrease of 287,544 tons and compares with one of 364,619 tons in June, 362,737 tons in May, 439,541 tons in April, 649,102 tons in March, 639,297 tons in February and 574,958 tons in January, and represents the twelfth consecutive monthly decrease reported. The unfilled tonnage a year ago was 11,118,468 tons, or 6,288,144 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,685	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	.....	10,805,038	6,109,103	8,759,042
Sept. 30	.....	10,374,804	6,284,638	8,297,905
Oct. 31	.....	9,836,852	6,472,668	8,353,293
Nov. 30	.....	9,021,481	7,128,330	8,124,663
Dec. 31	.....	8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

Fire Brick Production Increases

Figures of the United States Geological Survey show that the 1920 production of fire brick amounted to 1,131,000 thousands, as compared with 943,942 thousands in 1919. The 1920 production was valued at $52,750,000, or an average of $46.64 per thousand; the 1919 production was valued at $36,170,000, or an average of $38.32 per thousand. The quantity shows an increase of 20 per cent during the year; the value an increase of 46 per cent and the unit value an increase of 22 per cent. In each year the total value of the product was approximately 20 per cent of the total value of all brick and tile manufactured in the United States.

Beginning Aug. 15 the open-hearth department of the National Malleable Castings Co.'s plant at Sharon, Pa., started on a five-day-a-week basis, instead of three days a week. Other departments will continue to run three days each week.

VANADIUM PRODUCTION IN PERU

Extent of the American-Owned Deposits and Plans for Future Operations

The recently published *Boletin del Cuerpo de Ingenieros de Minas del Peru* gives some interesting data* concerning the important vanadium deposits of Peru, which are American controlled and operated and constitute the chief source of supply of vanadium for the world. The principal deposit, which is at Minasragra and is the only one in active exploitation, has yielded since the beginning of operations in 1907 a total of 27,998 metric tons of ore, having a content of 10,413.6 metric tons of vanadic acid, equivalent to 5850.4 metric tons of metallic vanadium.

Concerning the deposits, the report says: "The great interest awakened in vanadium has resulted in the thorough search for a new deposit in all parts of the world, and there have been developed effective processes for the extraction of vanadium from certain ores in which it is contained in minute percentages. Very little has resulted from these efforts, since there have been discovered no new deposits of importance and the amount of vanadium which has been recovered from other ores by the metallurgical processes referred to does not appear to be important because the processes, while technically successful, necessarily involve a large cost of production. In view of these facts we believe that the vanadium reserves of greatest importance in the world and in Peru are the numerous and extensive deposits of asphaltic material, which exist in the departments of Junin and Lima. These contain from 1 to 2 per cent of V_2O_5. These deposits were the object of interest on various occasions, and in 1908 and 1910 there were exports of ash obtained by burning the asphalt, with a resulting content in the ash of from 20 to 25 per cent of V_2O_5. Later, the depression in vanadium as a consequence of the remarkable developments at Minasragra has caused the suspension of these exploitations except in some few localities near the railroad, which still utilize the vanadium from the ash to a limited extent."

Referring to the Vanadium Corporation of America, the *Boletin* says: "For some time this company has given special attention to the exploration of its mine to determine as definitely as possible the extent of the ore, so that it could plan its work and determine the future of the business. The result of these explorations, which were done mainly by diamond drilling, has been satisfactory and in consequence the company decided to undertake the expensive improvements which are now being made. It was reported that the ore in sight represented about 16,500 tons of metallic vanadium, and it was claimed that the total ore in the mine, based on probable estimate, would exceed 45,000 tons.

"The president of the company at a recent meeting denied certain rumors that had been circulated about the exhaustion of the ore reserves, claiming that on the contrary the engineers had discovered a new vein of ore which increased the reserve very much. In addition to this it was announced that the company was planning an installation for the treatment of the mine waters which carry an appreciable quantity of vanadium, heretofore lost in Lake Punrun, and that the recovery from this source would be equivalent to $500,000 yearly.

"From these facts and reports it appears evident that the reserve at Minasragra are sufficiently large to insure an ample production during many years, especially with the provision of methods and facilities to permit of realizing on the leaner parts of the deposit. As is to be expected, the grade of the ore is not so high as at first when the rich zone of patronite (vanadium sulphide) was being worked. Now the oxide ores preponderate and are extensive in quantity but of lower grade. The sulphide of vanadium ore which was formerly extracted had from 20 to 25 per cent of V_2O_5 and by elimination of the sulphur by calcination it was possible to export a product of from 40 to 45 per cent of V_2O_5. However, in 1919 the average of the exports was only 30.4 per cent, and in 1920 some shipments as low as 16 to 20 per cent were made. Because of these conditions, the company decided to construct at Jumasha, on the shores of Lake Punrun, a beneficiating plant and a furnace, by which it can obtain a product 85 to 90 per cent of V_2O_5, which can be exported to the United States for refining. At first it was planned to treat the ore by lixiviation but, considering the good results obtained by the electrical furnaces at Bridgeville, Pa., it was decided to use instead electrical smelting, and a contract has been made for a 20,000-kw. hydroelectric installation at a place about 40 kilometers from Jumasha.

"In addition to the reserves in the deposit, the company has a large amount of ore already mined which it has not been possible to export before because of the transportation conditions. Formerly the ore was transported on the llamas from the mine to Jumasha, and then across Lake Punrun on barges, and then conveyed again by llamas to the station of Ricran, on the Cerro de Pasco Railroad to La Oroya. The employment of llamas furnished uncertain transportation, and to remedy this a broad gage railroad has been constructed from the mine to the lake, a distance of 12 kilometers. This was finished in 1920. Likewise, an excellent road for automobile trucks was built from the lake to the railroad, a distance of 25 kilometers. Over this road the ore is transported by caterpillar tractors, drawing special trucks which are loaded at Jumasha and transported across the lake on motor barges. This transportation system is adequate for the handling of a thousand tons monthly."

*Translated by Kirby Thomas, New York.

To Replace Chateaugay Furnace at Standish, N.Y.

Contract has been awarded the William B. Pollock Co., fabricating interest of Youngstown, Ohio, for the replacing of a blast furnace, supplying the ladle equipment and making necessary improvements to the stoves and piping by the Chateaugay Ore & Iron Co., Standish, N. Y. The award represents one of the most important blast furnace contracts entered into this year. The blast furnace to be replaced was built and erected 17 years ago by the Pollock company.

The Pollock company will erect the new furnace as well as build it. The ladle cars to be supplied are a new built-up, short-pour type of the Pollock company's own design. Freyn, Brassert & Co., Chicago, designed the new stack for the Chateaugay company, while E. P. Ross, vice-president of the Wharton Steel Co., is in direct charge of the improvements.

Chicago Hearings on Basing Point in September

CHICAGO, Aug. 13.—Hearings on the Pittsburgh basing point for steel prices will be opened here in September, according to K. E. Steinhauer, attorney for the Federal Trade Commission, who is in the city investigating the complaint of the Western Association of Rolled Steel Consumers. At these hearings attorneys for the respondents and the complainants, respectively, will introduce evidence. The examiner, after the hearings, will present tentative findings to the commission. The attorneys may then present their objections to such findings and the commission may allow counsel to argue the matter before it both orally and by brief.

Contract is being negotiated for construction of the Youngstown & Austintown Railroad, a four-mile branch of the Erie extending from the Ohio Works of the Carnegie Steel Co. at Youngstown. The purpose is to afford plant sites with rail connections for small and diversified industries. The project is being financed by the New Industries Co. of Youngstown, of which George E. Rose is president. The Erie, it is stated, has agreed to reimburse the builders for the cost of construction by allowing them a certain charge for each car of freight moved over the road.

New Time Study Watch

The duration time study watch shown in the accompanying illustration is a new instrument developed by the Mortimer J. Silberberg Co., 122 South Michigan Ave., Chicago, for use in time and motion study. It is designed to handle the timing, analysis and observation of from one to ten operations, up to and including 5 min. duration.

There are three circles on the dial, the outer one being red; the center, black; and the inner blue. The large hand makes a revolution in 100 sec., the small hand in the center moving over a red, a black and a blue sector to indicate by color the circle in which the large hand is operating. All of the figures on the dial denote production per hour, based on the time of ten operations. For example: If ten operations were observed in 20 sec., the figure under the large hand in the red circle would show 1800 operations per hour. If one operation were observed in 20 sec., then instead of 1800 it would show on the dial 1800 ÷ 10, or 180 operations per hour.

Figures on the Dial Denote Production per Hour, Based on the Time of Ten Operations

If an operation is timed and its duration is 130 sec., it will be noted that the large hand will have made one total revolution and 30 sec. additional. The small hand in the center of the dial will then pass the first sector and show in the second sector, which is the black and which denotes that the operation must be read in the black circle. Then reading under the 30-sec. mark in the black circle the figure 277 will be noted. However, this figure being based on the observation of 10 operations, and only one operation having been timed in that period, it is necessary to point off one figure, and the result is then 27.7 operations per hour, based on one operation timed in 130 sec. The same applies to operations of longer periods; the small hand moves in the colored sector, showing in which circle the large hand is operating, simplifying the calculation of elapsed time.

The instrument has the take-out time feature allowing the operator to start and stop the watch without returning the large hand to zero. When an operation is entirely completed pressing the crown down returns all hands to the starting point. The dial is divided in seconds and half-seconds.

Increasing the Output of Castings in Steel Works

A method of lay-out for steel works whereby castings can be produced practically continuously is described at length by a writer in *Stahl und Eisen*, July 29, 1920, an abstract of which is furnished by *Technical Review*, London, which cites the following advantages:

By subdividing the total casting operations into casting work proper and secondary operations, and transferring these two branches of the work to two separate sets of machines, losses of time, which are otherwise unavoidable, are eliminated, and thus the highest attainable output of castings is obtained. By adopting these measures it is possible to cast 60 heats of 22 tons each, or 1320 tons of steel, in 12 hr.

By making the casting operations as far as possible automatic, the number of hands required on this work can be reduced to seven, and a saving in wages effected which varies according to the circumstances governing each particular case.

Traversing platforms and other equipment details for the transverse motion of the foundry cars, with their ladles, are dispensed with, thus effecting a saving not only in plant charges and space, but also eliminating a source of danger.

The foundry can be made considerably smaller in dimensions, and the floor space thus set free can be used for other purposes in existing steel works. The plant charges can also be considerably reduced in new installations.

Stagnation in Italy

MILAN, ITALY, July 27.—There has been practically no changes in the month. Business is absolutely dead and it is therefore hard to give correct prices. Italy is going through a very hard spell on account of the continual fighting between the Socialists and Fascisti.

Thousands of people are out of work as all firms are laying off help and some have even closed completely. The hotels and summer resorts are begging for guests; this time last year one could scarcely find a room in a summer resort.

Here are this week's prices, largely nominal, in lire, f.o.b. Milan, per 100 kg.:

	May 22	June 30	July 27	Cents Per Lb., July 27
Copper, electrolytic	575	600	630	11.65
Copper sheets	1020	1020	1040	19.24
Brass sheets	900	900	900	16.65
Brass wire	875	875	880	16.28
Brass rods	550	550	560	10.36
Brass tubes	1070	1070	1100	20.35
Black sheets, base, 4 mm	160	150	160	2.96
Galvanized sheets, No. 20	250	240	235	4.35
Tin plate, standard, per case	189	165	175	$7.14

Stereoscopic Eyepiece for Microscopes

A new eyepiece for use on microscopes is being offered by the Bausch & Lomb Optical Co., Rochester, N. Y. With this eyepiece a stereoscopic effect equal to that given by a binocular can be obtained with a monocular microscope. Among the advantages of binocular vision absence of eye fatigue and the well-defined relief of details which might escape one eye may be mentioned.

The Tops of the Eyepiece Caps Are Adjustable for the Eyepoint of the Eyepiece

The attachment is designed so that the axes of the eyepiece tubes are parallel, permitting the eyes to be used with relaxation of convergence, and hence accommodation, as if they were directed at a far distant object. A prism system mounted in the body holding the two parallel eyepiece tubes divides the pencil of light from the objective into two full aperture pencils, and turning them through 90 deg., reflects one and transmits the other. Since placing the new eyepiece upon the monocular microscope raises the tube length to 230 mm., its extension tube has a negative correction lens to compensate for this increase. The two eyepieces are regularly 6.4 x specially matched for this use, and specially matched 7.5 x eyepieces can also be supplied. The steroscopic eyepiece can be used with almost any monocular microscope.

The Inland Steel Co., Chicago, reduced wage rates, effective Aug. 1. Wages for day and tonnage employees are now the same as those which were in effect May 1 to Oct. 1, 1917. Salaries of employees paid by the month were to be adjusted on an equitable basis, according to the announcement by the company. On July 1, the Inland Steel Co. discontinued the basic 8-hr. day, eliminating time and one-half pay and placing production departments on a straight 10 and 12-hr. basis.

Necessity of Proper Cost Accounting

Machine Rate or Production Center Method Stressed—Distribution of Overhead in Bulk or by Department—Why Some Methods Fail

BY J. B. SEHL*

THE primary purposes of cost accounting may be summarized as follows. 1st. To ascertain actual costs. 2nd. To forecast with reasonable accuracy in order to fix future selling prices. 3rd. To reduce costs. 4th. To increase efficiency. From this we begin to appreciate its importance to the manufacturing, selling and administrative departments of the business.

Elements of Cost Considered

Manufacturing costs are made up of three elements: materials, labor, and manufacturing overhead, or burden as it is often termed. In manufacturing there is another overhead burden which consists of selling and administrative expense, and this also has to be considered in addition to the manufacturing cost, before the final cost can be determined, profits calculated and selling prices established.

In manufacturing there can be no production for marketing without combining material, labor and overhead in some proportion to each other. That is to say, in some industries material may be the important element, its fabrication involving little labor; in other lines of industry, this condition may be reversed, the material being unimportant in value but its conversion into finished product involving a large amount of high-priced labor. But, whatever the conditions may be as regards material and labor, the manufacturing overhead expense or burden is as inevitable as taxes and death, its weight very frequently spells success or failure for the enterprise, and its distribution over the product necessitates the employment of accounting principles which are absolutely dangerous unless properly applied.

Direct or Productive Material

The cost of the material of which the product is composed is usually easy to follow, requiring merely an entry for the amount involved. By arranging suitable facilities for the storage of material and its issuance by requisition for consumption, much can be done not only to facilitate the cost accounting work, but to aid those who have the immediate responsibility for the preparation, planning and execution of factory production.

Stock records, so called perpetual inventories, and stock control of material, whether it be finished or unfinished, is good business conduct for the very good reason that it represents money and should be safeguarded as such. Theft is not the only reason why materials mysteriously disappear; waste, spoilage of work are among other reasons. But, whatever the cause, losses of material increase manufacturing costs accordingly.

Expense of Materials in Overhead

Materials which do not form part of the manufactured product, but are incidental in the manufacturing operations, should also be under stock room control. Frequently, materials of this class are expensive and make up a large proportion of the manufacturing overhead, and their consumption is more difficult to account for than the material which goes into the product.

Direct or Productive Labor

Among the several methods of recording and paying for the performance of labor may be mentioned the premium system, or some modification thereof, the contract method, piece work and day work. Whatever the method, the importance of speed and accuracy cannot be overestimated, because this is where direct contact with the workman is involved, and his time card is his bookkeeping system. It is the score card of his performance and, for this reason, the job time card must be planned to give all the necessary information with the highest possible speed, first to the operator and his foreman and without bookkeeping by them, before the time record is incorporated in the cost records.

What the foreman wishes to know, among other matters in connection with time keeping on job order costs, is the success or failure to accomplish desired production, the earnings made, the quantity of good work produced, how much defective work and the reason therefor. It is evident that this information must be given to him quickly, and also to the workmen. They should have this information day by day and not week by week. The foreman is primarily the executive to whom the workmen look for instruction and the settlement of matters affecting their daily work, time, earnings, etc., and he must be in a position to answer questions quickly and also accurately; therefore, neither his nor their co-operation can be expected with any timekeeping arrangement that is an irritant instead of an assistance.

Operatives who are assigned to what is termed "productive labor" are not always producing. For reasons sometimes beyond their control they are subject to "lost time," due to waiting for work, repairs to tools or machines, waiting for material, etc., and this lost time, unlike materials, cannot be replaced. The time keeping arrangement must account for such losses, and it is possible for the accounting system to incorporate the loss in the schedule of accounts, and indicate the amount.

Non-Productive or Indirect Labor

This class of labor, such as foremen and clerks, inspectors, truckmen, repairmen, has practically the same relation to manufacturing operations as expense material, and must be carefully accounted for and accurately distributed, because it frequently is a large item in the factory burden.

Manufacturing Overhead or Burden

A manufacturing business must provide, among other things, miscellaneous materials, machinery to work with and buildings in which to work. There must be power, light, heat, depreciation and various other items of similar nature, and a factory supervisory organization. The cost of maintaining the above represents what it *costs the company to keep workmen at work;* this is over and above the wages paid them and the material used by them for conversion into the finished product.

An examination of the general factory burden of a typical company would reveal expenses of three general classes: First—Expenditures that do not vary with increase or decrease of production, and known as "Fixed Charges," such as taxes, fire insurance, depreciation and interest on investments. Second—Expenditures that vary to some extent with increase or decrease of production and known as "Semi-Fixed Items," such as factory supervision, cost of operating the purchasing and receiving departments, clerical hire in the factory offices, emergency hospital expense, washrooms. Third—Expenditures the volume of which is in direct relation to volume of production and which

*Billings & Spencer Co., Hartford, Conn. Abstract of paper read before American Drop Forge Association at Chicago, June 24.

are usually termed "Variable Charges," such as yard expense, internal transport, inspection, liability insurance, general equipment, repairs and supplies of various kinds.

After the proper determination and classification of the general burden charges, the next step (and most important) is properly to apportion and distribute it over the producing departments or operations. In a large business, which manufactures and markets a varied product, extreme care must be used so to apportion the general overhead charges as to place each kind of product on a basis which is competitive with another producing these goods exclusively.

As an illustration, a business may comprehend the manufacture of iron castings and the machining and assembling of these pieces into machinery for its own use and also for sale; it may also produce forgings to be sold without further processes and it may also machine and heat treat them. To make the forgings it must provide the proper machine tools and fixtures. With such a variety of activities, those directing the policies ought to know if it is cheaper to purchase the castings than to manufacture. The same applies to the forgings, and the provisions for dies, tools and fixtures must have the same consideration. In determining matters of such vital importance, how is an intelligent decision to be made without proper distribution of expense?

Departmental Burden Assigned Where Possible

It is usual to place machinery performing similar operations in defined groups, as separate from operations of different character. Often an arrangement of this kind is called a department and occasionally referred to as a production center. Irrespective of phraseology, it is apparent that machinery and the work performed by it necessitates operating expenditures that are different from expenditures carried by the operation of machinery on some other class of work. Other classes of work may be what is known as bench work, requiring little or no machinery.

For factory accounting purposes, the procedure then is to "tie up" certain expenditures directly to the operations causing the expenditures, as for example: The replacement cost of drop boards is contingent on the operation of drop board hammers and not on steam hammers, repairs to machinery are not to be expected in connection with bench work operations, fuel oil for the forge department would not be a proper charge to the die-sinking department.

Certain work may necessitate certain immediate inspection before other operations ensue, thereby treating this more directly than the inspection which is of general character. Trucking costs may be more excessive in some departments than in others, and the same with lubricating and cutting oils, supply tools, belting renewals, expense materials, power, etc., and it will be noted that most of these charges which can be applied directly do vary, and are closely related to the volume of activity.

Spreading Expense Items Over Product

Assuming the expenditures representing production burden to have been properly classified and distributed over the producing departments or operations, the next procedure is to "cost" the articles manufactured with an amount truly representative of their share of the burden incident to their manufacture. There are commonly used five methods of diffusing expense over product: 1. The percentage method; 2. Man-hour method; 3. Sold-hour rate; 4. List percentage method; and 5, Machine rate or production center method.

The last named method has as its objective the distribution of manufacturing burden "through the machine" rather than "through the man," as do the percentage and man-hour methods. It is becoming recognized as the most accurate of all the methods of expense distribution, because it is a clearer expression of the charges incidental to a particular process or operation. It comprehends more definitely the outlay to which the business subjects itself in providing the means of performing the particular process, and it reflects this expenditure in an hourly or daily rate that is a service charge to the product for the time it consumes in such service.

For the purpose of establishing machine rates it is practical to classify into groups the machinery performing similar operations and call these groups "Production Centers." Processes which are similar and not performed by machinery can be grouped in like manner and given the same terminology; consequently a "Production Center" can be a classification of any similar productive activity, performed with or without machinery, and should include the auxiliary machinery or equipment immediately essential to its operation.

One principal requirement for the fixing of Production Center rates is the more direct application of indirect expense, and considerable "detective work" is necessary to effect this. Visualizing the activities of a manufacturing plant as a whole, we have discussed the expenditures that are fixed, semi-fixed and those that rise and fall sharply with the volume of production.

In review, it is seen that to determine a machine or production center rate, it is necessary:

1. To classify machines or processes into groups of similar operation.

2. To determine the operating costs of groups for a given period.

3. To determine the operating hours of the groups for the same period.

Operating costs, divided by the operating hours, gives the actual cost per hour.

Predetermined Machine Rates Based on Budget

The basis for predetermined rates is the budget, a means by which income and expenditure are related and regulated. The first essential to the operation of rates, based on budget forecast, is to provide means of constant comparison of actual with estimated figures, for without this constant scrutiny the arrangement becomes haphazardous.

The usual method is to provide a detailed statement for each production center or unit, showing the number of machines in the group, the possible hours and estimated hours of activity and any other facts which will make the statement convenient for reference. On this statement are listed the charges incidental to operation and, if the statement is in columnar form, in the first column is entered their estimated costs for the period and, in the second column, the actual costs for the same period. In the third column can be entered the variance between the estimated and actual expenditures. The credit element to the statement is the burden earned, which comprises the amount that is charged to the product, and we now can compare the earned burden to the estimated and actual expense.

If, on analysis of the statement, there exists an excess of actual over estimated cost, this is caused by higher prices for materials, labor, etc., inefficiency or a decrease in activity. If the estimates are higher than the actual costs, this is caused by lower prices for material and labor, higher efficiency or an increase in activity. Recalling the statement that the production center activity has been fixed at a standard which past experience indicates as attainable under normal conditions, and which, if operated at such a standard, would indicate normal costs of product, then any difference between the estimate and the actual activity indicates increased or decreased production.

Present day conditions are marked by a more than usual effort to discount the future, and it is sound business to fix our prices on the basis of what we believe will be the prevailing costs under near future conditions. We are to do this by analyzing and forecasting manufacturing and other costs, and also by recognizing the fact that present day inventories are worth no more than their replacement value.

If this is an economic truth, then the efficacy of the budget for costing purposes is proved, and the accounting arrangement that fails to provide the facilities for such forecast is inadequate and out of harmony with present day requirements.

Some cost finding arrangements have been unsuccessful because they adhere too closely to the prevail-

ing idea among accountants that the principal use of cost finding is to fix selling prices. Most important of all, its uses as an aid to executive control is the opportunity for comparison of costs, order by order, or of actual processes with standard process. The absence of this has caused many cost systems to break down in times like the present, and just when the information is needed most.

If a good planning and production follow-up arrangement is already in operation, the cost work is greatly simplified; on the other hand, intelligent cost work can be made a factor in developing a good planning and production system. Unquestionably there is a very close relation between the two which must not be overlooked, and there has been lack of harmony in this respect. Executives are interested in cost work which produces the desired results without interfering with factory activities; so, therefore, the closer the cost finding and the planning and following up of production are co-ordinated, the less will be the impression among shop executives that their duties consist principally of supplying information to the Cost Department.

Split-Head Rail Failure Shows Rupture*

Differs from a Piped Rail and Is Often More Easily Discovered by Outcropping at Side

ON January 3, 1920, the derailment of a passenger train on the Chicago Great Western Railroad, near Wyeth, Mo., resulted in the death of 1 passenger, and the injury of 79 passengers and 3 Pullman employees. The derailment was due to the failure of a rail, the leaving end of which was broken into a number of small fragments. The receiving end, for a length of

End View of Rail, Polished and Etched with Tincture of Iodine, Showing Relations of Markings in Upper Part of Head, and Origin of Split Head Fracture

23 ft. 6 in., remained intact. The type of rupture displayed was a split-head fracture. A vertical plane of rupture was developed which nearly separated the head into halves, which extended along the length of the rail for a distance of 13 ft. Of this section, 9 ft. 6 in. was broken into small fragments, 32 being recovered.

The rail was 85 lb. weight, A. S. C. E. section, rolled in September, 1904, and laid in the track in October of that year. Its age was therefore 15 years 3 months. It was made of Bessemer steel.

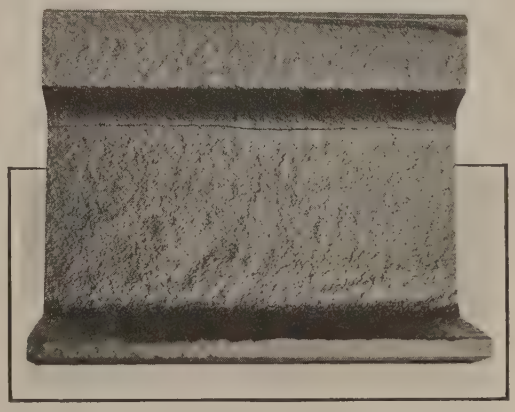
This rail presented a common type of rupture, the characteristics of which are illustrated in the several cuts herewith. In rails with split heads a longitudinal, vertical plane of rupture is developed, located along the middle of the width of the head. The origin of the plane of rupture is an interior one, located about ¼ in., more or less, below the running surface of the head. The shallow zone above the origin of the rupture remains unbroken until the last stages of failure are reached.

In the development of the split head the plane of rupture extends downward until abreast the junction of the head and the web. Here it commonly bifurcates, the branches extending right and left toward the fillets under the head. Final rupture occurs by the complete separation of the halves of the head and their detachment from the web. At the upper initial edge of the plane of rupture a small V-shaped ridge of metal, attached to the upper zone of metal, is frequently found. This acts as a wedge to separate the walls of the fracture.

The incipient point of rupture, in respect to the length of the rail, was somewhere in the 9 ft. 6 in. section, which was broken into small fragments. The characteristics of the metal of the rail were similar along this portion of its length and in the unbroken part adjacent thereto.

One figure shows the appearance of the rail, in cross section, near the fractured portion, after polishing and etching with tincture of iodine. The upper edge of the plane of rupture is characterized by the presence of markings on the end surface revealed by the tincture of iodine. These markings, here viewed on end, represent longitudinal streaks in the steel. They are lines of structural weakness, affecting the metal under crosswise strains.

The split in the head, shown at this stage of development, is much wider at its upper edge than elsewhere. The wedge-shaped rib of metal at its upper edge is forced by the successive wheel pressures between the faces of rupture, thereby increasing the width of the head. The plane of rupture separated below into two branches. One branch extended and reached the periphery of the section at the fillet under the head on the outside of the rail. The other branch extended toward the gage side of the rail, and appears in a partially developed stage.



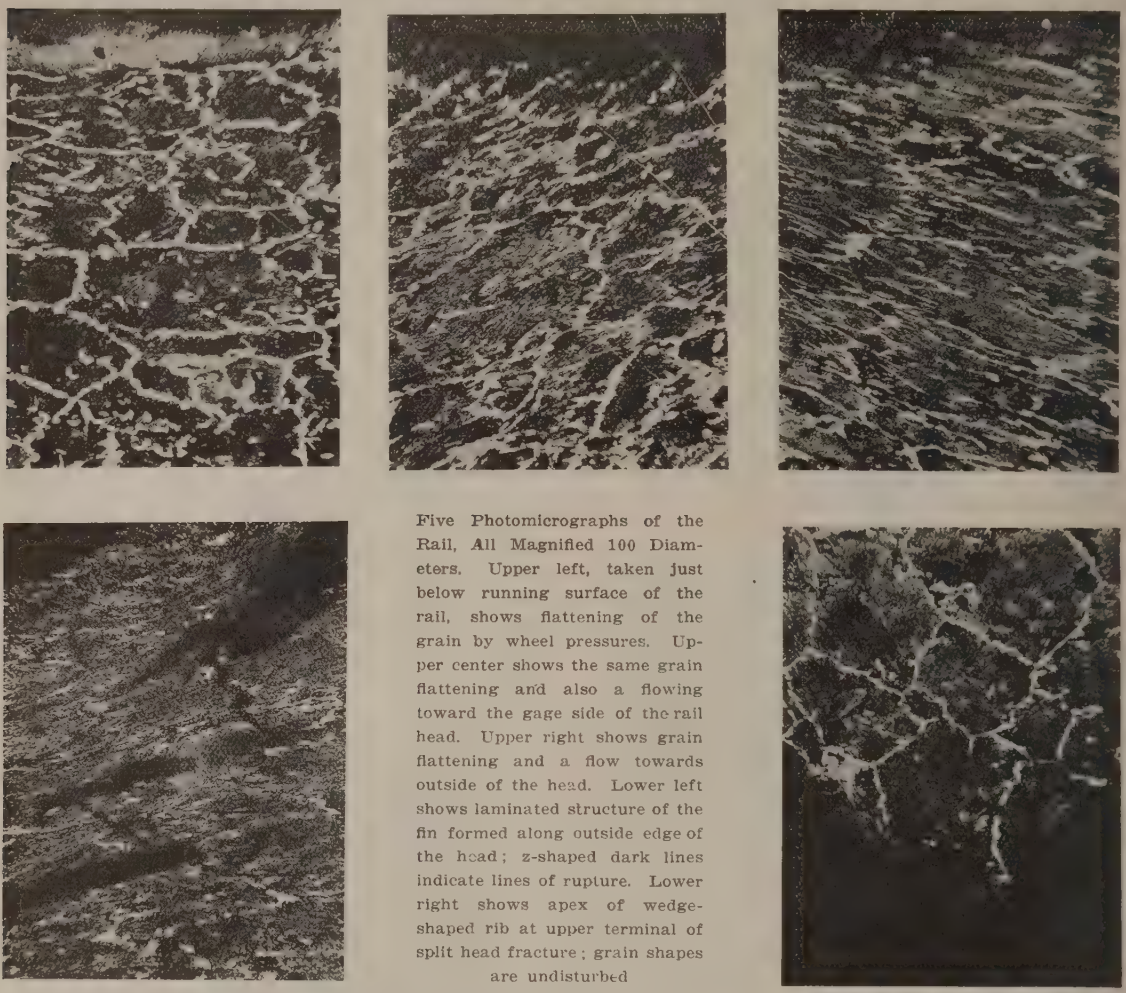
Side View of Rail, Showing Longitudinal Crack at the Fillet Under the Head, Where Split Head Fracture Had Reached the Peripheral Surface of the Rail

In the side view of the rail is shown the line of rupture under the head, which had reached the peripheral surface. Fractures of this kind do not always continue in an unbroken course, but deviate under the influence of contiguous streaks in the metal.

In the study of the failure of steel, attention cen-

*Abstract of report of Dr. James E. Howard, engineer physicist, Interstate Commerce Commission, Washington.

ters upon one principal feature and the relations of subordinate features to the principal one. The principal feature relates to the stress or strain, mutually related factors, which the metal is capable of enduring, and the manner in which limiting values in terms of stress or strain are reached. In plainer language, it is desired to know what loads the steel will carry; what relations the properties of the metal shown under test bear to the endurance of service conditions; whether any part of the elongation displayed in the tensile test or the contraction of area then displayed will be realized in service; whether the ultimate tensile strength of the steel represents a particular value to the rail when in servce; whether the ductility clause of the drop test has any real significance; whether the drop test itself has any definite relation to the serviceability of the rail. These and other queries suggest themselves. Chemical composition and finishing temperatures are factors which influence and control physical properties in rolled shapes—established by the laws of nature and not by specifications.



Five Photomicrographs of the Rail, All Magnified 100 Diameters. Upper left, taken just below running surface of the rail, shows flattening of the grain by wheel pressures. Upper center shows the same grain flattening and also a flowing toward the gage side of the rail head. Upper right shows grain flattening and a flow towards outside of the head. Lower left shows laminated structure of the fin formed along outside edge of the head; z-shaped dark lines indicate lines of rupture. Lower right shows apex of wedge-shaped rib at upper terminal of split head fracture; grain shapes are undisturbed

Opportunity occasionally offers to acquire data touching upon some of the above queries. On the present occasion microscopic observations were made upon the structural appearance of the metal of the rail adjacent to the running surface of the head, at the upper terminal of the split-head fracture, and at the lower terminals of the bifurcated fracture. The observations were directed to the distortion of the grain of the steel adjacent to the running surface, where flattening and flow occur immediately, due to the wheel pressures, and noting the undistorted shape of the grains at the split-head fracture.

The metal of this rail was capable of displaying ductile flow. The distorted shape of the grain next the running surface and the formation of a fin along each edge of the head is evidence thereof. At the terminals of the split-head fracture and the apex of the wedge-shaped rib at the upper edge of the split-head fracture there was, however, no appreciable distortion of the grain. At these places, microscopically, evidence was absent of any appreciable permanent set of the steel having taken place. Ductile flow and brittleness in the same rail are here shown, the result of the manner in which the stresses were received. The same is true of other carbon steel rails. Whether any part of the elongation or contraction of area of the tensile test is displayed in service depends upon the manner in which those features are developed.

The depth of the zone of distorted grain was about 0.05 in. Below this depth normal shape of grain prevailed. A feature of interest is raised in this connection—namely, that microscopic evidence is not presented showing a disturbance of the structural state of the metal so far down as the origins of split-head fractures are located. Evidence of a state of internal compression in the upper part of the head does not rest upon microscopic indications, but upon the results of strain gage measurements. In comparing the results of strain gage measurements with the indications of the microscope it has not been made clear that the presence of internal strains of either tension or compression may be recognized with the aid of the microscope. If such were the case the most far-reaching results would come from the use of the microscope in ascertaining the existing states of strain in all kinds of engineering structures.

A plane of rupture may pass into or through a steel member without change in shape of the grain, and therefore without display of appreciable ductility. This has been found true in different grades of steel. The behavior of rails in service furnishes the basis for the

query concerning the value in itself of the ductility clause of specifications. A greater or less display of elongation will take place in steels, depending upon their composition, when tested in such a manner as to permit of the display of ductility; that is, certain steels inherently possess such ability by reason of their chemical composition.

Specifications can enumerate these numerical values, but without changing the results. These remarks are made because the failures of materials are often attributed to lack of meeting specifications, when as a matter of fact the relation between the specified properties and the ability of the material to endure service stresses has not been given consideration. This is a plea for a better understanding of the specific causes which lead to failures, in which those of rails present notable opportunities.

In summation, the failure of the rail which caused the present derailment was due to the presence of a split-head fracture. Wheel loads cause distortion of the grain of the steel and induce lateral flow of the metal at the running surface of the rail, the tendency of such loads being to spread the railheads. The successful resistance to such lateral forces depends upon the structural soundness of the metal in the railhead. Longitudinal streaks are lines of weakness which influence the formation of split-head fractures and locate their incipient points of origin. Longitudinal streaks are due to casting and mill conditions. Their elimination, or reduction in numbers and gravity of development, are matters for the steel makers to consider. The ages at which split-head rails manifest themselves indicate such fractures are of slow and progressive development.

It is a matter of conjecture, although having the appearance of probability, that split-head rails would be unknown if strictly seamless steel were available for rails. The rail problem is intensified by reason of the employment of high wheel pressures. Soft rails display mashed heads; hard rails furnish a large number of transverse fissures.

There is a popular fallacy that split-head rails do not constitute a dangerous type of fracture, since at certain stages in their progress of rupture they may be detected in the track. This detection, however, comes after the necessary margin in strength in the rail has been practically exhausted, and not prior thereto. An element of danger has arisen when split-head rails are detectable in the track. An economic question is involved in the elimination of the causes of split-head failures, since many rails are removed for this cause which are not otherwise unserviceable. Finally, split-head failures should not be reported as piped rails, for they form quite a different problem.

TRADE ASSOCIATIONS

Government to Announce Affirmative Policy Respecting Open-Price Organizations

WASHINGTON, Aug. 16.—Following discussions during the past week between Secretary of Commerce Herbert Hoover and Attorney General Harry M. Daugherty, announcement has been made by both officials that an outline of policy to be pursued regarding open price and trade associations is soon to be published. Secretary Hoover especially has emphasized the need of letting business interests of the country know as nearly as possible what they may do within the law. It is his view that an affirmative rather than a negative policy should be laid down and used as a chart for the guidance of business. Until this is clearly established, it is pointed out that close co-operation between the Government and business interests of the country cannot be expected, because of the uncertainty on the part of the latter as to whether or not they are violating the law in supplying the Government with statistics.

So-called open price and trade associations particularly are interested because they are being asked to aid the Department of Commerce in providing it with data concerning industrial activities. Unless assurance is given to them that they may do this freely, without fear of legal interference, doubt has been expressed that they can be of any great and continuous aid in helping the department. For instance, it has been explained, the Department of Commerce through the initiative of Secretary Hoover, has begun the monthly compilation of commodity tables, giving an outline of business conditions in what is known as "A Survey of Current Business." It has been observed that there were only two trade associations that supplied data for the first number of this document, issued under date of July 1. The inference has been that associations generally have refrained from a more active participation in the work in the absence of assurance that they are committing no breach of the law.

Both Secretary Hoover and Attorney General Daugherty have on several occasions expressed the view that the vast majority of these trade associations are entirely legitimate and do constructive work that is of great importance to the national welfare. They, of course, have recognized that there are exceptions. Investigation by the Department of Justice of these associations which are alleged to exist in violation of the law, however, will in no way be an attempt to disturb commercial or industrial activity unnecessarily, according to a statement made by Attorney General Daugherty last Thursday.

"The Department of Commerce," said Mr. Daugherty, "is much concerned about the welfare of business. Mr. Hoover and myself have discussed the situation and we both are anxious to give business reasonable assurance that it will not be disturbed by Government action or legal interference. There are a great number of trade associations and organizations of business that are of much benefit to business in general. The majority of these organizations are desirous of doing the right thing. There are, however, some which, under guise of trade associations, go beyond the point permitted by law.

"Prices are fixed in an illegitimate way and illegal things are done and camouflaged," Mr. Daugherty continued. "Representatives of several organizations have come into the department and agreed to work in harmony and quit what might seem to be questionable practices. I want to say, of course," added the Attorney General, "that in taking this matter up and discussing it directly with representatives of the organizations should not lead to the conclusion that the Department of Justice will close its eyes to violations of the law. The administration wants to start right in dealing with business and believes that the present is the time to make the start."

The New York, New Haven & Hartford Railroad has placed an order with the Osgood Bradley Car Co., Worcester, Mass., for eight motor equipped electric zone cars costing $70,000 each, and 14 trailers costing $35,000 each, a total of 22 cars involving an investment of more than $1,000,000. The new rolling stock will be used on the railroad's main line between New York and New Haven, Conn.

In the table of by-product coke plants in operation May 1, 1921, published in THE IRON AGE, Aug. 4, it is shown that 885 Semet-Solvay ovens were under construction at Rosedale works, Cambria Steel Co. This is an error. The correct number is 88. The total number of ovens built or building as of May 1, 1921, therefore, is 11,628 instead of 12,425 as originally published.

Officials of Smith & Wesson, Springfield, Mass., firearms, have announced that the plant, which closed July 15 for a month, will not reopen before Sept. 6. Incoming business does not warrant an earlier opening.

Principles of Modern Rolling Practice*

Discussion of the Great Power Required for Finishing Passes — Phenomenon of Speed-Gain in Rolling

BY E. COTEL†

TO the strong ascendancy of rolling mill practice is due the commanding importance of the iron and steel industry. Beams and railroad rails, those most essential materials in modern life, can no longer be produced in sufficient quantity and quality by forging. The fact that rolling is merely an improved form of forging undoubtedly springs from the complete identity of all the phenomena of the two methods.

Like the spreading in forging, the work of rolling is evidenced by a considerable elongation of the bar, owing in both cases to its contracted section, and by a slight increase of its width. The difference of these two working methods in point of continuity touches neither their substance nor their nature. The difference in fact is only that the constantly repeated hammer blows in forge work coalesce in rolling to a single pressure, so that the periodic advance of the bar is replaced by a continuous automatic feed. By the rolling method merely the periodic interruptions are avoided, and hence we can say that rolling is forging become stationary. Indeed, by a mathematical analogy, we may say that rolling is integrated forging.

In spite of the fact of no theoretical difference between the two processes, the integral character of rolling gives it a huge advantage over forging. Because of the rotary motion and the avoidance of idle periods, that is, for the up and down strokes of the hammer and the free shifting of the bar, rolling has all the advantages of a mass-production method. The past century has well recognized these advantages and so utilized them that the development of the rolling process has been extraordinarily great and important.

*Translated from *Montanistische Rundschau.*
†Chief engineer, Krompach, Czecho-Slovakia.

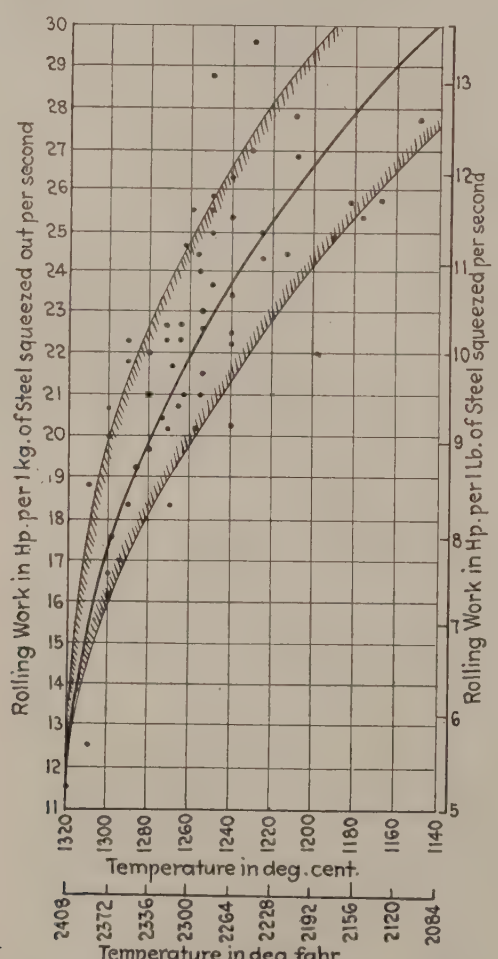


Fig. 2. Recorded Power Characteristics from Experiments of Dr. Puppe:—Rolling in the Gothic Pass

The Power Required for Rolling

In designing a roll train a most important question, not only financially but in point of reliable operation, is the power required—that is, a determination of the

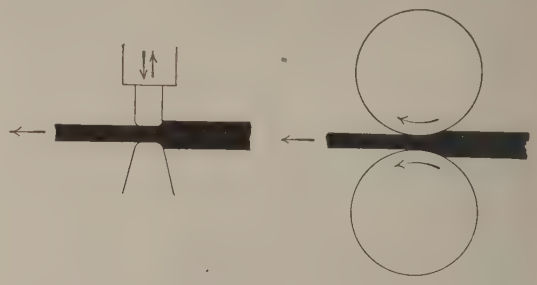


Fig. 1. Analogy Between Forging and Rolling

power for the drive. This question of power consumption was until recently unsolved. Theorists have indeed often tried to determine the rolling work by calculation, but always without practical result, since the power consumption varies too greatly for different roll-groove sections. Even the distinguished work of Dr. Puppe[1] could not solve the problem. The valuable collection of his test results deserves, however, the greatest recognition, because it furnishes a definite starting point to subsequent investigators.

My particular acknowledgment to Dr. Puppe is all the greater because the following simple and certain solution of the problem is based on his experimental data. After the appearance of his work I was of the opinion that a regular interdependence must certainly exist among his data, in spite of the fact that he had not himself discovered it. The graphical expressions of his power-consumption values unfortunately show neither regularity nor logical coherence. Nevertheless I discovered the desired regularity, upon choosing an entirely new way of studying the interdependence.

Rolling-mill work, due to the nature of rolling, can be nothing other than the work of squeezing out a certain mass of metal. Consequently, in passes of similar section and at the same temperature, the rolling work in ratio to a given weight of metal squeezed out per second must always be practically equal. The correctness of this assumption has been completely verified by the results.

Conformably with the foregoing, I have in my investigation[2] converted Dr. Puppe's dubious experimental results so as to support a conclusion that the power-consumption values for grooves of similar section show a substantially perfect equality. Details are given in

[1]Experiments to Determine the Power Required for Rolling Mills, 1919.

[2]For Determination of Rolling Work, *Stahl und Eisen*, 1918, No. 16, page 336.

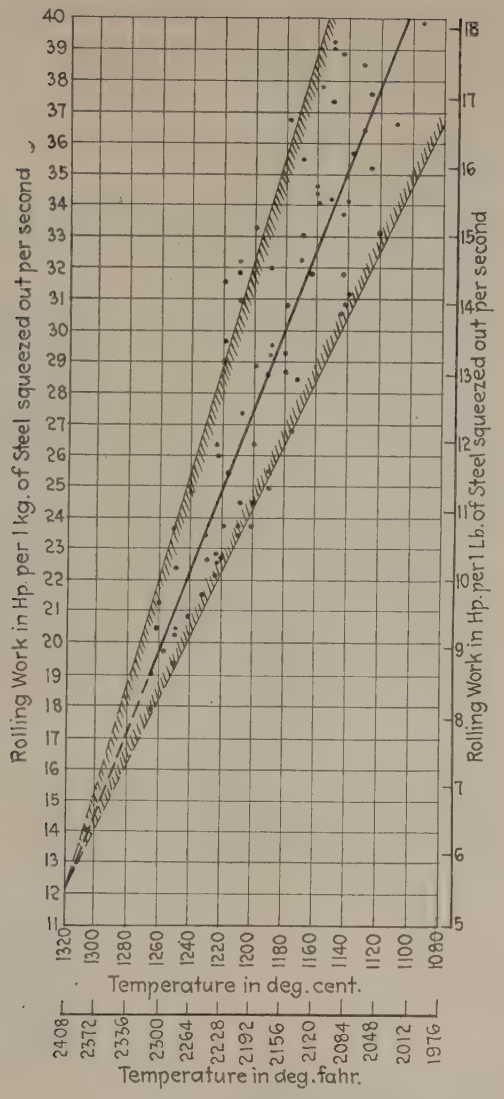

Rolling Work in Hp. per 1 kg. of Steel squeezed out per second
Rolling Work in Hp. per 1 Lb. of Steel squeezed out per second
Temperature in deg. cent.
Temperature in deg. fahr.

Fig. 3. Power Consumption for Rolling in the Box Pass, from Experiments of Dr. Puppe

the article just cited. Here are brought together in an accompanying table only the values of work determined for the various groove sections.

It is noted that at the commencement of the rolling all the groove shapes consume relatively little power, and that the greatest absolute difference between the power-consumption values for the first passes through the rolls amounts altogether to only 20 hp. In contrast, the power-consumption values for the last passes are decidedly high, and the absolute difference between the power values of the finishing passes is very great.

This phenomenon may very plainly be seen in the graphical representations of the power consumption. It is self evident that for the purpose of determining the driving power needed, only the highest values are actually important. If we take for a unit the power consumption of the Gothic pass, since it is the lowest, we find the other maximum power-consumption values exceed it by the following multiples:

The box pass.....	1.3 times	The rail pass.....	3.7 times
The round finishing pass	1.3 "	The railroad-tie pass	4.1 "
The diamond pass.	2 "	The channel pass..	4.3 "
The flat-oval pass.	2 "	The tee pass.....	6.5 "
The flat-bar pass..	2.2 "	The I-beam pass...	7.6 "
The polishing-roll pass	3.7 "		

Publication of these power-consumption values for the various groove sections, which before that time had been wholly unknown, both absolutely and relatively, soon brought out a letter from the prominent specialist, A. Schöpf,[3] in which he fully confirmed my data and conclusions on the ground of his own experiments.

If we chart these values from experiment or calculation, we get a more perfect picture of the rolling work, and are in a position to draw interesting deductions from the curves. Figs. 2, 3 and 4 show graphically the same data from Dr. Puppe's experiments that were contained in the tables.

An interesting fact shown by the curves in the graphical figures is that the lower limit of the rolling work is practically the same for all groove sections and amounts to about 12 or 15 hp. (metric) for each kilogram per second of metal squeezed out (5.38 to 6.72 hp. per lb. per sec.). That is to say, the curves, extended below the range of the experiments, intersect the line of maximum roll temperatures always at a height of about 6 hp.

Table I

Rolling Work per Pound of Metal Squeezed Out per Second

Shape of Grooves	Lowest Hp.	Corresponding Temperature Deg. Fahr.	Highest Hp.	Corresponding Temperature Deg. Fahr.
Gothic	4.9	2408	13.4	2102
Box-pass	8.9	2307	17.9	1958
Round finishing	...	....	17.9	1940
Diamond	13.4	2161	26.8	1886
Flat oval	...	....	26.8	1958
Flat bar	14.7	2093	29	1814
Polishing roll..	22.3	2113	49.1	1958
Rail	14.3	2210	50	1803
Railroad tie...	18.3	2161	55.4	1719
Channel	24.6	2082	58	1666
Tee-bar	17.9	2071	87	1899
I-beam	13.4	2082	102.7	1744

Naturally, the work consumption increases with falling temperature. While, however, this increase for the Gothic and box passes is moderate, and even the

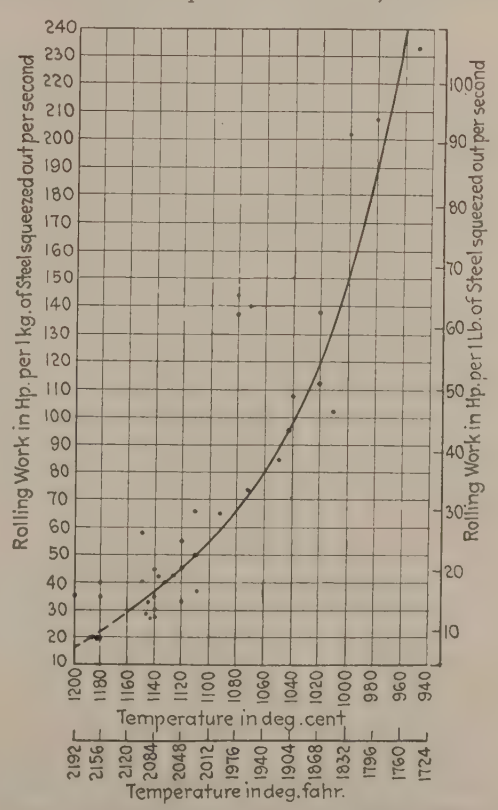

Rolling Work in Hp. per 1 kg. of Steel squeezed out per second
Rolling Work in Hp. per 1 Lb. of Steel squeezed out per second
Temperature in deg. cent
Temperature in deg. fahr.

Fig. 4. Characteristic Power Curve for Rolling I-Beams, as Shown by Dr. Puppe's Experiments

[3] *Stahl und Eisen*, 1918, No. 27, page 613.

maximum values for these sections are not very high, the corresponding power consumption for the special sections rises rapidly, and the maximum power values for these grooves are several times greater than for the Gothic and box passes. For the Gothic passes a temperature drop of 40 deg. Fahr. corresponds to an increase of about ⅝ to 1¼ hp.; for the box passes, to about 1¼ hp.; whereas for the special sections it is 4 to 5 hp., even for the first passes, and 15 to 22 hp. for the finishing passes.

This indeed is characteristic of the special sections, as a result of the violent squeezing out in a lateral direction, or in consequence of extending the thin web and flanges, which rapidly cool and hence offer great resistance. Rolling-mill men are daily paying increased attention to the conditions of economical groove design, so that the rolling work, especially in the profiling passes, may be much reduced. But until this is brought about there can at least be no doubt that a driving engine chosen to perform present rolling work must be

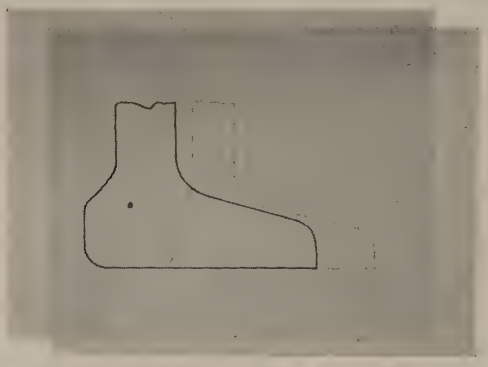


Fig. 5. Illustrates the Podhradsky Method of Laying Out Pass Profiles

more powerful than should really be necessary for reliable service; and at all events there is an advantage in having reserve power for a possible extension of the rolling-mill program.

On the Principles of Roll-Pass Design

Successful rolling, exactitude of profile, economical use of power and wear of rolls are dependent upon the form of the grooves, whence it is evident that high importance attaches to the methods of designing them. The very clever and practical method of Chief Engineer L. Podhradszky, of Krompach, for laying out the profile shape, avoids the use of awkward paper templets and substitutes for them a transparent oiled tracing paper so used that it is unnecessary to cut out the shape.

If we draw the outline of a groove with a hard pencil on a tracing paper, and the outline of the proposed roughing (or previous) groove on another sheet, we can superimpose them and thus can precisely observe and judge the working and filling out of the metal which it is intended to produce. The two sheets, laid one over the other on white paper, Fig. 5, lie stretched perfectly flat, do not stick together, do not tear, and they allow both profile outlines to be seen at once. But the chief advantage is the possibility of changing the form with a few strokes. This method is so perfect and simple that everyone who has tried it will use it.

Even the design of the grooving has had no pronounced, recognized rules. For laying out round, box and Gothic passes there are indeed very well-tried and generally familiar methods, but these are almost entirely lacking for the special shapes. Even the best well-known treatises on grooving design mostly handle this subject on the basis of good, well-tested examples, and only to a slight extent on the basis of definite, general rules.

The first rational and correct principle of a theoretical grooving method for the special sections (irregular profiles) has been offered in the notable study of W. Tafel, entitled "New Methods for Calculating Grooves."[1] A further development of Tafel's methods will lead to important progress in the field of grooving. Since, however, the present applications of his idea are quite complicated and tedious, grooving still remains ever a matter of experience and judgment.

The chief rule of all groove design is as follows: The change of shape in the cross-section shall be as simple, as easy, as possible. The more violent the change of shape in a pass,

1. the greater will be the power consumption,
2. the greater will be the wear of the groove,
3. the less will be the chance of correctly filling out in the groove.

Since this fact is established by experience, personal ingenuity will always play a leading rôle in grooving, even should the methods of grooving by calculation be fully adopted in practice. Mathematics is the science of absolutely inflexible figures, and yet there are many mathematical problems which have more than one answer. One solution may be long and complicated, another short, simple and clear.

In proof of this assertion the possibilities in rolling Phoenix rails offer a good example. The Phoenix (grooved) rails are, as generally known, manufactured in such a way that the grooves are channeled in the metal when going through the last two roll passes, by means of small horizontal auxiliary rolls. But this method is very inconvenient for the rolling work, on the one hand because the necessary attachments can generally be inserted in existing roll housings only with great difficulty, and on the other hand because the old driving engines are usually too weak for this rolling work.

The problem of rolling 60-kilogram (121 lb. per yard) Phoenix rails in a comparatively weak reversing mill was solved by forming the horn of the groove like the flange of a beam or rail, and bending it in during the last pass without special appliances. As shown in Fig. 6, *a* is the old and *b* the new shape of the next to the last roll groove. The trial rolling gave a good result and, despite the fact that the matter was never

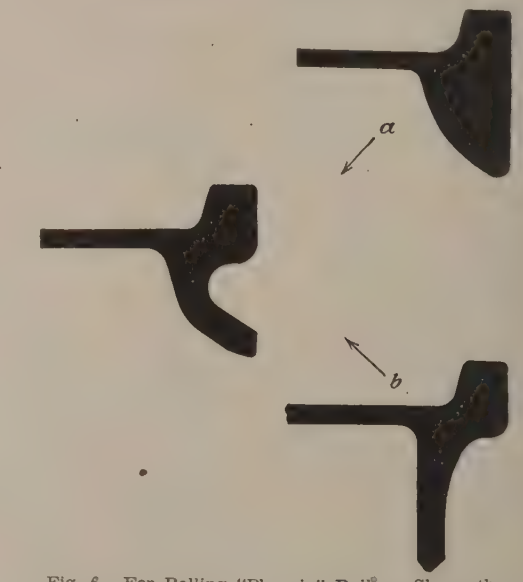


Fig. 6. For Rolling "Phoenix" Rails, *a* Shows the Section Formerly Used, and *b* the Section Now Used, Immediately Previous to the Last Pass, Which Gives the Final Section Shown at Left

carried out commercially, some years later an English book gave the same solution, this having been employed in practice.

This is evidence that even methods very generally used can be simplified and improved, or that problems in rolling practice almost always have more than one correct solution. The correctness here relates solely to the right shape of the last cross section, since the economy of the various solutions may widely differ.

Confirmation comes also from A. Schöpf, in his discussion of my work, where he remarks: "Cotel says that the rolling work, at least in the profiling passes,

[1] *Stahl und Eisen*, 1909. No. 18, page 651.

must in the future be lessened. Of late I have concerned myself with design of passes for wire and have found that even in this subject, which seemed unqualifiedly a closed one, considerable progress is still possible."

Stretching and Speed Gain [Bar Acceleration] in Rolling

The fact that the stretching or spreading of the metal between the rolls takes place in one direction, opposite to that of the bar's movement, or that the roll cannot perform the stretching forward, but only backward, is of no special significance, and interesting merely because it is a fact first determined a few years ago. These observations and determinations had in the meanwhile been confirmed by Haedicke.[5]

The speed gain [acceleration of the bar to a speed greater than that of the roll circumference] is a very interesting phenomenon accompanying the rolling, the properties of which have not until recently been fundamentally investigated. Following my article, "The Stretching in Rolling,"[6] Dr. Puppe published, in his study of the speed gain, a rich collection of his experimental data relating to it. A single fault in his notable work is that he takes the phenomenon of the speed gain to be altogether a regular one.

There is no doubt that, besides the factors which Dr. Puppe observed, there are several others which have an influence upon the degree of speed gain. To prove this and disclose such factors, I made various experiments in the year 1909, and in my article[7] showed that:

(1) Besides the factors observed by Dr. Puppe, both the amount of lateral pressure and the rotary speed of the rolls exert a considerable influence upon the amount of the speed gain;

(2) The amount of speed gain may vary for a single bar by about 100 per cent;

(3) The speed gain cannot therefore be considered a regular phenomenon determinable with formulae.

Consequently the claim of Dr. Puppe that the phenomenon of speed gain can be utilized in designing the roll grooves is unsound. This, however, is also stated by W. Tafel in his article on the latest methods of designing grooves, already mentioned, although he had made no experiments concerning it.

[5] *Stahl und Eisen*, 1908, No. 24.
[6] *Stahl und Eisen*, 1908, No. 5.
[7] *Bányászati és Kohászati lopak*, Budapest, 1910, No. 7.

Causes of Cracks in Case-Hardened Objects

Grinding Found to Be the Predominating Factor—High Speed of Rotation a Means of Avoiding Cracks and Softening

REVUE DE METALLURGIE for April has a most interesting paper on the reason for the surface cracks so frequently seen in case-hardened objects after grinding. It is by Messrs. Guillet, Galibourg and Beuret. First a description is given of the cracks, well illustrated by photographs, and a review of the literature, in particular the recent paper by Hanson and Hurst before the Iron and Steel Institute. Their conclusion was that if the network of cementite could be suppressed the pieces rejected for cracks would be greatly reduced.

Grinding a Main Cause of Cracks

In order to study the question the French experimenters treated the specimens to prolonged attack in 10 per cent sulphuric acid. This develops cracks which are only latent in the specimens. At least fifteen main factors entering into this question of formation of cracks are given in detail in the paper; but by means of careful observations it was found possible to simplify the matter and not investigate the influence of all of them. It was soon found that the grinding used to dress the pieces to the desired size after treatment was the predominating factor. For instance, in the case of shafts the cracks always form a closer network at the ends where there is most grinding, than in any other part. Plane surfaces, where the wheel works on the flat, crack more easily than cylindrical surfaces. Further, it is a striking fact that the cracked pieces, which are very hard before dressing, may be readily filed after the cracks are produced. This seems to indicate that they have suffered a superficial tempering or reheating which could only come from heating while being ground. These views are supported by the case of a shaft the details of which are given.

Next is a short review of the subject of the cracks formed in the liners of guns, and the theories explaining the cracks produced during erosion as outlined in 1915 by the eminent Russian metallurgist, Tchernoff. These theories the authors believe to be applicable to the present case.

Methods of Prevention

Careful experiments were carried out to determine methods of avoiding the cracks. It was decided to consider only those pieces sound which did not develop cracks after 24 hours in the 10 per cent sulphuric acid. All the experiments were concentrated towards the aim of obtaining the minimum of heating and tempering while grinding to the desired finished size. In a tentative way it was found, other things being equal, that this result was obtained when the piece was turned as rapidly as the arrangement of the machines allowed. It must be understood that the wheel also turns as usual. The theoretical reasons for this are given in detail. Two typical cases taken from the results obtained may be given. Fifty-two cylindrical bars, 14 mm. diameter, of ordinary carbon case-hardening steel were treated, Nos. 1 to 28 to have 0.5 mm. depth of case, and Nos. 29 to 52 to have 1.0 mm. Each of the two lots was divided in two parts, one being reheated at 150 deg. C for 30 min., and the other ground without reheating. Each of these lots was in turn divided and these subdivisions ground to size, one with the piece turning at 120 turns per minute and the other at 500. The striking results of this test are shown below:

Bar Nos.	Depth of Case	With or Without Reheating After Quenching 800—8250 deg. C. in Water	Bar No's.	Conditions of Grinding Speed of Piece, r. p. m.	Results of Grinding After Etching in 10% Acid
1	0.5 mm	Without	1 to 7	120	All cracked
to	0.5 mm	Without	8 to 15	500	No cracks
28	0.5 mm	Reheated	17 to 22	120	All cracked
	0.5 mm	Reheated	23 to 28	500	No cracks
29	1.0 mm	Without	29 to 34	120	All cracked
to	1.0 mm	Without	35 to 40	500	No cracks
52	1.0 mm	Reheated	41 to 46	120	All cracked
	1.0 mm	Reheated	47 to 52	500	No cracks

As may be seen, whatever the conditions of treatment, the pieces are cracked or not depending upon whether the speed of rotation of the piece was sufficient or not.

Results With Case-Hardened Pinions

A second test was made on case-hardened pinions, quenched and ground on the plane surfaces normal to the axis of rotation and on a part of the shaft. These pieces were considered as giving an enormous loss because of the cracks found on the cylindrical surfaces, and more particularly on the faces of the pinion. Photographs are given in the original paper

showing these conditions. The results given in the table below confirm fully the previous results obtained. In this case, also, notwithstanding very different working conditions, the speed of rotation of the piece dominates the question.

Results of Grinding Pinions—All Case-Hardened for 0.8 mm Depth and Quenched in Water at 800 to 825 Deg. C.

Machine	Pinion No.	With or Without Reheating	Conditions of Grinding Speed of Piece	Results
A	1 to 4	With	500 r.p.m.	No cracks
A	5 to 8	With	120 r.p.m.	Badly cracked on the two faces and 15 mm. on the two ends of shaft.
A	9 to 12	Without	500 r.p.m.	No cracks
A	13 to 16	Without	120 r.p.m.	Same as 5 to 8
B	17	Without	One face with new wheel, 120 r.p.m.	Badly cracked
		Without	One face with dirty wheel, 120 r.p.m.	Like 5 to 8
B	18	Without	Both faces with dirty wheel, 120 r.p.m.	Like 5 to 8
B	19 to 20	Without	Both faces with dirty wheel, 440 r.p.m.	Like 5 to 8
				No cracks

The tests carried out leave no doubt that neither the depth of the case, nor cold work, nor the presence of cementite in excess is a principal factor in the production of the cracks. It was interesting to see whether heating alone would make pieces crack without the intervention of grinding. For heating the piece very rapidly and on the surface only, the most active of all the methods tried consisted of pouring on the case-hardened and quenched surface molten copper, raised to 1200 deg. C, then cooling the whole with a jet of water, as when grinding. Under these conditions cracks are produced on the surface and are visible even without etching. A photograph is given in the paper showing the cracks brought out more clearly by etching.

The experiments, therefore, lead to the following conclusions:

1. The cracks are due more than anything else to a heating of the metal while grinding.
2. It is possible to obtain considerable cooling with plenty of water and to avoid all cracks by giving the piece to be dressed a circumferential speed high enough (about 400 r.p.m. for pieces 15 mm. (0.591 in.) diameter).

Also the same heating that produces the cracks is the cause of pronounced softening of the surface. In this case also, and for the same reasons, with sufficient speed of rotation of the piece practically all softening is avoided. G. B. W.

Universal Machine Shop Rule

To aid in solving many machine shop calculations without the necessity for using pencil and paper, R. Poliakoff, 709 Sixth Avenue, New York, has designed and placed on the market a 12-in. rule which contains on its two sides various scales by which calculations can be made by the aid of a pair of dividers. These scales, which are laid out to logarithmic measure, permit the user to solve a number of machine shop problems of which the following are perhaps typical:

Given diameter of bar and cutting or grinding speed, to find the r.p.m. Given diameter of bar and r.p.m. of grinder or lathe, to find the grinding or cutting speed. Given length of bar, number of r.p.m. and feed in inches per revolution, to find the time required to turn or grind the bar. Given depth of cut and feed of machine, to find the volume of metal removed. Given speed and feed of machine, to find the area machined.

As the rule contains both English and metric scales, its use is not confined to calculations. It has a high, white celluloid finish, so that dirt accumulated in the shop may readily be removed.

Rogers, Brown & Co. have been appointed sole agent in the United States for the sale of virgin aluminum, of various grades, produced by the Norsk Aluminum Co., Christiania, Norway. Stocks of aluminum will be carried at New York and Cleveland.

Safety Hooks for Handling Plates

Safety and speed in operation and simplicity of design are features claimed for the Comrie safety hook, designed by Alexander Comrie, Standard Shipbuilding Corporation, Shooters Island, N. Y. It is intended primarily for handling plates, though it is adaptable for piling, railing, piping; it can be made large enough to handle armor plate. The pull or lift can be exerted from any direction. Teeth at the gripping end of the tongue become engaged with the plate, so that if the strain is prematurely released the load will not be dropped.

It is made of a forged steel jaw, a tool steel tongue and BB chain, its weight being about 80 lb. It takes 20 sec. of two men's time, one man at the crane and

With Teeth at the Gripping End of the Tongue, This Hook Lifts Plates Safely

the other at the hook to lift a 4-ton plate from the racks and place it upon a flat car. Two or more plates can be lifted at a time.

The standard clamp for plates, as used in shipyards, will lift plates from 1/16 to 1⅞ in. in thickness. So great is the grip that the tongue often has to be tapped slightly to disengage the clamp. It is claimed that the teeth do not mar the plates. The designer states that not an accident nor delay has been traceable to its use.

The Pennsylvania Tank Car Co., Sharon, Pa., has started work on an addition 100 x 400 ft. to its plant at Masury, Ohio, a short distance from Sharon. The additional facilities will afford employment for 400 workmen. The company will hereafter do both repairing and fabricated work at its Masury plant, and tank car parts will be manufactured, as well as assembled. Three miles of railroad tracks will be laid to provide storage for tank cars. The company is likewise installing a similar additional unit at its plant at Argentine, Kan., the structure to be 183 x 300 ft. The expenditure there will be about $150,000.

RAILROAD BILL HELD UP

Improvement in Many Industries Delayed—
—$500,000,000 Issue Is Maximum

WASHINGTON, Aug. 16.—With stimulation of the iron and steel and other industries largely dependent upon passage by Congress of the $500,000,000 funding bill for the railroads, concern has been expressed over the obstacles this legislation is facing. The point has been reached where it seems unlikely that it will be enacted before Congress takes a recess and there is no indication how much time will be required after Congress reassembles. The strongest opponent to the measure is Senator LaFollette of Wisconsin and the tactics he has adopted are largely responsible for the slow progress being made. He has asked that former Directors General McAdoo and Hines of the Railroad Administration appear before the Senate Committee on Interstate Commerce, which, with the House Committee on Interstate and Foreign Commerce, last week began hearings on the bill. The witnesses were Director General Davis and Chairman Meyer of the War Finance Corporation. Mr. Hines is abroad and it will be a considerable time before he can be in Washington.

Meanwhile industrial and financial interests still hope that the measure can be enacted without the delays its opponents plan. As is known, the President is urging its passage, recognizing the importance of such action to relieve the unemployment situation. Mr. Meyer has told the Senate committee that if Congress does not pass the funding bill it will be necessary to make a direct appropriation of $250,000,000 in order to enable the Government to pay the railroads the net balance due them. Members of both the House and Senate committees have received communications from business interests urging quick passage of the bill. Among them is one addressed to Chairman Cummins of the Senate committee by Charles A. Livingston representing the Illinois Manufacturers' Association, urging prompt enactment of the bill "in order that the railroads, industries and all shippers may immediately be relieved, that transportation troubles may be averted and unemployment be lessened."

For General Business Betterment

Both Mr. Meyer and Mr. Davis have vigorously urged quick passage of the bill. The former has spoken of it as a measure for country-wide as well as railroad rehabilitation and vigorously denied that it was a "hand-out" as it has been characterized by some opponents. If it is passed equipment trust certificates running up to $310,000,000 in value which were deposited with the Railroad Administration during its control for the purchase by the Government of engines, cars, rails, etc., would be sold to the War Finance Corporation. The latter would dispose of them in the market gradually. At present these certificates, which bear interest at 6 per cent, are not marketable securities.

Assurance has been given by Mr. Davis that the maximum of funding under the bill would be $500,000,000 and the amount would probably be less. This statement was made in answer to claims by Senator LaFollette that the bill really would authorize the War Finance Corporation to fund or sell over $1,000,000,000. Making a detailed analysis of the railroad debts to the Government for additions and betterments, mostly equipment, furnished the carriers during the war, Mr. Davis said a total of $1,144,000,000 had been advanced for that purpose. For this, it was said, the railroads had given $310,000,000 in equipment trust notes and $70,000,000 had been paid in cash, leaving a balance of $764,000,000, of which $61,000,000 already has been funded privately. Approximately $700,000,000 of the Government advances consequently have not been funded, it was stated, but for various reasons the bill would require funding of less than $500,000,000. Mr. Meyer said that not all of the railroad securities held by the Government would be accepted and marketed by the War Finance Corporation. Only good securities, it was pointed out, will be funded.

Strike Settled on Open-Shop Basis

MILWAUKEE, Aug. 15.—Striking employees of the Hamilton-Beach Mfg. Co., Racine, Wis., manufacturer of domestic and industrial appliances with electric motor power, called off a strike instituted more than a year ago to enforce a demand for recognition of the union. Following a conference between Fred J. Osius, president of the company, and R. G. Knudson, representing the Industrial Commission of Wisconsin, striking employees held a meeting and decided to declare the strike off.

On Aug. 1, 1920, between 750 and 800 employees walked out when the company enunciated the "open shop" policy. Since that time more than $2,000,000 in wages has been lost to strikers, according to conservative estimates. Suits involving $1,200,000 in damage claims resulted. The company brought suit against union labor organizations for damages, while the unions retaliated with counter suits demanding damages for alleged false arrest and personal injuries. There were numerous riots and at one time when an appeal was sent to the Governor for State troops for protection of the plant, the sheriff was ordered to appoint 100 deputies to preserve order.

An official statement signed by "The Former Employees of the Hamilton-Beach Mfg. Co." says: "The men and women who were former employees of this company, after carefully considering the sacrifices that had been made financially fighting for their cause and also that it would be for the best interest of the community to have this affair settled, are willing to accept the proposition of Mr. Osius."

A statement by the company said in part: "This company believes that its interest, as well as the interest of every employee, are best and most honestly served by maintaining an open shop. We stand for the principle of the open shop in which union and non-union men may work without molestation or being forced to join any organization. We pay wages and maintain shop conditions which compare very favorably with any other manufacturers in our industries. This company is glad to discuss matters appertaining to proper working conditions and fair, clean treatment, and expects in return just what every good workman knows is due the company. No employee or class of employees needs the help of any outside agitator to correct conditions in this shop. The employment office of this company is now open. Applications will be received by mail or at the office. The company will open its factory just as soon as sufficient employees apply for work so that it can operate."

DETROIT, Aug. 13.—During the week ended Aug. 2 the 79 plants of the Detroit Employers' Association had 118,803 men on their payrolls. This was an increase of 1231 over the preceding week. There were 11,083 men working on part time, with an average week of 36 hr. This compares with 12,728 and 35 hr. for the week ended July 26. The number of men employed for the week was about 64.5 per cent of the number employed by the same plants at about the same time last year. Production, according to all reports, in these plants has mounted considerably about 80 per cent of production last year at this time.

July wage disbursement of $3,323,982 by Youngstown, Ohio, industries is the lowest in three years, reflecting manufacturing stagnation, irregular employment and unemployment. It represents a decline of $440,234 from the June payroll and compares with $6,402,521 paid in July, 1920, a loss of $3,078,539. The exceeding low rate of steel mill operations during the period represented accounts for the small distribution.

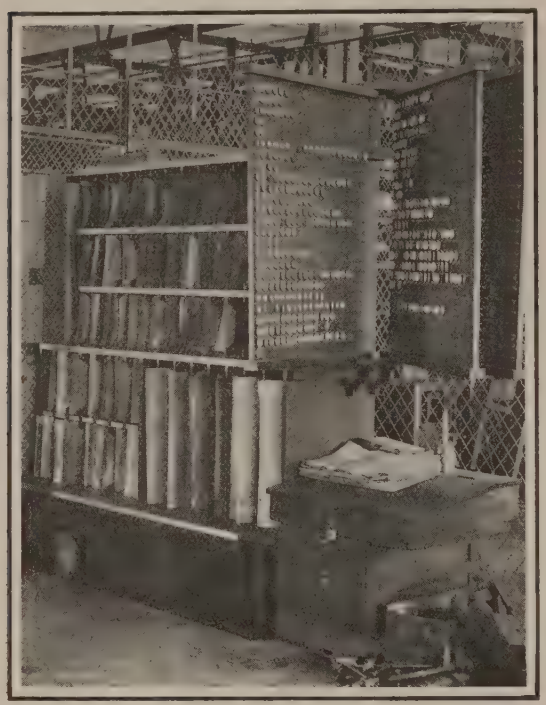
Among the speakers at the annual convention of the National Implement & Vehicle Association at Chicago, Oct. 12 to 14, will be Herbert Hoover, W. P. G. Harding, governor of the Federal Reserve Board, and Henry C. Wallace, Secretary of Agriculture.

CONTROLLING BLUEPRINTS

How Engineering Department Maintained Correct Drawings and Money Was Saved

BY H. M. FITZ*

Blueprints have been mounted in one form or other for shop use for many years, but in a large shop where hundreds of blueprints are made and issued daily, costs are watched closely and any suggestion that is made to improve conditions with a possible increase in cost is questioned. The management of a motor truck company went to the trouble to find out what mounting the prints costs, and what is saved by so doing.



Cabinet Provides for Three Sizes of Blueprints, Which Are Mounted on Cards, and Checks Are Used for Keeping Track of Withdrawals

In a shop that is not entirely a one-product shop but doing different kinds of work, it is necessary that the blueprints be placed in the shop in the most substantial way possible. Sometimes the engineering department loses control of the drawings and blueprints the minute they leave the drawing room by not properly listing and checking the number of each that goes to the shop. The fact that blueprints are still engineering property and are merely loaned to the shop to use is overlooked. Any corrections or changes should be recorded by the engineering department.

For example, an experience is recalled of finding four blueprints (spoiled work caused the search) that were issued at four different times with certain dimensions changed each time, but the unchanged prints were not taken care of either by correction or collection. Others were found with changes in dimensions made by some one in the shop. The engineering department had no record of changes being made. Suggestions from the shop are practical and necessary, but with proper control the responsibility should rest on the engineering department.

Checking out blueprints in the shop helps to decrease the loss. For instance, if a print drops behind a tool box or a bench, it is not likely to stay there if there is a check on it. The system helps to locate prints in case of changes during process and reminds the user of returning it to the proper place.

The average blueprint costs about 21 cents to produce. A shop that receives a daily average of 195 blueprints has an expense on this account of $40.74. In this case, it was found that 50 per cent of the blueprint work was replacement of shop-worn prints rendered unreadable from handling and misuse. Spoilages occur from oil-stained and creased blueprints, adding to the manufacturing costs, so the management stopped this replacement work—not only by mounting them on cardboard and shellacing—but placed an eyelet to hang up a print, providing in addition a hook at each machine and bench for that purpose. A cabinet was built to take care of three different size prints that have been standardized, also boards placed book fashion with the drawing numbers in numerical order and hooks for checks.

The additional cost amounted to 7 cents per blueprint, making a total cost of 28 cents. By reducing the 50 per cent replacement, or 97 blueprints, the possible saving is $97 \times 21 = \$20.37$ per day, and seems worth while from a cost standpoint alone. In addition the general appearance of the shop was improved and the saving gave the blueprint boy more time for making records.

*McVicker Engineering Co., Minneapolis.

Foundries Agree to Report Pig Iron Stocks

Out of 1050 members of the American Foundrymen's Association using pig iron, 450 have thus far agreed to co-operate with Secretary of Commerce Hoover by supplying monthly a report of pig iron on hand at the end of the month and pig iron used during the month. Only three firms have expressed themselves as averse to giving out such information. The poll of the membership of the association was decided upon by the board of directors following a conference on iron and steel statistics held in the office of the Secretary of Commerce on May 18, at which W. R. Bean, president, represented the association. The sentiment of members was sounded not with the idea that such statistics would be collected by the American Foundrymen's Association, but rather to ascertain for Secretary Hoover what firms would be willing to supply his department with the desired information. The results thus far are regarded as highly satisfactory and further replies from members are looked for.

The Tank Car

Under the above title, the Pennsylvania Tank Line, Sharon, Pa., has issued a paper bound book of about 150 pages, with comprehensive index, which gives an immense amount of information regarding the use of tank cars, the rules of railroads with regard to tank cars on their lines, regulations for the transportation of inflammables, mileage allowances, safety appliance standards, specifications for tank cars of both the American Railroad Association and the Master Car Builders' Association, car accounting records and specifications of cars made by the company. The work is so complete in all the details under the headings listed above that it must be of great benefit to both shippers and other users of tank cars, as well as the railroad systems over which they operate. In the rear of the book are given a number of general tables and drawings showing such items as capacities of cars for varying depths of contents, details of safety valves, heating coils, sill construction and other matters connected with the construction and equipment of the cars.

Foundrymen's Association to Publish Monthly Bulletin

The first issue of a monthly bulletin to be published by the American Foundrymen's Association has gone to press. The bulletin will be 6 x 9 in. and will contain eight pages. Its purpose is to keep members advised of the progress of committee work between conventions, to record any other association news of importance, and to call attention to important articles in the technical journals, by publishing abstracts from those papers. C. E. Hoyt, secretary-treasurer, Marquette Building, Chicago, is the editor.

Use of Cupolas in Open-Hearth Practice

Melting High Silicon and Other Pig Iron Continuously and Supplying Hot Metal to Four 60-Ton Basic Furnaces

BY V. W. AUBEL*

IN Bessemer steel making before the days of direct metal and mixers, continuous cupola operation was the dominant factor in production. The prevailing practice was to have several of these cupolas in reserve to allow for repairs, relining, etc., so that the supply of hot metal would always be sufficient for the converters. But even in Bessemer practice the run of a cupola was seldom more than six days, the mill as a general rule being shut down from midnight Saturday to midnight on Sunday of each week. Some large foundries operate heavy-duty cupolas, but as a rule they are in operation continuously for only 10 hours of each day, the bottom being dropped each night.

The use of cupolas for supplying hot metal to basic open-hearth furnaces is probably not a practice in steel plants of any size, and certainly it cannot compete with the use of mixers and direct metal where a blast furnace is a unit of the plant. Nevertheless, for basic open-hearth plants which use cold pig charges, not having a blast furnace as a unit of its plant, it might be of advantage to premelt in the cupola. A great many factors necessarily enter into the desirability of using such a process but, as an example of what may be done in an emergency, this article may be of some interest.

The following letter from the author accompanied this article:

"I was very much interested in an editorial paragraph in the July 14 issue of THE IRON AGE, *in which you quote from an article in "Foundry." It is recommended that the lime charge in the cupola be regulated more after the practice followed in burdening the blast furnace, and in this way eliminate considerable of the sulphur in cast iron scrap. I wish to add my testimony to this recommendation, as I know from actual experience that it is possible not only to desulphurize to a considerable extent in the cupola, especially when the sulphur content is abnormally high, say 0.100 per cent or over, but also to desiliconize to a very great extent by using larger quantities of limestone than is usual in cupola practice. Although not a cupola or foundry expert, having followed blast furnace work all my life, yet I had at one time several years ago to melt some 20,000 tons of miscellaneous pig iron in the cupola. My experience gained over several months of very heavy-duty cupola operation led me to think that a great many cupola operators are not obtaining the purifying effect from their cupolas which it is possible to get simply by adding the proper amount of limestone and maintaining a proper slag.*

"My interest in this matter has influenced me to inclose a small article which covers my experience in this line. It was written just previous to the war and may contain some portions which are of interest."

The steel plant in which the following run was made consisted at the time of only one blast furnace and four 60-ton basic open-hearth furnaces with the necessary coke ovens and mills, but with no hot metal mixer. During a forced temporary shutdown of the blast furnace for repairs the management was faced with the necessity of using cold pig charges for the open-hearth furnaces. Something like 20,000 tons of pig were available, which had mostly all been stocked by a magnet crane in one large pile, no effort having been made to sort the different grades. This iron ranged in silicon from 0.50 to 6.00 per cent. Previous practice with cold pig heats had not been very successful from the standpoint of time. They invariably ran from 18 to 20 hr. against 10 to 12 hr. for the hot metal heats. A great deal of the loss of time with cold iron was due to the difficulty of regulating the ore and lime in the open-hearth charge when the silicon content of the cold pig was not known. The heats invariably either melted "soft" or high carbon and time was lost in recarburizing or oreing down as the case might be. The variable silicon content of the pig also caused a great deal of delay due to erosion and eating away of furnace banks and bottoms. When a patch of high silicon was struck for the charge, the result was that the furnace not only melted "high" and the heat was a long one, but very often the banks and bottoms would require repairs and more loss of time resulted. The yield from hot metal heats was also found to be from 2 to 5 per cent higher than with cold stock.

Two large spiegel cupolas had just been completed and it occurred to the management that under the circumstances it might pay to use these for supplying the open-hearth with hot metal. Aside from the increased yield and gain in time of heats it was thought that the uniform grade of metal resulting from the remelt would save much of the delay on banks and bottoms. In other words the cupolas were to perform all the functions of a mixer.

The cupolas are very strongly built on four columns imbedded in brickwork. The base is a cast steel circular plate with heavy double drop doors. They are 30 ft. high from base to charging floor, with a shell diameter of 9 ft., and working diameter of 6 ft. The slag notch is 3 ft. from top of drop door, with the wind box 7 in. above this. The wind box contains 40 tuyeres each 3½ in. in diameter, placed in four rows. There are eight manholes in the bottom of the wind box and all of the tuyeres except eight, where the blast pipe enters the box, are accessible through small plate covered handholes with eyesights. Two manholes are provided for access to the hearth. Blast is furnished through a common blast main 24 in. in dia. by a No. 8 Green rotary blower, belt driven by a triple expansion high-speed steam engine. Butterfly valves control the wind for each cupola.

Adapting the Cupolas for Heavy Duty

As the capacity of the blower or the efficiency of the charging arrangement were not known, a trial run was made with one cupola. The situation of the cupolas gave only a very limited stockyard. The charging was by hand with small unweildy 2-wheeled hand buggies similar to what is used for hand filling blast furnaces. These buggies would only hold 1000 lb. of pig or about 250 lb. of coke and only one buggy could be raised to the charging floor on each trip of the elevator. A very small tonnage only could be handled in this way so the buggies were discarded and a system of narrow-gage tracks installed. Two different gages and two sizes of 4-wheeled side tipping trucks were made use of. The small 18 in. gage trucks would hold

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2000 lb. of pig, and the large 2 ft. gage trucks used for coke would hold 600 lb. A large flat sheet was fixed at the foot and in front of the elevator and both gages of tracks let onto this sheet which, kept always well oiled, allowed either size of truck to use both elevators. A steel plate charging floor and large openings into the stack made these trucks very suitable for handling on top. The pig and coke were filled directly from the cars into the small charging trucks.

The original arrangement shows how each cupola tapped from its own spout into a common ladle, which was spotted on a recording scale underneath the tapping platform. The slag notches were on the rear 120 deg. away from the tap hole and the slag was allowed to run through holes in the floor onto the ground. As a considerable quantity of slag was anticipated, this arrangement was reversed to allow the use of a steam dumping blast furnace slag ladle. New tap holes were cut almost underneath the old slag notches and a large Y runner built with brick. The leg of the runner was a brick-lined steel spout. New slag holes were cut directly over the old tap holes and the slag run through the floor into the ladle.

Operation

After the alterations, as mentioned, were made, both cupolas were prepared for blowing in. After the drop doors were put up, all cracks were well luted with fire clay; then a 6-in. bottom of dry ground fire brick was well rammed with a slope to the tap hole. The tap hole and breast were made up of tar and burnt dolomite well rammed into place. A hole, 2 in. in diameter, was left for slagging. The second and fourth rows of tuyeres were bricked up, as the capacity of the blower was hardly sufficient for maximum production. A wood fire was started in each cupola by inserting wood through the manholes and the addition of some kerosene oil from the charging platform. More wood was thrown in from above and then a couple trucks of coke were added until the bed was about a foot above the tuyeres. When the coke was glowing on top, the manholes were bricked up and the cupolas charged full. The bed was of 5000 lb. weight and on account of the high ash content of the coke, it was necessary to charge some lime with this bed, otherwise the first slag would be so viscous that it would adhere to the hearth. It was found to be of vital importance to get a good hot free running slag from the very first and in our practice we used burnt lime for the bed and the initial charges. The blowing-in charge was as follows:

6 Trucks coke (600 lb. each).
15 Shovels burnt lime (20 lb. each).
2 Trucks coke.
8 Shovels burnt lime.
4 Trucks pig iron (2000 lb. each).
2 Trucks coke.
8 Shovels burnt lime. } 2 charges made cupola half full.
4 Trucks pig iron.
3 Charges { 2 Trucks coke. 14 Shovels limestone. 5 Trucks pig iron.

Charging commenced on hot coke bed at 7 a. m.; blast was put on at 10.30 a. m. and first tap was at 1.00 p. m. Both cupolas were filled and blown in together. About 140 r.p.m. was the capacity of the engine giving the blower 90 revs. and 16 oz. blast pressure at the cupola. The cupolas were tapped every 20 min. into a 30-ton blast furnace iron ladle. It took about one hour to fill a clean ladle. Coke breeze was used liberally on the surface of the metal to prevent skulling. When the ladle was filled, it was taken by the engine, weighed and delivered to the open-hearth department, and another ladle placed for filling. Three ladles were kept in service. It was necessary for the cupola foreman to keep in very close touch with the steel melter so as to supply the hot metal at the right time. Three 8-hr. shifts were worked and an engine was in attendance at all times to handle the hot metal and bring up stock to the cupola yard. The pig was loaded by magnet in the open-hearth stockyard and the coke used from trucks just as it came into the plant yard. The slag ladle was dumped once each day.

Considerable trouble was experienced keeping the small tuyeres open. It was necessary for one man almost to spend his entire time punching them open with an iron bar. By using tin cylinders instead of steel pipes for tuyeres we were able to increase the diameter from 3½ to 5 in.

One of our first troubles to overcome was the tendency of the slag notch to become greatly enlarged due to the cutting action of the slag. We were unable to keep the hole built up with anything, so we finally hit on the idea of using a blast furnace cinder notch cooler or "monkey," as it is called. These are cylindrical copper water jackets with a 2-in. center hole for the flow of the slag. When inserted into the hearth jacket of the cupola flush with the outside and held firmly with braces they gave first-class service and eliminated all of our slag notch troubles.

We next found that our tap hole and breast would only last about 24 hr. and we were losing a lot of time each day draining the cupolas and putting in a new breast, besides making the work extremely difficult for the tapper. We overcame this difficulty by using a steel ladle teeming nozzle. These nozzles are about 8 in. in diameter, about 10 in. long and have a 1.50-in. hole, and are made of first-class fire brick. These were placed so as to be flush with the inside of the hearth and rammed tightly around with dolomite and tar. They had an average life of about 5 days when they had to be changed, the hole becoming too large due to the cutting action of the metal. The life of a lining averaged about 10 days. In all 5 different runs were made over a period of about 2 months. The operation was very irregular, a great deal of time being lost waiting on the open-hearth furnaces.

It was doubted at first whether the two cupolas would be able to supply sufficient metal for the four furnaces and it was expected that a large proportion of scrap would be used in the charges, but after the first day the original hot metal charge of 50 tons was adhered to. Even then the cupolas were on blast only on an average of 18 hr. out of each 24 hr. of possible operation. A delay report was accurately kept. An electric signal bell in the engine room was controlled from the tapping floor and both the tapper and the engine driver were required to keep a report of the number of revolutions ordered and the time blast was off. A report of the filling was kept by both the cupola foreman and the top fillers. This report was checked each day against the yard reports of material delivered to the cupola yard. The gross and tare weights of the hot metal ladles were kept by the weigh master and also entered by him on the open-hearth furnace charging sheets. All coke, limestone and pig iron were weighed before being taken to the cupola yard.

The fact that our coke was very high in ash and the importance of having a good liquid slag for successful continuous operation was mentioned before. The analysis of the coke and ash follow:

	Ash	Sulphur	SiO_2	Al_2O_3	CaO	MgO
Per cent	18.2	0.40	49.00	32.70	3.00	0.50

The limestone analyzed:

	SiO_2	Al_2O_3	CaO
Per cent	4.2	0.70	53.1

The regular cupola charge after 8 or 10 hr. was: 1200 lb. coke, 320 to 400 lb. limestone and 14,000 lb. pig. The slag analysis was fairly uniform at: SiO_2, 48.0; FeO, 2.0; Al_2O_3, 16.5; MnO, 5.0, and CaO, 28.2 per cent. With this analysis and figuring for a slag of approximately 50 per cent SiO_2 and 30 per cent CaO, we found it necessary only to add 1121 lb. limestone. As our charge was always between 320 and 400 lb. we were evidently desiliconizing to the extent that 250 lb. limestone would unite with SiO_2 in the above ratio or 208 lb. SiO_2 or 100 lb. silicon, equivalent to approximately 0.80 per cent Si in the pig iron. The analysis of the melted iron was remarkably uniform, always below 1 per cent silicon with the sulphur ranging from 0.50 to 1.00 per cent. Only two or three times did we run into a streak of high silicon pig iron, and then we were always careful to add more limestone. On one occasion at night two 40-ton trucks of 6 per cent silicon iron were charged by mistake. Only prompt addition of considerable fine fluorspar saved the cupolas

from being hopelessly bunged up with slag, due to it becoming extremely silicious and at the same time very viscous.

Summary of Delays for Total Campaign

Total number of hours	1,575
1st repairs to lining	68 hr.
2nd repairs to lining	51 hr.
3rd repairs to lining	89 hr.
4th repairs to lining	43 hr.
5th repairs to lining	75 hr.
Total delay for lining repairs	326 hr.
Total time blast off waiting on open-hearth	376 hr.
Total delays	702 hr.
Total operating time, or total time blast on	873 hr.

Production Summary

Total iron melted (pig to cupola yard)	13,210 tons	
Metal to open-hearth furnaces (net)	12,191.70 tons	
Metal to foundry	26.60 tons	
Recovery	12,218.40 tons	92.42 per cent
Scrap recovered as ladle skulls	661.53 tons	5.08 per cent
Losses in slag, etc	330.20 tons	2.50 per cent

Summary of One Blast—10 days

Total production, net weight of hot metal	2,601.6 tons
Total coke into cupola yard, actual yard weight	305.8 tons
Melting ratio	8.5 lb. iron to 1 lb. coke
Weight cold pig to cupola yard	2,713 tons
Ladle skulls, actual weights	80 tons
Losses	32 tons

Example of One 24-Hr. Run

Time lost, each cupola		6 hr. 30 min.
Net production hot metal		368.25 tons
Charges:		
No. 1, 29	Charge,	1,200 lb. coke
No. 2, 33		360 lb. limestone
		1,400 lb. pig iron
Melting ratio		About 10 to 1
Rate of melting		21 tons per hour for two cupolas

Considerably better results would have been obtained were it possible to dispose of all the metal the cupolas could melt. Nearly every 24 hr. the blast was off from 6 to 12 hr., sometimes for periods of 5 to 6 hr. each. Under these circumstances it was not safe to burden the cupolas too heavily. These delays were responsible for chilling and building up of the hearth, which was evidenced by the decreased amount of metal in the succeeding taps. The hearths were seldom ever clean after the doors were dropped, the accretions seemingly consisting of both metal and slag. Our greatest difficulty in the operation of the cupolas was in keeping the tuyeres open and preventing irregular melting. Although we were only using 20 out of the 40, and had increased their size to the limit of the shell hole, it was practically impossible to keep the melting evenly distributed. If several adjacent tuyeres were left unattended for a few hours, accretions and shelves would build up on that section of the tuyere zone which often as not would stay there until the end of the campaign, gradually as a rule getting worse instead of better. A blank of coke and several bags of fluorspar would sometimes clean out the melting zone but not always. These obstructions, which were formed, were always preliminary to slower driving and were usually responsible for a considerable loss of iron in the slag.

The writer is strongly of opinion that for heavy-duty work especially, a single row of large rectangular tuyeres with a slightly downward slope is the best type of construction. For this kind of work, also, the wind box should not be built onto the shell, as is the custom in so many foundry cupolas. A form of construction similar to the blast furnace bustle pipe should be followed, with each tuyere having a separate feed from the wind pipe. This allows the use of water to cool any hot spot that might show up on the melting zone. In heavy slagging cupolas, the water-cooled slag notch is no doubt a great help. A cooler with a 2½- or 3-in. hole is preferable. This hole may be reduced with clay to any size desired, the clay also neutralizing the chilling effect of the cooler on the slag. For a tapping breast which must withstand the cutting action of such large tonnages of metal, the fireclay nozzle will probably give the most satisfaction.

Cost of Operation

Going partially into the question of cost and the advantages of the hot metal over the cold stock charges, the cupolas operated on three shifts of 17 men each, comprising:

1 Foreman	$2.50	1 Electric lift operator	$2.00
1 Tapper	3.00	8 Stock men in yard	2.25
1 Assistant tapper	2.50	1 Locomotive driver	3.00
2 Chargemen	2.50	1 Switchman	2.50
1 Engine driver	3.00		

Total about $30 per shift or $90 per day.

As this crew was not engaged during the lining period or a total of 326 hr. for the entire campaign, this leaves 1249 hr. as time actually working or 52 days at $90 per day, or $4,680. This is the labor cost for melting 12,218 tons or 38c. a ton. This compares favorably with the practice at one large foundry with which the writer is familiar where they melt 72 tons per day of 10 hr. Here the charging and handling of the stock is all by hand and the cost per ton is approximately 45c. Adding to this cost of 38c. that of relining, cost of coke, limestone and incidental repairs, etc., brought our total melting cost up to about $1.00 per ton. Without going further into figures, it suffices to say that from the standpoint of the open-hearth department, after careful investigation it was decided that hot metal at any cost of remelting under $2.50 per ton was cheaper than using cold pig charges. To summarize some of the advantages:

The increased yield of steel would more than balance the cupola losses.

The increased production due to quicker heats was such that for one month the production was greater than any previous production when receiving hot metal from the blast furnace in full operation. This was due to hot metal being always available from the cupola, whereas the blast furnace only tapped every four hours and very often an open-hearth furnace would have to wait several hours between casts for metal. The more uniform grade of metal from the cupola was also an advantage.

The saving in limestone in the open-hearth charges due to the lower silicon content of the cupola metal, more than paid for that used as flux in the cupola itself.

The advisability of using cupolas to premelt the pig in basic open-hearth steel plants having no blast furnaces depends so much on local conditions that it could not be advocated as a general rule. Most plants using cold pig and scrap stock are very particular to secure a uniform grade of material, but even then the writer believes that, with a modern mechanically charged cupola, the increased production of the open-hearth furnace from the use of hot metal will considerably more than pay for the cost of operating such a cupola plant.

In 1914 about 89 per cent of the ocean-going tonnage of the world was propelled by engines deriving their energy from the combustion of coal. In 1921 Lloyd's reports that only 72.3 per cent of the (larger) tonnage depends upon coal for propulsion. Steam vessels using oil for fuel have increased from 2.62 per cent of the total to 20.65 per cent. Internal combustion engines now propel 2 per cent of the tonnage—more than four times the proportion prevailing in 1914.

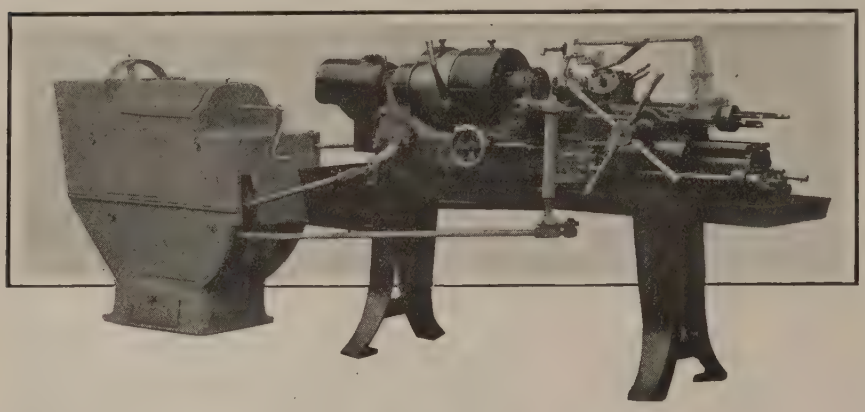
The Wheeling Steel Products Co., sales subsidiary of the Wheeling Steel Corporation, announces that the vacancy created by the retirement of John Duncan as vice-president in charge of pipe and tin plate sales will not be immediately filled. Mr. Duncan's duties with the Wheeling Steel Products Co. have been assumed by other officials of the company.

That pig iron is cheap is no wonder, according to the Pittsburgh *Press*. "THE IRON AGE and the rest of the iron and steel trade journals," it says, "are all right as far as they go, but not one of them has hit on the real reason why pig iron is at the lowest price since 1903, the reason being that it is the only thing not used in home brewing."

Hand Screw Machine Attachment

An attachment called the iron man, for use with hand screw machines and turret lathes, making them fully automatic in operation, has been placed on the market by the Pearson-Scott Co., Indianapolis.

The device is shown in the accompanying illustrations and consists essentially of a disk mounted on a frame and upon which there are flat cams. The cams make contact with rollers on the crossheads that are connected to the ends of reach rods the opposite ends of which are connected to different units on the machine. The attachment is driven through the worm shaft to periphery of the disk as shown. The speed is controlled by buttons placed on the ring gear and a countershaft of special design takes care of speed changes necessary for the various materials worked upon. In case of clogging of the parts or slipping of the belts on the machine a safety pin is provided to prevent injury to the mechanism. The cams are so placed on the disk that operations are performed in the proper sequence, one part being completed at each revolution of the disk. Locating the cams on the disk is a simple matter, as the shapes of the cams are stencilled on the sides of the disk as shown, and holes drilled so that a cam will not fit in any other than its proper place. Twenty cams are supplied with each attachment. The indexing cams are never changed and the reacting cam is intended to take care of coasting in the turret slide.



Cams Are So Placed on the Disk That Operations Are Performed in Proper Sequence. The attachment may be located at either end of the machine. Hand operation is not interfered with and attachment may be quickly disconnected

The iron man may be located at either end of the hand screw machine and may be used for driving simultaneously two machines doing the same kind of work. A stock feed unit is included which is adaptable to any screw machine, making a continuous feed and giving a stroke of 12 in. if desired. This unit is separate and distinct from the attachment as is also the turret lock and die setting unit which automatically locks and unlocks the indexing turret and sets the dies for chasing threads.

The Aluminum Bronzes

R. Guérin, reporter to the French Aluminum Commission, gives a résumé in *La Nature*, Oct. 16, 1920, of the properties, as far as they have been determined up to the present, of aluminum bronzes, or, as the French Standards Committee has decided to term them, the copper-aluminum alloys.

According to an abstract in *Technical Review*, London, reference is made to the pioneer work of Henry Sainte-Claire Deville, and the recent researches of Guillet, Le Chatelier, de Fleury, and others, as well as to the researches on quenching and annealing that were carried out at the French Aeronautics Laboratory during the war by M. Breuil. The photomicrographic examination of forgeable bronzes cast by the Durville process (which gives perfectly sound ingots) reveals the presence of a hard constituent consisting of fine grains, embedded in a plastic mass. Tests made also showed that the fineness of grain of these metals contributed to a reduction in friction, while offering a resistance to wear superior to that of phosphor-bronzes. Under loads which would have cracked or destroyed all ordinary anti-friction metals, aluminum bronze rollers were subjected to protracted running tests without exhibiting appreciable wear. These alloys are also excellent conductors of heat, while retaining their mechanical properties at high temperatures. At 350 deg. C. a 90:100 bronze gave a tensile strength of 50 kg. per sq. mm., an elongation of 15 per cent, and an elastic limit of 31 kg. per sq. mm., the latter having slightly increased with the temperature. These alloys are non-magnetic, which makes them suitable for use in certain parts of rotors, where a high elastic limit is required.

The resistivity of a 10 per cent aluminum bronze has been found by M. Pécheux to be eight times greater than that of copper, and increases with temperature; at 630 deg. C. the figure for resistivity is doubled, and it approaches that of German silver.

It has been decided in France to mint coins of small denominations of aluminum bronze for issue by the Chambers of Commerce in place of the small notes now in use.

How the United States Steel Corporation organizes for safety and some of the concrete things done by it to attain it is outlined in an article entitled, "Safety Where the Bessemer Blows," by Louis Resnick, which occupies first position in the August issue of *National Safety News*. It is illustrated by 16 photographs and charts. The expenditures of the corporation for safety have increased from $595,649 in 1912 to $1,420,456 in 1920, the record year. As an illustration of how far the corporation will go to make safe conditions, mention is made of the window cleaner's track and cars, and other runways, built near the roof of a building in the National Tube Co.'s plant at McKeesport at a cost of $50,000.

Characteristics of Foundry Cokes and Slags

Analyses, Units of Value and Tests — Analyses and Value of Fluxes—Slagging— Nature of Slags and Value of Melting Process

BY Y. A. DYER*

COMMERCIAL coke is manufactured in the old-type "bee hive" oven and in the new-type "by-product" oven. The coking principles involved apply to both forms of manufacture—expulsion of gases from bituminous coals and "fixing" of the carbon residuum. That is, driving off by heat the rich hydrocarbons in an atmosphere from which air is practically excluded, and concentrating the amorphous carbon of the coal. The two forms of coking materially differ by reason of the methods employed as to gas disposal.

In the manufacture of beehive coke the rich volatile gases are permitted to escape from the oven into the open air, while the by-product or retort process reclaims these gases and condenses them into a tar and liquor form. By subsequent series of fractional distillation and concentration, valuable by-products are obtained from the tar and liquor in the form of creosote, sulphate of ammonia, benzol and other organic compounds and combustible gas.

A coal which contains less than 20 per cent volatile matter does not, under present coking methods in use, "cake" or fuse properly—hence is classed as non-coking coal. Should it contain more than 30 per cent volatile matter the porous structure of resultant coke will likely be so great that its wall structure will be too weak effectively to sustain or carry metal charges; or will at least permit a too free burning away of coke bed at the zone of fusion.

The presence of free (uncombined) or inherent (combined) sulphur in coals vitally determines their suitableness for the manufacture of coke—especially for foundry use; that is, whether the sulphur is largely mechanically free and volatile—in the form of iron pyrites (FeS)—or whether mixed in the ash in the form of calcium sulphate ($CaSO_4$). If the former condition prevails, much of the sulphur may be mechanically washed out of the coal at the mines, or volatilized in the oven and burned to SO_2 gas. Some sulphur may remain in the coke from this reaction as iron sulphide, but usually the major portion of the sulphur present will be disseminated in the coke ash as calcium sulphide (CaS), as a residue from the heat reaction on the gypsum ($CaSO_4$).

Typical Coke Analyses

Following analyses represent (in percentages) a fair average of chemically satisfactory foundry coke—(BH) representing beehive coke and (BP) by-product coke:

	Fixed Carbon	Volatile Hydro-carbons	Moisture	Ash	S	P
Eastern:						
(BH)	87.25	1.48	0.77	10.50	0.80	0.017
(BH)	88.00	1.00	0.50	10.50	0.80	0.018
(BH)	89.00	1.50	0.74	8.76	0.75	0.016
Western:						
(BP)	89.51	1.03	0.75	8.71	0.67	
(BH)	83.00	0.95	0.25	15.80	0.65	
Virginia:						
(BH)	91.54	1.70	0.25	6.51	0.70	0.002
(BH)	87.56	1.36	0.56	10.52	0.62	0.007
Southern:						
(BH)	89.15	1.32	0.35	9.18	0.65	
(BH)	88.00	1.07	0.60	10.35	0.75	0.030
(BP)	87.87	1.14	0.39	9.56	1.00	0.030

Both the quality and the effectiveness of coke may be expected to reflect the chemical and physical factors of the coal from which produced and the mode of its manufacture. It is particularly true in the South that the generally satisfactory foundry cokes are produced in the beehive oven. There seem to be exceptions to the rule in some sections. Mixtures of certain West Virginia and Pennsylvania coals produce a high-grade by-product coke. However, it would seem that there are certain superior physical and chemically combined constituents (as yet inexplicable) present in beehive coke for foundry use.

Possibly one of the basic causes of these virtues may be due to the fact that the coke is permitted to "ripen" or mature under cumulative moderate conditions which prevail during the coking period in the beehive oven, rather than being forced to yield to drastic influences in the superheated and rapid coking retort oven. In other words, it would seem that the carbonization and cementation processes are more uniform and complete under moderate conditions prevailing in the beehive oven.

Peculiar Characteristics of Coke

Some foundrymen are prone to condemn coke from outward appearances. Carbon deposits, in the form of "soot" or dark, "stringy hairs" are often classed as "jamb" coke or black ends. The writer has had numerous analyses made of such substances and in each instance the carbon content of the coke was 92 to 93 per cent. "Rusty" spots on coke are often classed as an indication of high sulphur. Their presence is traceable to iron oxide in the coke ash. Some cokes "clinker" freely and have a tendency to "gum" and interfere with the circulation of gases. This condition is controlled by the constituency of the coke ash. An ash low in alumina, and high in silica and iron oxide (iron silicate), will have a low melting point by reason of the basic effect of the iron oxide.

According to Richards, a typical iron silicate (Fe_2SiO_4) has a melting point of 1904 deg. Fahr. An ash high in alumina, high in silica and low in iron will have a high melting point. Any material increase in iron oxide and lowering of silica and alumina will lower the melting temperature. According to Richards, again, a typical iron-aluminum-silicate ($Fe_3Al_2Si_3O_{12}$) has a melting point of 2093 deg. Fahr.

Following analyses of coke ash are typical and illustrative of the varying composition of ash as related to fusibility. It will be noted that the nearer the ash approaches the composition of a typical aluminum silicate—54.2 per cent silica and 45.8 per cent alumina—the more infusible it will become. The nearer it approaches a typical iron-aluminum silicate—53.6 per cent iron and alumina and 46.4 per cent silica—the less infusible it will become. No. 1 ash is non-clinkering, No. 2 ash is fair and No. 3 ash is clinkering:

	No. 1	No. 2	No. 3
SiO_2	54.67	46.23	46.40
Al_2O_3	41.95	31.93	16.45
Fe_2O_3	Trace	14.54	18.15
CaO	1.82	5.04	11.80
MgO	1.46	2.26	4.63

Units of Value for Foundry Coke

Presence of high carbon and low ash in coke is not necessarily a guarantee that it will prove to be high grade for foundry purposes. These qualities are highly

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desirable, but not to the exclusion of due consideration to structure and to undesirable elements. In addition to fixed carbon and low ash, other units of value are wall and cell structure, low sulphur and phosphorus. First grade cupola coke may be expected to possess adequate burden carrying qualities. That is, its wall structure should approximate, by volume, 52 to 54 per cent, and cell structure 48 to 46 per cent.

Charging and melting conditions should vary with the porosity of coke. If the coke should be too porous and weak, relatively smaller charges of metal should be used; if heavier and denser in structure, normal charges should be used. This is reflected in fuel costs per ton of iron melted. The fixed carbon may vary from 87 to 90 per cent; sulphur is not objectionable between 0.65 and 1 per cent; ash may be from 8.5 to 11 per cent. Shatter test should approximate 75 to 80 per cent; compressive, or crushing, test 300 to 400 lb. per cu. in. The constituency of the coal ash, carbonizing and cementation processes will determine the wall structure of the coke; the volatile hydrocarbon content of the coal will influence the cell structure, or porosity, of the coke.

Tests to Determine Coke Characteristics

The apparent specific gravity of coke is the ratio of the whole coke, inclusive of pores, to that of an equal volume of water; real or true specific gravity is based on coke substance exclusive of pores—the carboniferous elements, together with the ash and other constituents. Apparent specific gravity is of most importance, and ranges from 0.80 to 1.25; true specific gravity from 1.25 to 1.90. Hardness test ordinarily ranges from 2.50 to 3, and is a very important test for coke. The kindling temperature of coke is about 1292 deg. Fahr.

A simple method to ascertain shatter test is to place 100 lb. of coke in a metal container, hoist it 6 ft. and drop four times on a firm metal or concrete surface. Put the shattered coke over a 2-in. screen. That portion which does not pass through the meshes of the screen represents the percentage of "shatter."

Compressive or crushing strength is obtained by placing a 1-in. cube of coke in a specially constructed machine and crushing it until it breaks. Pounds pressure to cu. in. is registered by the machine.

The cell and wall structure are obtained as follows: cut 1-in. or 2-in. cubes of coke from a fair average sample, and dry thoroughly by heating. When cooled, carefully weigh and note; then immerse the cube or cubes in distilled water and place under air receiver. Exhaust the air to force the water into cells; remove cube or cubes, weigh again and note. Difference in weight between dry coke and water filled coke, equated to apparent specific gravity of the coke, represents the aggregate cell space; the remaining percentage will represent the wall space.

Fluxes for Foundry Use

Most fluxing materials occur in carbonate form. That is, their elements are in combination with carbon and oxygen. Once heated to their critical temperatures, the carbon and oxygen are expelled, or pass off as carbon dioxide gas, leaving as a residuum an oxide and small percentages of impurities. The oxides form an active base for fluxing and holding in solution, or neutralizing, the harmful effects of impurities which may be present in gangue or slag.

Calcium.—The most abundant form of calcium is the carbonate $CaCO_3$, or lime rock. When pure it is white or gray in color, though impurities of iron compounds and organic matter may alter the shading to red, yellow, blue or black. Calcite is crystalized limestone, and is a pure form of calcium carbonate. Marble is a hard crystaline limestone, and the crushed "marble spalls" are often used to good advantage as a flux. Oyster shells are also very pure calcium carbonate and constitute a good flux. By weight, 56 per cent of calcium carbonate forms the oxide, or effective flux, and 44 per cent is driven off as carbon dioxide gas—decomposition being effected at a temperature between 1500 and 1600 deg. Fahr. It requires 818.7 B.t.u. to decompose 1 lb. of limestone.

Magnesium.—One of the most abundant forms of magnesium is magnesium calcium carbonate ($CaMg(CO_3)_2$), or dolomitic limestone, closely resembling lime rock and marble. By weight, 47.6 per cent of the carbonate ($MgCO_3$) forms the oxide, or effective flux, and 52.4 per cent is driven off as carbon dioxide gas. Decomposition of dolomite is effected at a temperature between 1100 and 1200 deg. Fahr. As a flux, magnesium oxide is 1.4 times more effective than calcium oxide.

Fluorine.—This is the most active of all known fluxing elements; it forms an extremely fluid slag and will dissolve anything. Fluorine enters widely into combination with other elements—especially calcium. In this form it is known as calcium fluoride (CaF_2), or fluorspar. No oxide of fluorine is known. On account of its high expense, compared with limestone and dolomite, its use is very much restricted in the foundry.

Satisfactory Flux Analyses

Following analyses are given as information in checking percentages of desirable and undesirable elements in fluxing materials. Each specimen submitted approximates first-grade in respect to percentage constituency of fluxing elements. The active bases—calcium oxide, magnesium oxide and calcium fluoride—are desirable; the impurities—silica and alumina—are undesirable in large percentages:

	CaF_2	CaO	MgO	SiO_2	FeO and Al_2O_3
Fluorspar	92 to 98	....	....	8 to 2.00	...
Limestone (Eastern)	.....	53.00	3.86	0.82	0.80
Limestone (Eastern)	.....	54.34	0.72	0.70	0.58
Limestone (Alabama)	.....	49.00	8.73	2.00	0.70
Limestone (Alabama)	.....	53.00	1.15	2.10	0.79
Dolomite (Alabama)	.....	31.00	20.50	5.00	3.74
Limestone (Texas)	.....	54.74	0.38	0.28	0.40
Oyster shells	.....	55.00	0.10	0.50	0.15
Marble spalls	.....	54.00	0.20	0.60	0.20

Slagging

Strictly speaking, slag is a fluid or semi-fluid mass of matter which forms at a high temperature, and separates from other matter present according to relative density or specific gravity. Commonly referred to, slag is the dross, scoria or cinder created in the smelting and refining processes incident to the production of metals. By reason of the presence of large quantities of infusible acid matter in the formation of certain slags, it is necessary to supply a basic material to create fluidity, neutralize the acids and hold in solution certain oxides and sulphides, thereby rendering them harmless to the molten metal. Such process is termed fluxing and slagging, and the flux material used is basic in nature; the base and acid neutralize each other. That is, by a series of changes they mutually destroy each other's characteristic properties, and produce a compound known as a salt.

Many foundrymen prefer to ignore the necessity of fluxing the cupola gangue. Inasmuch as all materials charged in the cupola pass into either metallic, slag or gaseous form, it is evident that all the non-volatile matter of the charges, including any rust (iron oxide) from corroded scrap metal, will pass to the slag. It would, therefore, appear very important to form a slag which will have a greater attraction for harmful impurities than the metal possesses. The heat of formation of a cupola slag (calcium-aluminum-silicate) is very high, and for that reason the high heat retained in it serves as a protection to the metal bath in the cupola and keeps the metal hot. It is well to retain a

good portion of the slag in the cupola during the melting process.

Nature of Slags

A cupola slag is essentially a calcium-aluminum-silicate—largely composed of lime, silica and alumina, with small percentages of iron oxide, manganous oxide, alkalies and calcium sulphide. Acid slags are viscous in nature and basic slags are fluid. The presence of a comparatively small amount of iron oxide and iron sulphide in a slag creates a greenish tinge; large amounts create a black viscous slag. Such latter condition is a fair guide to indicate that heavy oxidation of metal has occurred. An effective method of checking oxidation is to have slag analysis determined—especially for ferrous oxide.

In normal working cupolas, iron oxide in the slag should not exceed 7 to 8 per cent; it will vary between 4 and 8 per cent. Iron oxidizes in the cupola chiefly as ferrous oxide and passes to the slag; silicon oxidizes as silicon dioxide; sulphur combines chiefly as calcium sulphide and manganese sulphide; manganese oxidizes as manganous oxide and combines with sulphur as manganous sulphide. Iron oxide and manganous oxide are active bases—hence readily combine at high temperatures with acids present; therefore, if they are not satisfied by acids present in charges, they are likely to attack the silica (acid) bricks, or cupola lining.

Two slags produced under specific conditions have been analyzed. Metal charges for each heat consisted of like material—1500 lb. iron and scrap, 12 lb. of 80-per cent ferromanganese and 150 lb. intermediate coke. For heat No. 1, 30 lb. of limestone was used as flux; for No. 2, 50 lb. of stone. Slag from No. 1 heat was of dark brownish color and viscous in nature; from No. 2 heat it was more fluid and of greenish tinge. For No. 1 heat the coke bed was found to be too low; for No. 2 heat it was normal. Following slag analyses were reported for the two heats:

	No. 1 Per Cent	No. 2 Per Cent
SiO_2	48.10	47.60
Al_2O_3	12.10	16.12
CaO	21.50	22.90
MgO	1.68	1.71
FeO	11.63	7.46
MnO	4.94	5.48
S	0.05	0.15

Metal analyses from these two heats were reported as follows:

	No. 1 Per Cent	No. 2 Per Cent
Graphitic carbon	2.80	...
Combined carbon	0.60	...
Total carbon	3.40	...
Silicon	1.65	1.41
Sulphur	0.072	0.04
Phosphorus	0.74	0.69
Manganese	1.13	1.05

Slag from a highly oxidized heat of metal on the same test was also analyzed, showing ferrous oxide 33.18 per cent (metallic iron 25.80 per cent). Castings from this heat contained prolific blow holes, segregation and cold-shuts. The slag was black and very viscous in nature.

The acid to base ratio in each of the two slags reported above is entirely too high for satisfactory fluxing of sulphur by the "lime route." Fortunately, a low sulphur coke (0.60 per cent) was used and a good percentage of ferromanganese, otherwise the iron would likely have been excessively high in sulphur. An acid to base ratio of 0.90 or 0.92, or base to acid of 1.1 or 1.08, is recommended for effective desulphurization. The following theoretical slag composition will serve as a goal to approach:

SiO_2	32.00 per cent
Al_2O_3	15.00 per cent
CaS	3.00 per cent
CaO	38.00 per cent
FeO	8.00 per cent
MnO	2.50 per cent
Alkalies	1.50 per cent

STRUCTURAL STEEL FAILURES

Unusual Ones Not Due to Fatigue—Krupp Repeating Impact Testing Machine

Peculiar failures in structural steel parts, as well as the results of a special impact testing machine, are discussed in the monthly organ of Krupp's, Essen, Germany, *Krupp'sche Monatshefte*, June, 1920, by two writers, an abstract of which is published by *Technical Review*, London, as follows:

Structural steel parts often do many years' service in the machine or structure, and then suddenly fracture, though there is no evidence of overstressing. Fracture takes place without appreciable deformation, or elongation or reduction of area at the fractured portion. As an example of parts subjected to the stresses associated with this type of fracture, the writers mention the recurring impact or shock stresses of railroad vehicle axles due to the rail joints, the alternating direction of the forces of crankshafts and similar changes in parts of high-speed machines caused by the oscillating masses, or by rotating portions that are not properly balanced. These stresses are generally additional to the tensile (or compressive), bending and torsional stresses which occur simultaneously.

The writers contend that these fractures must not, as is generally done, be regarded as fatigue fractures, because modifications in the structure of the steel, and, consequently, changes in the strength, are caused by these "permanent" or "secular" stresses. The fractures are probably often due to imperfect elasticity of the steel. Thus, taking a bar under bending stress, small permanent deformations may be set up in the outermost fibres, these deformations eluding detection with all present methods of accurate measurement. Where the number of loads involved is small, these deformations are unimportant; but if the loads change very often in magnitude or direction, the result is that fine and scarcely perceptible cracks occur, and gradually progress into the material as the result of further secular stressing. The cracks produced give to the material a certain slight mobility, and the cracked surfaces rub on each other until they are smooth, and, finally, the portion of the section still adhering breaks. Illustrations are given of fractures of this kind taken from crankshafts, railroad and tramway axles, locomotive cranks, etc., showing the smooth portions and the last adhering part. Most of the fractures proceed from notches or acute angles acting as notches, reentering angles, or sudden changes of cross-section.

After referring to the work of Wöhler and others in regard to alternating stresses, which they state only gives qualitative information, the writers describe the repeating impact testing machine used by Krupp's, and the results obtained. The machine has 4.185 metric ton tup, with a normal drop of 30 mm., and is capable of delivering about 85 blows per min. After each blow the specimen is turned through either 180 deg. or through 1/25 of the total revolution, special gear being fitted to the machine for the purpose. A wide range of tests were made with specimens having different forms of notches (round, acute, and obtuse angled), and of different composition; full details of these are given in the paper. The tests made show the relations between the resistance of steels to permanent or repeated stresses, and their yield point. Many of the fractured test-pieces showed the same peculiar structure as the broken part from which they were taken.

Finally, it is stated that machine parts which have been case-hardened, and which are subjected to continuous stresses, show a long life—this result according with the results of the repeated impact test.

The paper contains valuable information for all who have to deal with the suitable designing of parts to overcome the stresses described.

The Kissel Motor Car Co., Hartford, Wis., has added 100 men to its working force under a plan of enlarging production of both passenger and commercial cars. The woodworking shop, which has been closed for several months, also has been reopened.

ERIE LEASES ITS REPAIR SHOPS

Railroad Expects Lowered Costs and Avoids National Agreements

What promises to prove a most interesting experiment is the reported leasing by the Erie Railroad to the Railway Service Corporation of the Erie repair shops at Marion, Ohio. The men back of the Service Corporation are in the main well known manufacturers of Marion, and are members of the Marion Employers' Association, which is an open-shop organization.

It is reported that, upon appearing for work at 7 o'clock Monday morning, the erstwhile employees of the Erie shops were offered their old jobs by the new management, at their old rates of pay. Inasmuch, however, as the Railway Service Corporation is not in any sense a common carrier, its operations will be entirely outside the jurisdiction of the Railway Labor Board, and hence such matters as the long-disputed national agreements, the eight-hour day and various other features which have attended the operation of railroads in the United States for some time, will not necessarily apply under the new regime.

There has already been trouble at Marion, although this antedates the new arrangement, and was caused by the announcement on the part of the Erie Railroad that the ten-hour day would be resumed, overtime would not be paid for Sunday work and each employee should submit to physical examination. Resulting upon this announcement, the force of 400 to 500 men had dropped off nearly half. Consequently it was a much reduced force which came on the new job.

It is said that a plan somewhat similar to that which has been put into effect at Marion has been in vogue for several months in the Erie repair shops at Hornell, N. Y., where approximately 1000 men are reported engaged in locomotive repairing. It is also reported that negotiations are under way which, if successful, will turn over the Silvia, Ill., shops of the Rock Island Railroad to a similar outside corporation for operation.

But it is stated that, if a general tendency along this direction is noticed, the Railway Labor Board may take the view that an effort is being made to sidestep or violate the Esch-Cummins act, under which the railroads are now operating. The new company at Marion has been incorporated, the papers being filed with the Secretary of State at Columbus last Saturday, but nothing was made known of the plan until the men reported for work Monday morning.

To Hold Hearings on Patent Bill

WASHINGTON, Aug. 16.—The compulsory work and patent bill, after coming up in the Senate for consideration, has been referred back to the Committee on Patents, with instructions that hearings will be held on the measure. It is known as the Stanley bill and was introduced at the request of the Secretary of War because foreigners were obtaining inventions relating to American ordnance and selling them to German interests. The patent committee of the American Engineering Council has reported that the bill introduced a dangerous innovation into the law, which was not intended by those who drafted it, and furthermore, it would not obtain the result desired. Members of the patent committee will present their case before the Senate committee.

A 90 Per Cent Duty on Imported Army Supplies

WASHINGTON, Aug. 16.—The iron and steel trade is interested to a certain degree in the resolution passed last week by the House providing a duty of 90 per cent of the original value in the United States on reimportation of army supplies shipped abroad during the war to the American Expeditionary Forces. Most of the material is in France, where much of it, it is stated, after being bought by the French Government, was sold and fell into the hands of speculators, who have been dumping it in this country. While there is considerable steel included in these supplies it is high carbon tonnage, for which there is practically no market here at present and with no prospects that there will be soon, if at all. However, it has been stated by steel men that some of it, such as shell billets, could be used for making axles, reinforcing bars, etc., although perhaps 80 per cent of it, it is estimated, would have to be remelted as scrap. The measure now is before the Senate committee on finance, which will begin hearings on it in a day or so, according to present plans.

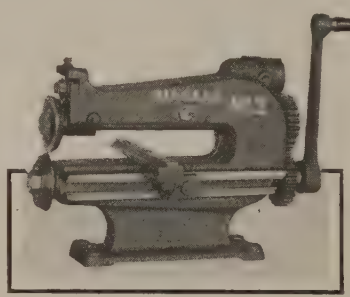
Consolidation of Tractor Plants

The Post-Whitney Co., a consolidation of the Post Tractor Co., Cleveland, the Whitney Tractor Co., Upper Sandusky, and the Chief Motor Co., Port Huron, Mich., has perfected production and distribution plans calling for the manufacture and sale of 30,000 tractors within the next 16 mo. The Post plant at Cleveland will be used to build transmissions. The Chief Motor plant at Port Huron will be devoted to the manufacture of motors for the Whitney tractor. The other parts and general assembly will be done at the Whitney plant at Upper Sandusky.

The officers of the company are: A. B. Whitney, president and treasurer; Harry S. Erd, vice-president and general manager; Ralph Blue, secretary. Maurice F. McCarthy has charge of production and C. E. Grove is manager of distribution, which includes sales, service and advertising.

Splitting Gage for Rotary Shear

A new slitting gage for a rotary sheet metal shear is being placed on the market by the Niagara Machine & Tool Works, Buffalo. The accompanying illustration shows the application of the gage to a No. 2 Niagara slitter.



The Gage Is Set by Turning a Nut on the Gage Block

The gage permits of keeping the work being fed into the machine at a predetermined distance from the cutters. The guideway of the gage is arranged horizontally on the front face of the machine and is integral with the frame. A guide block is movable longitudinally in the guideway and may be clamped thereto at any point. Detachably secured to the upper part of the block there is an angle-iron wear strip arranged transversely of the machine and this fits into an abutment that is made integral with the guide block. When circle and ring cutting the guide block and its wear strip may be quickly removed by sliding them forward until the head of the clamping bolt is disengaged from the guide. Ordinarily, however, it is sufficient to merely slide the gage rearwardly out of the way. There is but one adjustment to make in setting the gage, namely, turning the nut on the gage block. The gage cannot be thrown out of adjustment when accidently moved along the guide and the large area of contact between the block and the guide eliminate the tendency of the block to slip longitudinally after the adjusting nut has been tightened.

The No. 2 Niagara slitter has been recently redesigned and is now ready for the market equipped with the patented slitting gage as shown.

Wage changes in June, in the British metal, "engineering" and shipbuilding industries, affected 350,500 workers, according to *Commerce Reports*, and showed a decrease in weekly wages of £90,850 ($340,700, at $3.75 per £). Thirty-five hundred workers received advances, amounting to £1,350 weekly; 347,000 sustained decreases, amounting to £92,200 weekly.

First Reductions in Iron and Steel Rates

Bearing of Rock Island Action on the General Movement—Carriers Agree to 25 Per Cent Differential on Steel for Export

WASHINGTON, Aug. 16.—Much interest has been shown in efforts being made by the Chicago, Rock Island & Pacific Railroad to reduce freight rates on iron and steel products from the Chicago district to the important implement manufacturing towns of Rock Island and Moline, Ill. The situation is apparently local, but there is the possibility of the movement expanding and bringing down the iron and steel rate structure throughout the country. It is a matter of history that a break in rates in one section often is followed by a widespread reduction. Moreover, there is an increasing disposition on the part of carriers to lower rates voluntarily, recent instances being the decision reached at New York last week in favor of a 25 per cent differential on steel for export and the cut in rates on grain for export from points on Lake Erie. The iron and steel trade is becoming more active in urging rate reductions as necessary to lower costs of production and to stimulate demand. This attitude of producers has been particularly noticeable in and around the Pittsburgh district. Thus the move made by the Rock Island may be an additional influence toward a general reduction in iron and steel rates.

First Reduction Disallowed

The Rock Island has made two attempts in the direction of lower freights. Its first move was checked by the action of the Interstate Commerce Commission last Wednesday in suspending the tariff which would cut rates by approximately 15 per cent on a general list of semi-finished and finished steel products from Chicago to Rock Island and Moline, the tariff having been filed to become effective Aug. 10. The suspension was made on the strength of a complaint of the Illinois Steel Co., made in view of the fact that the reductions first proposed would not apply to Gary, Ind., where the steel company has plants. The reduction was forbidden the Rock Island in connection with the Elgin, Joliet & Eastern Railroad, because of a technical error, the carrier having published rates from Chicago and South Chicago to Rock Island and Moline which were lower than rates from intermediate points, including Gary, Hammond and Indiana Harbor, Ind. This was in conflict with the fourth section of the act to regulate commerce, which does not permit lower rates for a longer than a shorter haul over the same lines in the same direction. Upon notice from the commission that the tariff had been suspended from Aug. 10 to Dec. 8 pending investigation and hearing, because of this violation, the Rock Island made application last Friday to be permitted to apply the lowered rates from Gary and other Indiana points as well as from Chicago and South Chicago so as to correct the error made and to come within the provisions of the fourth section. The present rate on shipments of finished steel from Chicago to Rock Island and Moline, towns which adjoin each other, is 17c. per 100 lb., and the proposed tariff would reduce the rate to 14.5c. per 100 lb., a cut of 14.7 per cent.

The reason for the action of the Rock Island is said to have been that it has been losing business to the Chicago, Burlington & Quincy Railroad, and attempted to place rates on the same levels as those maintained by the latter. In making its proposal, the Rock Island called attention to the fact that the rates over the Burlington are lower than on any other line in Illinois. The Burlington has made one or two efforts to bring its rates up to the level of those on other lines, but for one reason or another the orders of the commission have made that impossible.

Attitude of Commerce Commission

The policy of the commission toward rate reductions has not been as favorable as shippers had hoped. Chairman Clark has written a number of letters pointing out that the necessities of the carriers are so great, by reason of high operating expenses, that even a temporary loss of revenue would be serious. The commission has suspended various tariffs carrying reductions, but at present is not following this policy so closely. After holding the matter up a few days, it permitted Henry Ford to make a reduction of 20 per cent in rates on the Detroit, Toledo & Ironton Railroad, which some traffic men have felt may tend to bring down rates throughout the Central Freight Association territory, even though the D., T. & I. line is not important from the standpoint of mileage.

The need of cutting costs of production and of stimulating business as quickly as possible is back of the movement for lower freights on steel. While recognition is given to the financial needs of the railroads, it also is pointed out that the increased traffic that will be developed by lower rates will result in a greater net return to the carriers. Reductions that have been made bear out this contention and encouragement has been found in the improvement in the railroad situation. Net operating income was $51,778,000 for June, 1921, or $14,697,346 more than in May. The earnings for June, on the basis of the tentative valuation fixed by the Interstate Commerce Commission for rate making purposes, would mean an annual return of 3.1 per cent compared with 2.4 per cent the previous month. Tabulations show, however, that the railroads fell short $47,295,000 or 47.7 per cent of earning the 6 per cent contemplated by the act. June showed the largest earnings for any one month since November, when the net operating income was $54,343,793. Increased efficiencies, together with better control of expenditures, have been an important factor in the improved showing. At the same time significance is given to the fact that the volume of traffic has become greater where rates have been reduced, while traffic carrying rates held to be excessive or rates which it has been proposed to increase further has shown a further slump in movement. Iron ore from the Lake Superior ranges is an example.

Reduced Freight Rates for Export

American steel exporters have probably succeeded in obtaining reduction of 25 per cent in railroad freight rates on export shipments. Efforts toward this end have been made for several months and culminated in a final hearing in New York on Friday, Aug. 12, at which the United States Steel Products Co., the Consolidated Steel Co. and other steel exporters made pleas to representatives of the Trunk Line Association for a 33 1/3 per cent preferential export differential, this being the differential that prevailed before the war. The Trunk Line Association agreed to a 25 per cent differential and its recommendations have gone to the Interstate Commerce Commission, which is expected to give its consent, so that the new rates may go into effect some time between Sept. 1 and 15.

YOUNGSTOWN, Aug. 15.—Iron and steel exports from the Youngstown district will be benefited by a 25 per cent freight reduction agreed upon last week at conferences between manufacturers and the railroads in Chicago and New York. The reductions will affect export business only and the new rate to tidewater ports will be three-fourths of the domestic charge. Details, such as differentials, are to be worked out, after which tariffs will be filed with the Interstate Commerce Commission at Washington for approval. Trade competition in foreign field, chiefly England and Belgium, forced the

reduction, said representatives of the producers attending the conferences.

The Trunk Line Association called the meetings to discuss a "proposal to establish rates on articles of iron and steel manufacture, structural iron and steel, billets, blooms and related articles, pig iron, new iron, steel rails and cross ties, from Trunk Line and Central Freight association territories to Atlantic ports, for export on a basis of 25 per cent less than present domestic rates."

Current freight rate from Youngstown to seaboard is 42c. per 100 lb. on bars, plates and sheets, or 40 per cent above the 30c. rate effective prior to Aug. 25, 1920. Under the proposed 25 per cent cut on export tonnage, the rate will be 31.5c. On billets the present charge is $7, the proposed rate $5.25 and the original rate $5.

Shippers originally urged a 33 1/3 per cent reduction in rates on export steel, a differential which in times past existed between domestic and export tonnage. The proposed reduction will place Valley steel makers on a more favorable competitive basis with foreign makers.

Railroads Need Not Do Interchange Switching Within Plants

WASHINGTON, Aug. 11.—The Interstate Commerce Commission has handed down a decision that the railroad line operated by the Whitaker-Glessner Co. at its steel plant at New Boston, near Portsmouth, Ohio, is a plant facility over which the Baltimore & Ohio and Norfolk & Western cannot be required to perform interchange switching within the plants. The commission also held that placing of cars on interchange tracks within the plant constituted delivery at the industry at the line haul rate. A further holding was that the refusal of the trunk lines to perform interchange switching within the plant or to make in the absence of this service an allowance in money was not unreasonable, unduly discriminatory, or in violation of the fourth section of the act to regulate commerce. In consequence the commission dismissed both the complaint and the accompanying supplement.

Unreasonable Rates on Brass Products

WASHINGTON, Aug. 16.—Making a tentative report in the case of the West Virginia Metal Products Co. vs. the Baltimore & Ohio Railroad, et al, Examiner Henry C. Keane has recommended to the Interstate Commerce Commission a holding that rates on brass sheets, rods, wire and tubes from Fairmont, W. Va., to Flint, Mich., Cincinnati, Detroit, St. Louis and Toledo are unreasonable to the extent that they exceed the rates on like commodities from Pittsburgh. A similar recommendation is suggested as to the same points of origin and destination on less than car lot shipments of copper and brass sheets, rods, wire and tubes. The report also takes the view that the rate on the commodities named are unusually prejudicial in favor of the Pittsburgh competitors of the complainant. Points to which the rates were held to be unreasonable are those in which the complainant hopes to do the most business. Adoption of the report would cut off the third and fourth class differentials of 4c. and 3c. per 100 lb. now imposed against traffic from Fairmont to the destinations mentioned.

The New England Foundrymen's Association held its annual summer outing Wednesday, Aug. 10, at the Pomham Club, East Providence, R. I., approximately 125 attending. Charles T. Colvin, Colvin Foundry Co., Providence, R. I., chairman, and Charles E. Andrews, Whitehead Brothers, Providence, members of the Providence reception committee, met the association members at the New Haven station, where automobiles were taken to the club. A luncheon was served and a Rhode Island clambake at 2 o'clock, C. S. Lovell, Walker & Pratt Mfg. Co., Watertown, Mass., president of the association, presiding.

Foundrymen's Association Prepares Index of All Transactions

The American Foundrymen's Association, C. E. Hoyt, secretary-treasurer, Marquette Building, Chicago, has issued a complete index of the transactions of the organization. As stated in the preface of the index, a vast amount of valuable information has been contributed to the literature of the foundry industry, but its usefulness is seriously impaired by its inaccessibility to the majority of readers. The annual index of the transactions of the American Foundrymen's Association, as well as the volume of indices of the trade papers, afford a means of finding articles appearing in a limited period of time, but are of little assistance to the reader who requires an extensive list of references on a particular subject. Unless a person has unusual facilities at his command the great library of foundry facts is closed to him. For this reason the members of the board of directors in session at Pittsburgh, Dec. 9, 1919, authorized the secretary to engage an experienced librarian to prepare a page to page index of all available volumes of the transaction. The index recently published is the outcome of this action of the board.

In cross-indexing the text matter of technical articles, an effort has been made to include all headings under which the reader might reasonably expect to find the desired information. For instance, reference to a discussion on modern methods of cleaning gray iron castings will be under "Cleaning," "Gray Iron," and "Castings." The tendency was to err on the side of "over-indexing" rather than to cross-index too sparingly. For the convenience of those who identify papers by the names of the writers, the authors' index has been separated from the subject index and appears near the end of the book. The book is 6 x 9 in., contains 190 pages, and is bound in the same style as the annual transactions of the organization.

Revised Federal Tax Bill

WASHINGTON, Aug. 16.—Decided departures from the existing law are carried in the revised tax bill, introduced in the House yesterday, and proposed for passage during the present week, after which Congress hopes to recess till Sept. 19. According to Treasury experts and Republican leaders in the House the measure will yield approximately $1,500,000,000, or about $350,000,000 less for the current fiscal year than would be obtained from the law as it now stands. Supporters of the measure are of the opinion that the amendments drafted will simplify the task of collecting taxes and have made readjustments that are intended to provide a more equitable distribution of the assessments and give relief to the public and to business generally. Underlying the decision to cut the levies are the plans to reduce Government expenditures and by refunding the $170,000,000 of war savings securities and Pittman act certificates coming due, so that it will be possible to lower the Government's fiscal requirements from $4,550,000,000 to $4,034,000,000. Secretary of the Treasury Mellon has estimated that receipts amounting to $857,643,000 may be expected from customs, salvage and other miscellaneous sources, and that $176,357,000 or more will be obtained by reason of the overlapping of receipts collected under the law as now drawn and partly by recovery of back taxes. With this calculation in mind, $3,000,000,000 has been left for collection from the normal income tax, income surtaxes, back collections of income and profits taxes and from miscellaneous internal revenue.

The revised bill authorizes the Secretary of the Treasury to settle disputes over back taxes without resort to the courts. It is proposed to establish a tribunal to pass upon claims and the time for their settlement would be reduced from five to three years, unless extension is ordered by the Secretary. It is the belief of officials of the Treasury that this will make much easier the collection of taxes now in dispute, estimated to total approximately $1,500,000,000.

Advantages of American Valuation Plan

Puts Foreign Sellers on One Footing and Prevents Undervaluation, While Neutralizing Depreciation in Currencies Abroad

WASHINGTON, Aug. 16.—One of the statements submitted to the Senate Finance Committee in connection with the tariff bill is by J. F. Zoller, General Electric Co., Schenectady, N. Y., and relates to the American valuation plan. Mr. Zoller is a member of the executive committee of the American Valuation Association, 304 Madison Avenue, New York, and associated with him on that committee are D. W. Jayne, the Barrett Co.; John A. Matthews, Crucible Steel Co. of America; Charles F. Rockwell, Miller Brothers Cutlery Co.; H. J. Strugnell, Remington Arms Co.; Stanley Williamson, Linde Air Products Co., and others. Mr. Zoller's argument is in large part as follows:

Depreciation of Foreign Currency

"In studying this matter we have prepared some figures showing the value of currency of Great Britain, France, Germany and Japan both before the World War and at present. The table comprising these figures is herewith submitted:

Country	Money Unit	Value in U. S. Money July 1, 1914	July 1, 1921
Great Britain	pound sterling	$4.8665	$3.73
France	franc	$0.193	$0.08
Germany	mark	$0.238	$0.013
Japan	yen	$0.501	$0.481

"It shows among other things that on July 1, 1914, the German mark was worth in United States money $0.238, but on July 1, 1921, the same German mark was worth in United States money only $0.013; that in 1914 an ad valorem duty of 33⅓ per cent imposed upon the foreign value of a German article costing 150 marks would amount to $11.90, but to-day, due to depreciation of the German mark, the duty at the same rate would amount to much less than that.

German Wages One-Third Pre-War

"In 1914 skilled laborers in Germany received about 8.7 marks per day, equivalent at that time to about $2.09. In January, 1920, (I have not the figures for 1921) such skilled laborers received the equivalent of 73 cents per day, which amount if converted into marks at the rate of exchange prevailing on July 1, 1921, would mean about 56 marks per day. Other things being equal, it follows that an article costing 150 marks in 1914 would cost about 7 times that amount, or 1050 marks, in 1921; 1050 marks in 1921 would be equivalent to about $13.65. An ad valorem duty on this amount at 33⅓ per cent would amount to only $4.55, as against $11.90, the duty that would be collected at the same rate in 1914.

"But there is another important factor in the situation. Wages in Germany, measured in terms of United States money, have gone down materially since 1914. In 1914 skilled laborers in Germany received the equivalent of $2.09 per day. In January, 1920, they received the equivalent of only about 73 cents per day, notwithstanding the fact that they received a much greater number of marks per day. In the United States, on the other hand, wages have materially advanced during the same period. This is shown by the following table:

Employment	1914	1920
Bricklayers	$5.59 per day	$9.60 per day
Laborers	2.50 per day	5.58 per day
Carpenters	4.33 per day	8.27 per day
Painters	4.16 per day	8.33 per day
Plasterers	5.44 per day	9.22 per day

Note.—The figures used herein as regards wages here and in Germany are taken from pages 9, 22 and 74 of bulletin entitled "Wages," prepared for the Ways and Means Committee of the House, dated 1921.

"The ad valorem duty, therefore, instead of being made less than it was in 1914, as it certainly would be if imposed upon the foreign value to-day at any reasonable rate, should be made more because of the difference in labor costs between this country and Germany to-day as compared with 1914.

"From the foregoing it seems obvious that an ad valorem duty imposed in 1914 upon foreign value at a rate entirely adequate at that time would constitute practically no protection at all to-day against German importations.

"If we continue the levying of ad valorem duties upon foreign value, me must, in order to get adequate protection against German importations, make the rate so high as to constitute practically an embargo against those countries whose currency has not been much depreciated. In any event protection against Germany to-day under our present system probably means a prohibitive duty against many of the other foreign countries.

Fluctuations in Duty Avoided

"If we cannot impose ad valorem duties to-day as a practical matter upon foreign value and must impose ad valorem duties, then it would seem that the only alternative is to impose such duties upon the American value instead of the foreign value. The American valuation plan has the following advantages:

"1. If our ad valorem rates are applied upon the American value the duty will not fluctuate because of the fluctuation of foreign currency. This is very important, because if we should impose to-day an adequate ad valorem duty based upon foreign value, such duty automatically might become inadequate, due to further depreciation in the foreign currency, or it automatically might become prohibitive should the foreign currency recover.

Advantages to Consumer

"2. The American valuation plan would result in two distinct advantages to the American consumer, which advantages could not be attained if our ad valorem duties were imposed upon foreign value.

"(a) It is a means of securing more revenue from those countries whose costs of production are low than would be secured if the duty were imposed upon foreign value. Under the American valuation plan an article imported from China, for example, would be subjected to the same duty as a similar article coming from England, whose costs of production are much higher. This additional revenue from China and other countries whose production costs are low is secured without imposing a corresponding burden upon the American consumer. The sale of the article from England in this case establishes the price to the American consumer. Imposing more duty upon a similar article from China does not increase that price, but it does reduce the profit of the Chinese merchant and makes it more comparable with the profit of the English merchant. Any tax law that equitably produces more revenue without imposing a corresponding burden upon the consumer is almost an ideal tax law. The American valuation plan, therefore, is of material benefit to the consumer from this standpoint.

"(b) The American valuation plan tends to lower retail prices. At this time I think we will all agree that retail prices are high compared with wholesale prices, the prices of manufacturers and prices of raw materials. By imposing our ad valorem duties upon the American wholesale value we educate the American people as to wholesale values. If the people know the wholesale value they will have some conception of what the retail price ought to be. This will have a tendency to adjust retail prices to the benefit of the American consumer.

Countries Treated Alike and Inquisition Abroad Made Unnecessary

"3. This plan will make it possible to treat all foreign countries alike by imposing the same duty upon

the same article regardless of the country from which it comes. As it is now we discriminate against those countries having the higher production costs in favor of those countries having the lower production costs, so that to-day we discourage the establishment or maintenance of better living conditions abroad.

"4. American valuation will prevent, to a very great extent, undervaluation and make it possible for the Government to collect substantially all the duty prescribed by law. [The statement here quotes from a British authority as to the great prevalence of undervaluation. Some firms have junior partners who are kept ignorant of values, so that they can testify on invoices to the best of their knowledge and belief. The consular check on invoices is merely nominal.]

"5. Lastly, the American valuation plan would make it unnecessary for this Government to carry on foreign inquisitions in an attempt to secure foreign values, inquiring abroad into the private affairs of citizens of foreign countries, much to their disgust and displeasure. Foreign countries resent these inquisitions and they have resulted in the past in no small amount of irritation upon the part of countries otherwise friendly toward us.

Objections Answered

"The foregoing are some of the advantages of the American valuation plan over the foreign valuation plan. We now desire to consider with you some of the objections that have been urged against American valuation.

"1. It has been contended, or at least intimated, by many people in the press and elsewhere that the American valuation plan necessarily results in imposing more duty upon imported articles than would be the case if the duty were imposed upon foreign value. Some of the critics of the schedules in the pending bill have stated that the duty has been increased merely on account of the substitution of American value for foreign value. This reasoning is fallacious and misleading so far as the unsophisticated are concerned. These critics should address themselves to the rates and not to the base upon which these rates are applied and be made to understand that the same duty could be imposed upon the foreign value provided that could be ascertained with any degree of certainty under present conditions. And in order that the public may not be misled, it should be clearly stated that American valuation in itself does not mean more duty or less duty than we had before.

"2. It has been suggested that the American value would be difficult to determine. It is our view that this value would not be so difficult to determine as the true foreign value if we actually got the true foreign value in all cases. If it costs more to administer our tariff law under the American valuation plan than it does under the present makeshift plan which does not secure the true foreign value, it is our opinion that the proposed substitute will be worth much more to this country than it can possibly cost to administer it.

"One Government expert, if we understand his testimony correctly, after emphasizing the difficulties in putting this plan in force, suggested as a substitute for it, a fictitious foreign value. This fictitious foreign value was to be determined by making certain deductions, some arbitrary and some not, from this identical American value. This suggestion would seem to be an admission upon the part of this Government expert that the American value could be obtained at least for the purpose of determining his suggested fictitious foreign value. If it could be obtained for that purpose, it certainly could be obtained for the purposes of the pending bill. Therefore, we do not look upon this witness as one who believes it impracticable to attempt to ascertain the American value. It is our view that if this bill be enacted into law our Government officials without great difficulty will be able to adjust themselves to the changed conditions and will soon become much more familiar with American values than they have ever been with true foreign values.

"3. It has been urged that if the ad valorem rates be applied upon the American value, the importer will be unable to determine with certainty in advance of payment of the duty the amount thereof. Is it not a fact that any experienced business man, be he a manufacturer or a wholesaler, knows at least two things to almost a certainty; namely: (a) the cost of his product, and (b) the selling price? He would not remain in business long if he did not know these things. If we impose this duty upon foreign value to-day there is bound to be grave uncertainty as to the amount of protection afforded American industry. So if we admit that there might be some uncertainty as to the exact amount of duty collectible in isolated cases, we submit that that uncertainty is negligible, as compared with the uncertainty that would result if these duties are not imposed upon a permanent and substantial base.

"4. Lastly, it has been urged that the American valuation plan would result in permitting the American producer to increase the duty against his foreign competitor by increasing the wholesale selling price here. This proposition has been stated another way by saying that this plan would permit the American producer instead of Congress to write the tariff rates. This we think a novel objection. No one ever suggested to our knowledge as an objection that under our present law the foreigner might reduce the duty against his American competitor by reducing the price upon which the duty was assessed, and therefore the foreigner instead of Congress actually write the rates in the tariff bill. And yet, the foreigner is in a much better position to write the rates (if that is what it amounts to) under the present law, than the American producer would ever be under the American valuation plan. If the foreigner can in any way, under our present law, justify a lower valuation, or if he can get the duty imposed upon a lower valuation without justification, the result is directly beneficial to the foreign importer, because it reduces his duty and increases his profit. If the American producer, on the other hand, attempts to raise the duty by increasing the selling price, thereby writing the rates of duty in the law (if that is what it amounts to) under the American valuation plan, the result is directly disadvantageous to the American producer, because the rate of duty being always less than 100 per cent, he, by his own act, puts himself in a position to be at once undersold by his foreign competitor.

"We have endeavored to weigh before you the advantages and disadvantages of the American valuation plan. We believe that there must be disadvantages, because there always are, but it is our sincere belief that the advantages far outweigh the disadvantages. If we are to have adequate protection for our industries and are to be put in a position in this country to maintain the usual standards of living for our American workers, without the imposition of prohibitive duties against some countries other than Germany, it seems to us, as it does to the honorable Secretary of Commerce, that the American valuation plan is the only alternative."

To Survey Asiatic Markets

WASHINGTON, Aug. 16.—A field survey of Asiatic markets for American goods is to be made by Frank R. Eldridge, Jr., chief of the Far East Division of the Bureau of Foreign and Domestic Commerce. Assignment of a chief of division to such a field survey in the geographical area of the world in the economics of which he specializes is a new departure in federal promotion of American foreign trade.

Sailing from San Francisco about Sept. 22, Mr. Eldridge will accompany the representation from the San Francisco Chamber of Commerce that is planning a tour of Eastern markets for the advancement of trans-Pacific commerce. This trade delegation, with Mr. Eldridge, will visit Yokohama and Kobe in Japan, Shanghai and Hongkong in China, Manila in the Philippines, and Batavia in the Netherlands East Indies. Mr. Eldridge will part company with the San Francisco delegation in Batavia. From the Netherlands East Indies he will proceed to India, where a new field office of the Bureau of Foreign and Domestic Commerce is to be established.

Much of Mr. Eldridge's time in the Far East is to be applied to inspection of the work of men in the field for the Department of Commerce with a view to improving their services to American business.

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Competition and the Open Shop

If there had been an agreement among the steel makers not to furnish steel with more than 0.15 per cent carbon, or among the blast furnaces not to supply pig iron except with a silicon content between 1.75 and 2.25 per cent, or had there been other agreements reducing all steel and pig iron to common levels, the agreements would now break down, for we are in a period of strenuous competition. The blast furnace and the steel mill would seek to furnish the material best suited to the buyer's requirements, would strive to give the customer the best service possible. If there had been an agreement not to sell given classes of material at less than certain prices that agreement also would fail.

The competitive conditions among the sellers of material should and will exist also among the sellers of personal service. The average man, working for a wage, will seek to give his employer the best service possible, to do all the work of which he is capable, and the best work, in the time for which the terms of employment pay him. Nominally he will be working for so much an hour or so much a week, but practically he will endeavor to furnish the best service possible in the time. The open shop furnishes the opportunity. The union shop does not.

If there is insufficient employment for all, the better workmen in a union have employment, but the best are not permitted to do their best and if they were they could not expect to be paid proportionately, hence they may well prefer to work under open conditions. The poorer union workmen get no employment at all, and naturally prefer to sell their services for what they are worth under open conditions.

In 1920 the expression became common, "The higher the price, the poorer the quality." It was not the price that made the quality poor. The condition that caused prices to advance permitted quality to deteriorate. In the new condition, the same influence that reduces the price improves the quality. It must be so with labor or personal service. One cannot conceive of an economic condition that would produce price and quality competition in the sale of goods and not corresponding competition in the sale of personal service.

Can the lines of effort in which unionism has been conspicuous withstand this economic pressure? The lines are three—rail transportation, coal mining and the building trades. Already they are under great pressure, from quite different angles. The men connected with these lines comprise less than 10 per cent of the total number of workers, and the smallness of the proportion makes the cases all the more conspicuous.

As to railroad labor, the Transportation Act lays down seven considerations which shall guide the Railroad Labor Board. Not merely one of these seven, but the first of the seven, is: "The scales of wages paid for similar kinds of work in other industries." As to coal mining, scarcely a commodity is in more general use than coal; and seeing that coal is bought by very different kinds of buyers—by the householder, by the public service corporation and by the large private corporation—each class is able to exert a different kind of pressure if coal is not available at a price commensurate with the cost of other things that are bought. A condition of high prices for coal and low prices for everything else could not be expected to last long.

As to the building trades, if the workers cause building costs to be high and thus bring about a great accumulation of deferred building projects, that will not help them as they vainly imagine. Rather it will cause men to seek and find the way out. Experiences of that sort have been common. Time and again a new device has been put on the market and has sold well. One inquires why the thing was not invented a quarter century ago and the answer is it would not have sold well then. When the demand arises the thing is provided, and if an actual demand of sufficient proportions accumulates for dwelling houses or other forms of construction the way will be found to do the work efficiently and cheaply, without the consent of the bricklayers', carpenters' and other unions, if they have survived to that time.

One of the surprises of the post-war export trade of Great Britain and the United States has been the small demand for galvanized sheets. This is in striking contrast with the course of other products. In 1913 Great Britain's exports

of galvanized sheets were 63,500 tons per month and those of the United States 9500 tons per month. In 1919 and 1920 British exports were 15,500 tons and 34,200 tons per month respectively, or much less than the pre-war rate. In the same two years exports from American mills were 8500 tons and 9000 tons per month respectively, or nearly on a par with the pre-war rate. Thus, while the world demand in 1913 as represented by the exports of the two countries was 73,000 tons per month, it has been only 33,600 tons per month in the last two years, a decrease of about 54 per cent. This marked falling off accounts in part for the existing depression in the zinc markets of the world. There is the other side, however, in the backed-up demand that must have accumulated and that will come out later, for galvanized sheets are almost as staple a commodity as tin plate or steel rails.

Future Demand for Metals

That human demands for metals are bound to increase, as present backward countries advance further and further toward the standards of civilization existing in the United States, was pointed out forcibly by H. Foster Bain in a commencement address before the School of Mines and Metallurgy of the University of Missouri, from which institution the address comes as a publication. Mr. Bain pointed out that the pre-war consumption of copper in the United States was from 6 to 7 pounds per capita; in a country as well developed as France, it was only ¼ pound.

China uses about 100 pounds of coal per capita per annum. "Americans use approximately 6 tons, and other peoples use various amounts between. Generally speaking, the world is learning to use more and more coal, and to substitute the mechanical energy of heat for human labor. The United States is by no means the only country where modern plumbing is appreciated, and as the cult of the bathtub spreads around the world, the consumption of metals will grow. This demand can be supplied only by re-use of old metal or by making addition to the world's stock. Mineral wealth, fortunately, is not necessarily consumed in use. There is wastage, but there is also salvage, and large amounts of old metal are continually returning to use, so much so that important metallurgical processes, such as making open-hearth steel and cement copper are based upon supplies of scrap metal."

It would be idle to attempt to forecast the demands of any now backward country at any time when, in the future, its requirements may approach those now prevalent here. Yet it is impressive to note that a consumption of 6 tons of coal per capita for China's 400,000,000 people would represent nearly double the world's total production in 1920, which is estimated at about 1,300,000,000 tons, of which the United States produced 586,000,000 tons, all of Europe 597,000,000 tons, and the rest of the world 117,000,000 tons. Six pounds of copper per head in China would call for approximately the entire world's 1920 production of copper.

If India were to use, for each inhabitant, the equivalent of the 780 pounds of pig iron per capita produced in the United States last year, India's demand for one year alone would absorb all of the 1920 world's production of pig iron, plus the greater part of the 1921 output. The coming of such a time would cause a drain upon the world's iron ore reserves as now known, that would mean impending famine, despite the ever-increasing re-use of old material as scrap.

Beehive and By-Product Coke

The Geological Survey this week reports the output of coke by the by-product process in July. Shortly after the armistice the weekly reports of by-product coke output were discontinued, although beehive production has been reported to date. Beginning with last June a system of monthly reports was instituted for by-product coke. Production is reported for the two months, in net tons, as follows:

	By-Product	Beehive	Total
June	1,410,000	232,000	1,642,000
July	1,285,000	181,000	1,466,000

The most striking feature of the showing is the large proportion of by-product coke—85.9 per cent in June and 87.6 per cent in July. This is a remarkable proportion, for the two branches of the industry are not far from being balanced in potential capacity. With an average operating rate of 85 per cent, which seems to be the acceptable estimate against nominal rated capacity, the by-product ovens have a capacity of about 36,000,000 net tons a year. Whatever may be the capacity of beehive ovens now in existence, it is a fact that in 1916, the record year for beehive coke, 35,464,224 tons was produced by the process. Instead of there being an equal division in July, however, the proportion was about seven-eighths by-product and one-eighth beehive.

Were it not already well known that the production of pig iron recently dropped to a very low level the smallness of coke production, whatever the process used, would be surprising. The July output, shown above, was at the rate of 17,500,000 tons a year, this contrasting with 56,478,185 tons made in 1916, the record year, and about 51,888,000 tons made last year. The rate of production last month was 31 per cent of the average rate in 1916. The rate of pig iron production with coke as fuel, as shown by THE IRON AGE report, was 26 per cent as large last month as in 1916. The comparison suggests that the miscellaneous consumption of coke has held up better than its consumption in the iron blast furnace, though it is a fact that some by-product coke has piled up.

In 1918, the year of maximum production of bituminous coal and of coke, 14.7 per cent of the bituminous coal produced was coked, while the Geological Survey puts the normal proportion at 15 per cent. In July the proportion of bituminous coal produced that was coked was about 6.9 per cent. The comparison suggests what can be seen by other statistical comparisons, that the iron industry has been more depressed than industry in general.

It was to be expected that in a period of gen-

eral depression the by-product coking process should suffer less inactivity than the beehive process, and the experience of last month, with seven tons of by-product coke made to one ton of beehive, fully confirms the expectation. A part of the by-product production, but only a small part, was forced by the existence of contracts for supplying municipalities with gas from by-product operations. The Steel Corporation, without such obligations, discontinued the manufacture of coke in the Connellsville region some three months ago, while it has shipped large quantities of Connellsville coal to its by-product plants. The market in the Connellsville region has exhibited of late the curious spectacle of the price of by-product coal being higher than the amount that could be realized by putting the coal into beehive coke without charging any fixed expense to the ovens.

While the by-product process seems to make a good showing at the moment, from the long range viewpoint very little has been done. It would be only one step in the efficient use of coal simply to make all the metallurgical coke needed. Eventually the major part of the coal produced should be coked, the coke being used as ordinary fuel.

Refining with the Cupola

The cupola has been generally regarded in the iron industry as simply the cheapest and most efficient melting medium for pig iron or scrap. Recent experience, however, points to its possible use as a refining agent of considerable importance.

Besides the experience referred to in THE IRON AGE of July 14, in the lowering of sulphur by an increased lime charge in the cupola, there has been more recently the use of cupolas by a large steel company for furnishing hot metal to basic open-hearth furnaces, as detailed elsewhere in this issue. In this case the cupolas played the role of the modern mixer or took the place of the blast furnace as a source of liquid metal. The point of chief interest is that it was demonstrated to be possible to take heterogeneous pig iron, some quite high in silicon, and measurably eliminate the silicon, making the iron suitable for basic practice. This was accomplished by the proper use of lime in the charges. There was also a decided increase in the steel output of the furnaces and a saving in the limestone necessary in the open-hearth practice.

The author, in summarizing the advantages, claims that the increased yield of steel more than balanced any cupola losses; that the steel production, due to quicker heats, was greater than when using blast-furnace metal, because hot metal was always available from the cupola. While admitting that the advisability of using cupolas for such purposes depends largely on local conditions, he believes, that "with a modern mechanically charged cupola the increased production of the open-hearth furnace from the use of hot metal will considerably more than pay for the cost of operating such a cupola plant."

This testimony places the cupola in a new light. There are doubtless many plants having no blast furnaces or mixers, but in the habit of making quantities of steel, where pre-melting in cupolas would be of value and where advantage could be taken of the refining possibilities. As the quality of pig iron deteriorates or the contamination of scrap increases, the cupola may be found to have advantages which until now have not been thoroughly appreciated. There is at least the assurance that in its usual role in the iron foundry the cupola may be made to refine as well as melt.

The Induction Furnace

Induction electric steel furnaces have played a small role in the remarkable expansion of the American electric steel industry. Only one furnace of this type may be said to have operated successfully for any considerable time, and this is the furnace developed by the General Electric Co. and described in THE IRON AGE last week. There were over 350 arc furnaces in American plants at the opening of this year. It appears that in the General Electric furnace two radical changes have been adopted which overcome the obstacles to previous attempts with this type in the United States. The placing of the entire primary coil on top is one departure and a vital one, because any breaking through of hot metal cannot harm an expensive part of the equipment. The development of a special refractory is another step in advance. Much depends on the lasting qualities of the lining of induction furnaces and it was the fact that Austrian magnesite could not be obtained during the war which in large measure prevented the use of the two or three induction furnaces in American steel works.

Germany has been and still is the country in which induction furnaces have a prominent place in steel making. This is explained partly by the fact that in the early days an arc furnace was as expensive to install as an induction furnace. It is probable, however, that in the United States the induction type can never compete seriously for general purposes, in view of its first cost, but its field will be in the making of unusual and special high grade steels or possibly in special duplexing operations.

Wheeling Steel Corporation Labor Controversy

PITTSBURGH, Aug. 16.—The executive committee of the Amalgamated Association of Iron, Steel and Tin Workers has declared a strike in all the plants of the Wheeling Steel Corporation. Officials of the labor organization say that this is merely a formal step based upon the rules of the association and was forced, it is claimed, by the fact that the company locked the union men out some weeks ago, following the expiration of the agreement on June 30 between the Amalgamated association and the Whitaker-Glessner Co. and the Wheeling Steel & Iron Works.

The Wheeling Steel Corporation officials, it seems, declared some time ago for the open-shop principle and at the Atlantic City and Columbus, Ohio, conferences between the sheet manufacturers and the Amalgamated association, to fix the wage scale for the year ending June 30, 1922, the Wheeling Steel Corporation's subsidiaries were not represented. It has been said that the Amalgamated association made the demand that the Wheeling Steel Corporation sign the scale as a unit, thus covering all subsidiaries, among which is the Labelle Iron Works, which has been operated as an open shop. The Amalgamated officials deny this, claiming that they merely asked for a renewal of the agreement covering the plants of the Wheeling Steel & Iron Co. and the Whitaker-Glessner Co., which previously had been operated as union mills.

CORRESPONDENCE

Proposal to License Business Men

To the Editor.—The suggestion put forward in your issue of July 14 by Mr. Alvan T. Simonds, president of the Simonds Mfg. Co., which urges that no man shall be allowed to engage in business, at least in business involving a capital larger than a certain fixed amount, without passing an examination and securing a license (as the doctor and the lawyer are now required to do), and that no one should be allowed to participate in making laws unless he has proved in some way his fitness to grasp conditions to meet which the laws are being made—the suggestion strikes me as impractical. What we need is not more regulation but less interference with business on the part of the State.

Let us analyze for a moment the very thing that Mr. Simonds puts forward. "The State," he writes, "does not allow men to practise law or medicine without a license, but it allows any man who can secure the proper amount of capital or credit to enter upon a business venture involving not only himself and his future but also the future welfare of thousands of others. When a company employing 30,000 men and women fails because of poor management, due to an ignorance of fundamental economic laws, something has happened that society should not allow."

Doctors and lawyers and certain of the highly trained professions require, for their proper training, a certain amount of knowledge which can be obtained only from the study of books, and then rarely in any other way than by attendance at a proper institution of learning. In the case of doctors, and in a less degree in the case of lawyers, the life of the individual is at stake, and the State, very properly, requires that there shall be at least a minimum of knowledge.

In the case of a business man, however, does anyone suppose that any Tom, Dick or Harry can secure "the proper amount of capital or credit to enter upon a business venture" of any size without having his experience, character and references carefully investigated? Furthermore, the companies employing 30,000 men are few and far between, and such companies, and even much smaller companies, are almost universally managed by boards of directors who have definite obligations imposed upon them by law. The executives of such companies, moreover, are selected by the directors because of their supposed fitness for the task. In other words, while we have to-day no guarantee of fitness granted by any State licensing board, there is a constant weighing and examining going on by judges who are far more competent than any that the State could hire, namely the banks and credit departments from whom accommodation is asked, the various directors of the company, and, further, the stockholders themselves, beyond whom, in the case of the larger corporations, is the court of public opinion. All of these things act as checks on mismanagement. It is freely granted that notwithstanding all of these checks, cases of mismanagement are frequently and constantly arising, but to think that these cases can be cured by any State licensing device is absurd. Let us take a few concrete cases:

Some years ago the Westinghouse Electric & Mfg. Co. failed. Could this failure have been averted by asking Mr. George Westinghouse to pass an examination and take out a license from some State board? Or is it conceivable that Mr. Westinghouse could not have passed such an examination?

Within the memory of all of us, the New York, New Haven & Hartford Railroad was considered one of the prime investments, and we all remember the various disasters which overtook it, and which certainly were due to bad judgment and bad management. Is it conceivable that this situation could have been averted by asking the various gentlemen connected with the New Haven Railroad to pass an examination as to their fitness as business men?

Let us take the reverse of this picture. Mr. Henry Ford's replies on the witness stand to questionings in his famous libel suit a few years ago would not indicate his ability to pass an examination of the type that would be conducted by any State examining board authorized to issue licenses to business men. Yet it will be conceded that Mr. Ford has managed to build up a fairly tidy business.

Let us now pass to Mr. Simonds' next point in regard to licensing lawmakers. He states, "Is it not a rather curious attitude on the part of the public to require all those who are to practise law to go through a long term of study and to pass difficult examinations before they are admitted to the bar, and at the same time to send to our legislature and to Congress, to make laws, men who have little or no knowledge of the great fundamental principles that underlie the prosperity of the country?"

Unfortunately for Mr. Simonds' argument, the very men who he states have to go through this long term of study and pass difficult examinations before they are admitted to the bar are the very ones whom we send to our legislatures and to Congress. The percentage of lawyers in Congress and in the various State legislatures is overwhelming.

We all agree with Mr. Simonds that the more education we can have in business, and the more education we can have in our halls of legislature, the better it will be, but there is no panacea in any licensing device and no royal road to success possible by legislation. Certainly no additional paternalism on the part of the State will bring us to Utopia.

JOHN C. JAY, JR.

New York.

Compression Strength of Metals and Alloys

With a view to arriving at a satisfactory measure of the compressive strength of certain metals and alloys, A. Pomp, in an article in *Zeitschrift des Vereines Deutscher Ingenieure*, Sept. 11, 1920, has recently tested a number of specimens 10 mm. diameter and 20 mm. height in a 15-ton Amsler machine, and has given the results in diagram and tabular form from which the following table, showing the correspondence between the relative tensile strength and the relative pressure required to produce a compression of 10 mm., is extracted by *Technical Review*, London:

Material	Tensile Strength, Kg., Per Sq. Mm.	Compression Pressure, Kg.	Relative Strength, Per Cent	Relative Pressure, Per Cent
Steel (0.5% C), annealed	54.0	13,050	100.0	100.0
Brass (62% Cu), annealed	46.0	11,480	85.0	88.0
Mild steel (0.06% C), annealed	38.5	9,800	71.5	75.0
Copper, annealed	22.0	5,200	40.8	40.0
Aluminum, annealed	10.0	2,910	18.6	22.3
Lead-tin alloy (3%), pressed	2.4	630	4.5	4.8
Lead, pressed	2.2	405	4.1	3.1

The Iron Age and Its Readers

It has been one of the aims of THE IRON AGE to keep its readers posted on each new development in the notable expansion of the electric steel industry since its beginnings in this country a few years before the war. Besides data of a statistical nature, there has been presented complete information concerning the new types of furnaces as they have appeared from time to time. It is believed that THE IRON AGE has featured, by full descriptions and illustrations, every furnace that has secured its place by active commercial operation in the industry, and only such furnaces. The latest appeared in last week's issue when the new induction furnace of the General Electric Co. was described. The claim made is also true of the non-ferrous industry, which is fast showing a great dependence on the electric furnace for melting.

Iron and Steel Markets

PIG IRON ADVANCES

Buying on Larger Scale Than in Months

In Finished Steel Evidence Increases That Stocks Are Being Exhausted

The recent low dip in pig iron prices led to buying on a scale probably not equaled in a year, and producers of foundry iron in all districts shared in the business. A good many consumers whose stocks had run down sensed the possibilities of the low rate to which output had fallen and decided to buy.

In the past week furnaces at Chicago, St. Louis, Buffalo, and in Ohio and Pennsylvania districts have advanced their prices by 50 cents to $2 per ton in an effort to limit the losses they have been making on raw materials bought last year. While the extent of the actual rebound in the market is uncertain, the firmer stand of producers is marked and its effect will be closely watched.

The situation in finished steel differs from that in pig iron. Steel works are being run and none are dropping out of the race. Buyers do not believe that low point has been touched and are working close on stocks. The Ford Motor Co., in keeping as far as one month ahead of the mills, is an exception.

The past week has shown continued irregularities in prices, on some products rather more resistance to declines, but generally a willingness of producers to meet competition. The expectation of some increase in operations in the fall is general and is based on evidence that many consumers have used up their stocks and must buy on a larger scale. Producers report a moderate increase in buying in the past week, but the testimony is not pronounced or uniform.

In the effort to get business various mills are crossing usual lines. Makers of strip steel have sought orders in hoops and bands by low offers. Plate mills have gone in the field of the strip steel mills and rollers of light plates have made attractive offers on blue annealed sheets.

Some new-comers into the automobile sheet field have made concessions of several dollars a ton to get trial orders.

Wire products are as firmly held as any finished line—more firmly than the leading heavy products. New business is coming to some important producers at up to about 30 per cent of capacity, with indications that stocks are small all along the line.

New car work and car repairs are bringing further orders to the mills, but not to the extent producers have been led to expect. The railroad repair shops have plenty of steel in stock and are using it. Cars for the Kansas, Oklahoma & Gulf will require 5000 tons of plates, shapes and bars. A Chicago district car repair shop is in the market for 2500 tons of plates. About 10,000 tons of steel will be needed for the repair of 4950 cars and inquiries for 450 new cars have appeared.

Chicago still leads in concessions on plates which are the partial absorption of Pittsburgh freight. While business there has gone at 1.65c. and less, mills farther East have stopped at 1.75c., and 1.80c. has been secured on considerable business.

While the cotton tie season opened some weeks ago on the basis of $1.35 per bundle, the price has now settled to $1.30, Pittsburgh, in part in view of the decline in other mill products and in part because of German competition.

New structural work in excess of 30,000 tons has come on the market, including 18,350 tons for two Federal Reserve banks. Awards probably totaled about 4000 tons.

Some fair orders have been taken for tin plate recently, chiefly from oil companies, one large interest in this line buying over 3000 tons.

The slow progress in the plans for railroad relief at Washington is a matter of concern in the steel trade.

Basic pig iron figured in the increased activity in the eastern Pennsylvania market, one steel company taking 2000 tons and another 5000 tons, the prices ranging from $19 to $19.50 delivered. In the Central West the steel companies which for some time have made the market by sales of basic pig iron have advanced to $20 at furnace, or $1.50 to $2 above recent prices. In foundry iron radiator companies have figured in late buying, but specific reports of heavy tonnages taken by one such interest have not been confirmed, apart from a Buffalo transaction.

Scrap iron and heavy melting steel have shared in the strengthening of primary materials that has marked the past week, the advance in some forms of old material being not far from $1 per ton.

The action of Eastern railroads in agreeing to a 25 per cent differential on steel shipments for export recognizes the low state of that trade.

Pittsburgh

PITTSBURGH, Aug. 16.

The outstanding development of the past week in the situation here is a stronger market in the basic materials. An advance, amounting in some cases to $2 per ton, has been announced in basic pig iron by several of the steel companies, which hitherto have been supplying the demand, while the virtual exhaustion of furnace yard stocks of the foundry grade, coupled with the disinclination of makers of the latter to start up idle furnaces on to-day's costs and selling prices, has encouraged the asking of higher prices than have prevailed recently. In scrap iron and steel further advances amounting in a number of instances to $1 a ton have been established in the past week. This effort toward strengthening the foundation of the market structure naturally is looked upon as a constructive move. It may be said, however, that in the case of basic pig iron the attempt to obtain higher prices is based less upon a better demand or lack of supplies than a desire on the part of the steel company to reduce the losses which the recent base of $18 at furnace entailed.

The quite general report about the steel business is that orders are considerably more numerous in almost all lines than they were recently, but no claim is made that the individual orders are any larger than they have been in the past few weeks, nor do they reflect any abandonment on the part of buyers of a policy to take on supplies only as they are needed. Since practically everything bought is for immediate

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 16, 1921	Aug. 9, 1921	July 19, 1921	Aug. 17, 1920
No. 2X, Philadelphia‡	**$20.34**	$19.84	$21.85	$52.90
No. 2, Valley furnace†	19.50	19.50	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	24.50	45.60
No. 2, Birmingham, Ala.†	19.00	19.00	20.00	42.00
No. 2, foundry, Chicago*	**20.00**	18.25	18.50	46.00
Basic, del'd, eastern Pa	20.26	20.26	21.25	48.30
Basic, Valley furnace	18.00	18.00	19.00	48.50
Bessemer, Pittsburgh	21.96	21.96	22.46	48.40
Malleable, Chicago*	**20.00**	18.50	18.50	46.50
Malleable, Valley	20.00	20.00	20.50	50.00
Gray forge, Pittsburgh	21.46	21.46	21.46	50.40
L. S. charcoal, Chicago	33.50	33.50	36.00	57.50
Ferromanganese, del'd	70.00	70.00	70.00	200.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	30.00	30.00	33.00	60.00
O.-h. billets, Pittsburgh	30.00	30.00	33.00	60.00
O.-h. sheet bars, P'gh	32.00	32.00	35.00	68.00
Forging billets, base, P'gh	35.00	35.00	38.00	80.00
O.-h. billets, Phila.	35.74	35.74	38.74	69.10
Wire rods, Pittsburgh	42.00	42.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	1.75	1.75	2.00	3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.05	2.05	2.10	4.75
Iron bars, Chicago	1.75	1.75	1.90	3.75
Steel bars, Pittsburgh	1.75	1.75	1.80	3.25
Steel bars, New York	2.13	2.13	2.18	4.02
Tank plates, Pittsburgh	1.80	1.80	1.80	3.25
Tank plates, New York	2.18	2.18	2.18	3.52
Beams, etc., Pittsburgh	1.85	1.85	1.85	3.10
Beams, etc., New York	2.23	2.23	2.23	3.27
Steel hoops, Pittsburgh	2.25	2.25	2.50	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 16, 1921	Aug. 9, 1921	July 19, 1921	Aug. 17, 1920
	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	3.00	3.00	3.25	7.50
Sheets, galv., No. 28, P'gh.	4.00	4.00	4.25	9.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.40	2.50	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.75	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$13.00**	$12.50	$12.50	$38.00
Carwheels, Philadelphia	16.00	16.00	16.00	40.00
Heavy steel scrap, P'gh	**13.00**	12.50	12.00	29.00
Heavy steel scrap, Phila.	11.50	11.50	11.00	26.00
Heavy steel scrap, Ch'go.	**10.75**	10.25	10.00	25.00
No. 1 cast, Pittsburgh	16.00	16.00	16.00	41.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	39.00
No. 1 cast, Ch'go (net ton)	**13.00**	11.50	12.50	36.00
No. 1 RR. wrot, Phila.	14.00	14.00	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	**11.00**	9.75	9.00	24.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$17.50
Foundry coke, prompt	3.75	3.75	4.00	18.50
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.75	19.00
Electrolytic copper, N. Y.	11.75	11.75	12.62½	19.00
Zinc, St. Louis	4.20	4.20	4.25	8.00
Zinc, New York	4.70	4.70	4.75	8.35
Lead, St. Louis	**4.25**	4.20	4.35	8.87½
Lead, New York	4.40	4.40	4.40	9.12½
Tin, New York	*26.12½*	27.75	27.00	48.00
Antimony (Asiatic), N. Y.	*4.50*	4.60	4.65	7.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 16, 1921, Finished Steel, 2.364c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Aug. 9, 1921,	2.364c.
July 19, 1921,	2.407c.
Aug. 17, 1920,	3.974c.
10-year pre-war average,	1.684c.

delivery, not a little of the demand is being met from the mill stocks and the effect upon steel works and rolling mills operations is not pronounced. Building up of a backlog is almost out of the question so long as buyers generally are purchasing so close to their needs.

The Ford Motor Co. is scheduling about one month ahead and making a strong effort to keep its raw material inventory down to about three weeks' requirements. But this company is the only important consumer of steel that is buying even that far ahead. The natural inference from this policy is that buyers do not yet believe that the lowest prices have been touched.

Considerable irregularity still exists in prices, although in general there is slightly more resistance to efforts to force further declines than there was a few weeks ago. There are still a few manufacturers who want business so badly that they are naming very attractive prices, and since the greatest concessions are offered to the regular customers of other companies rather than their own, it is necessary for the other companies to either meet competitive prices or suffer the loss of regular patrons. The tendency to "poach in the other fellow's preserves" is one of the evils of the present situation. Some of the makers of strip steel are charged with having similarly sought business at very low prices in hoops and bands, and makers of plates similarly are credited with having tried, by naming low prices, to take business away from strip steel mills, while very low prices have been done on blue annealed sheets because of competition between plate makers and sheet manufacturers. Most plate mills can roll sheets up to No. 12 gage and when based upon the plate card can name a lower price than the regular makers.

Pig Iron.—Practically all of the steel companies which hitherto have been supplying the demand for, and making the open market in, basic pig iron, have in the past week gone to a minimum of $20, furnace, for this grade. This price represents an advance of at least $1.50 a ton, and in a few instances $2 a ton from what these interests previously were willing to accept. Merchant producers having any stocks of this grade, also, now are asking $20, furnace, minimum, but since this price has not yet found a basis in sales, it must be regarded merely as a quotation. The most recent transaction in basic iron was one of 2000 tons taken by a Pittsburgh district sheet maker, who claims to have secured the tonnage at a delivered price of about $20. This would be equivalent to about $18.04, if the iron came from Valley furnaces, and slightly more from furnaces having a lower freight rate into the Pittsburgh district. The same interest bought 500 tons of Bessemer iron at about 50c. per ton below the Valley furnace price on this grade. This iron was bought at $21.44, delivered, as against $21.96, the delivered price on Bessemer from Valley furnace. Foundry iron is quite firmly held, not because of the size of the demand but rather because so little of this grade now is available. On No. 2 plain, $20 is the minimum asking price and one producer is unwilling to go below $20.50, while still another, with furnaces in western Pennsylvania and Cleveland, has announced a price of $20, Cleveland, which would mean $22.94 delivered into this district. The Iron City Sanitary Mfg. Co. recently closed for 500 tons of No. 2 plain and No. 2X at an average price of $20, western Pennsylvania furnace. The recent pur-

chases of the Standard Sanitary Mfg. Co. for its Louisville, Ky., plant were made at $18.25, Birmingham, for No. 2 plain, and at an even lower base price for some high silicon iron purchased in that district. It also bought some iron in Chicago at $18.50, the purchase including No. 2 plain and iron of higher silicon content. The Union Radiator Co., Johnstown, Pa., is in the market for 250 tons of No. 2 plain, while Phillips Mill & Supply Co. is seeking 200 tons of low silicon iron for prompt delivery and the Danville Iron & Steel Corporation, Danville, Pa., wants 200 tons at 2.25 to 2.75 per cent silicon iron for last quarter delivery. Altogether about 1000 tons of foundry iron are wanted.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00 to $20.00
Bessemer	20.00
Gray forge	18.50 to 19.50
No. 2 foundry	19.50 to 20.00
No. 3 foundry	19.00 to 19.50
Malleable	20.00

Ferroalloys.—Inquiries for ferromanganese are somewhat more numerous than they have been, but with the exception of one from a Valley steel maker calling for 200 to 300 tons, for September and October shipments, they rarely exceed a carload. Among the latter is one from a Detroit steel casting company against which a price of $75 delivered on domestic 80 per cent material has been quoted. The most recent business done in domestic ferromanganese was at $70 delivered, for 80 per cent alloy, and with British ferromanganese available at $65 c.i.f., Atlantic seaboard, of $70.32, delivered Pittsburgh, it is doubtful if much more than $70 delivered to-day could be obtained for the domestic product. Very little interest is noted in other ferroalloys. Makers of 50 per cent ferrosilicon are not publicly quoting less than $65 furnace, freight allowed, but there has been no business recently to support this quotation. Spiegeleisen is offered at $26 for average 20 per cent material, but does not find much demand.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent $68; 76 to 80 per cent British ferromanganese, $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $26 furnace; 16 to 19 per cent, $25; 50 per cent ferrosilicon, domestic, $60, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Small lot inquiries for sheet bars are fairly numerous, in keeping with the better demand for sheets. The bulk of recent business has been done at $30, f.o.b. maker's mill, and this means f.o.b. Youngstown, in view of the fact that makers in that district have taken a part of the business. It is not possible to quote this price, f.o.b. Pittsburgh, because makers here will not go that low to secure business. Too little is going on in billets and slabs definitely to determine prices. It is said that a really desirable tonnage would develop a price of less than $30 for 4-in. rerolling billets, but, on the other hand, a recent bid of $28 Pittsburgh, against a substantial tonnage was turned down without consideration. Demand for slabs has rarely been as limited as it is at present. The claim is made that with plates selling at 1.80c. base and bars at 1.75c., there is not much profit in billets at $30 or slabs at $31, the present quotations.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $30; 2 x 2-in. billets, $32; Bessemer and open-hearth sheet bars, $30 to $32; slabs, $31; forging billets, ordinary carbons, $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The price of $42 Pittsburgh for No. 5 common soft rods still is the public quotation of all makers, but there is not enough business to provide a real test of this figure. We note a fair sized sale of some screw stock rods at $47, Pittsburgh, which on the basis of the differentials would support a price of $42 for ordinary soft rods. At the same time, the opinion is pretty common that an inquiry for 2500 to 5000 tons would bring concessions. Rods for export are said to have been offered at $38, Pittsburgh, for soft rods, and around $45 for carbon rods. Prices are given on page 435.

Structural Material.—Fabricating interests here generally report a fairly good inquiry but that they are getting no important awards. Bids were opened yesterday against the 8-story addition to the store of Joseph Horne Co., which will take about 3000 tons of steel, but no information yet is available as to who is the low bidder. Bids will be opened by the County Commissioners next Monday for a new bridge over the Allegheny River at Sixteenth Street, for which 5000 tons of steel will be wanted. There is little real activity in plain material but most makers report orders for small tonnages to be somewhat more numerous than they were recently. The going price on such lots is 1.85c., but the belief still is prevalent that considerably less could be done on sizable tonnages. Prices are given on page 435.

Steel Skelp.—A Pittsburgh district maker of lap-welded boiler tubes recently closed for a fair sized tonnage of skelp at 1.90c., Pittsburgh. Material for this use is of lighter gage than that employed in making standard pipe, and consequently commands a premium over pipe skelp because of the heavier labor charge. Pipe skelp is available at 1.75c.

Iron and Steel Pipe.—As is the case with almost all finished steel products, there is a fairly good run of small orders in standard steel pipe, but all makers note a tendency on the part of distributers merely to order supplies as they are needed, and no especially large individual orders are coming in. Since a good many of the current demands can be met from stock, mill operations do not increase much. There is good observance of the July 7 card on standard pipe, but on line pipe, prices vary considerably with the different makers, just as they have for some time past. Demand for oil well tubular goods remain extremely slow. Makers of wrought iron pipe are getting more business, but as is the case with steel pipe, the orders are more numerous than large. Discounts are given on page 435.

Iron and Steel Bars.—Rumors are common that less than 1.75c. is being done in mild steel bars, but they find no verification, as far as the general run of current orders are concerned, by makers in this district. While buyers seem to have fixed upon 1.50c. as the ultimate price, there are no makers willing to entertain within several dollars a ton of that figure and in support of the assertion that 1.75c. is being done more generally, it is pointed out that the Ford Motor Co., which is one of the largest buyers of the moment, is paying the latter price. Reinforcing bars occasionally sell down to 1.70c., base, although the more common quotation still is 1.75c. Makers of iron bars still are endeavoring to hold to 2.25c., Pittsburgh, for refined iron in carload lots. Chicago advices are that common iron bars recently sold there at 1.62½c.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets 1.70c. to 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. to 2.40c. in carloads, f.o.b. mill, Pittsburgh.

Nuts, Bolts and Rivets.—It is impossible to record even the slightest betterment in business and prices are extremely indefinite as far as Pittsburgh makers are concerned, most of them having shut down rather than pile up stocks at current costs and possibly carry them for a long time. Most makers actually are out of the market for the time being and are not making quotations. Prices and discounts are given on page 435.

Steel Rails.—The market for light rails still is dull and unsettled. Steel companies who are regular producers of these sections are quoting 1.85c. Pittsburgh for 25-lb. to 45-lb. rails. Against this, however, is an offering by one of the smaller makers of rails rolled from guaranteed soft steel at 1.60c., mill, or about 1.75c., Pittsburgh. Mills rerolling old rails also are on a basis of 1.60c., but since the railroads are not pulling up many heavy rails, the rerolling mills only occasionally can offer light sections of more than 30-lb. to the yard. Specifications against orders for standard rails are slightly larger than they have been.

We quote 25 to 45-lb. sections, rolled from new steel, 1.85c.; rolled from old rails, 1.60c. to 1.75c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—Orders are more numerous, but they leave much to be desired both individually and in the aggre-

gate. While 1.85c. is the common asking price few buyers are forced to go that high even on small tonnages. We note a sale of a couple of carloads to a tank and stack builder at 1.80c. and there is still a common belief among buyers that they could obtain a lower price if they had sizable tonnages to place.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Wire Products.—Orders with all makers in this district are more numerous than they were recently, but they run entirely to small lots for immediate shipment, and since manufacturers can supply them in most instances from stock, they do not mean any material increase in mill operations. Nail orders are comparatively good, but there is a fair sprinkling of plain, galvanized and barbed wire business. Talk of price cutting still persists, but does not find confirmation.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Sheets.—Although further expansion is noted in the number of orders and they are coming alike from jobbers and consumers, there continues to be more or less cutting of the regular market bases of 3c., 4c. and 2.40c. respectively, for black, galvanized and blue annealed. Concessions from these prices are slight in black and galvanized sheets but in blue annealed the competition from plate makers is rather sharp and to hold regular customers sheet makers have gone as low as 2.25c. base. Orders in all cases are for quick shipment and to a large extent are made from stock. Mill operations, consequently, are not much heavier than they were recently. Prices are given on page 435.

Tin Plate.—Orders for small lots for prompt shipment are coming along fairly well but there is no gain in business for future shipments. Makers report no difficulty in obtaining $5.25 per base box, Pittsburgh, on standard cokes. Not much export business is developing as Welsh makers are quoting more attractive prices.

Hot Rolled and Cold Rolled Strips.—Regular makers of hot rolled strips regard the market as 2.40c. base, Pittsburgh, and are not disposed to cut this price. However, there are some companies with equipment for rolling hoops and bands and plates which are actively soliciting business in strips and going as low as 2.25c. to secure orders, and occasionally regular makers meet competition to hold regular customers. Competition is not so keen in cold rolled strips, and the market is fairly steady at 4c. base, Pittsburgh.

Cotton Ties.—It develops that shortly after the opening of the season on the basis of $1.35 per bundle of 45 lb., Pittsburgh, the market settled to $1.30, partly in keeping with other merchant mill products, and also because of German competition. The August delivery price, therefore, is $1.31, the carrying charge being 1c. per bundle per month.

Spikes.—The New York Central Railroad recently closed with a Pittsburgh maker for 21,500 kegs of standard spikes, at 2.75c. base. No other important sales recently have been made and such inquiries as are coming out are for small lots, and are not very numerous. Inquiry for small spikes is reported to be somewhat better than it has been. Track bolts recently went to 3.25c. on a sale of 2000 to 3000 kegs, but this is below the price ideas of most makers in this district, some of whom are not willing to go below 3.75c. base on carloads of a size. Prices are given on page 435.

Boiler Tubes.—Business still is of rather limited proportions, although in the past week or so orders have increased in number if not in size. On lap-welded steel tubes prices still favor buyers, and on seamless tubes conditions are very similar. Discounts are given on page 435.

Cold Finished Steel Bars.—A strong effort is being made by makers to maintain a base of 2.60c., Pittsburgh, and on small tonnages this price is the rule. However, there have been concessions of $2 to $4 per ton from this price on desirable business, and it is probable that the lower prices would be repeated on inquiries of an attractive character.

Hoops and Bands.—The general quotation of makers still is 2.40c. base Pittsburgh on both products, but a quotation of 2.25c. recently made to large cooperage interests by some makers failed to bring the orders, the word being that the business was placed for less money. Apparently some mills are taking business based upon the bar card instead of the hoop and band card. On the other hand, the Carnegie Steel Co. claims to be getting business at 2.40c. base.

Coke and Coal.—The American Rolling Mill Co., Middletown, Ohio, is considering blowing in one of its furnaces at Columbus, Ohio, and has put out an inquiry for 10,000 tons of coke for September shipment. The Thomas Iron Co. also is reported to be in the market for a round tonnage. Outside of these inquiries the market presents no new features. One inquiry is regarded here as nothing more than a "feeler" and that quotations made by Connellsville operators will be used as a lever to pry down prices from a more convenient source of supply. It is doubtful if the operators will name a very low price since few would be inclined to light up idle ovens for merely a month's run. The spot furnace market still is quotable at $2.75 to $3, some being able to obtain the latter price, while others find that disposal of surplus tonnages is not possible at much above $2.75. There is a steady business in foundry coke with small lot buyers paying $4.25 to $4.50 and those able to provide fairly large tonnages cover them from $3.75 to $4. The coal market does not change much except that there are rather more inquiries for future shipments, some consumers being inclined to build up reserve stocks. Mine-run steam coal is quotable from $1.50 to $2, by-products within the same range, and gas coal from $2 to $2.50. Slack grade is quotable at $1.75 for steam and $1.85 for gas.

Old Material.—The stronger tendency in pig iron prices due to the reduction in available supplies is finding reflection in a more active and a stronger market for old material. Advances of at least 50c., and in most cases $1 per ton, from last week's levels, are noted as the larger demand has disclosed only limited tonnages of scrap available for early delivery. A number of dealers here are trying to buy heavy melting steel at $13, f.o.b. the plant of a large Pittsburgh independent steel company, but are finding it rather difficult to uncover supplies at that price. Several dealers with yards in this district have rather sizable stocks of open hearth grades, but as it cost well above current levels, the market would have to move up to a basis of at least $17 Pittsburgh for heavy melting steel before any of these stocks would become available. A West Virginia steel maker recently paid $10.50 delivered for compressed sheets, $8 delivered for machine shop turnings, and $8.75 for short shoveling turnings, but it is doubtful if those prices could be repeated today, the average price idea of most dealers being well above these figures. The general market is aided by the fact that current offerings run small, rarely reaching a total as large as 2000 tons.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola size	16.00 to 16.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	15.50 to 16.00
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron axles	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.00 to 8.25
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	9.50 to 10.00
Short shoveling turnings	8.75 to 9.25
Heavy breakable cast	14.50 to 15.00
Stove plate	12.00 to 12.50
Cast iron borings	8.50 to 9.00
No. 1 railroad wrought	12.00 to 13.00

Chicago

CHICAGO, Aug. 16.

It develops that producers of merchant pig iron booked a substantial tonnage just prior to the advance a week ago, one order from a steel company calling for 10,000 tons of basic and another from a Wisconsin melter amounting to 5000 tons of foundry. There continues to be active inquiry for pig iron and some orders involving several hundred tons have been closed at $20 base, Chicago furnace. Producers are holding firm at the new price and it is intimated that a further advance to $21 may be made.

Demand for finished steel has not shown a change similar to that which has taken place in the pig iron market. Except for railroad car construction and repair work, which is gradually increasing in importance, there is little in sight which will call for any considerable tonnage of plates, structural material or merchant bars. Reinforcing bars are in fair demand, however, but in the absence of purchases of merchant bars by manufacturers, there is by no means enough bar business to go around and competition among mills is keen. Evidently reflecting an increase in dwelling house construction, sheet metal shops are busy and are buying fair tonnages of sheets. There is also better demand for light plates.

The price situation has undergone little material change. Sheets are firmer but the same cannot be said of plates, structural material and bars. Wire products, the demand for which has been maintained, are holding more steadily than any other finished commodity. Structural lettings are still too light to give stability to the market. The successful bid on 971 tons for the Ruggles & Radmaker salt plant, Manistee, Mich., was $70 erected. The American Bridge Co. took the business.

Reduced freight rates on steel and pig iron to the Pacific Coast have been brought one step nearer by the transcontinental freight committee's approval of a proposed cut averaging 33 1/3 per cent. The rate on plates, structural shapes and bars is brought down to $1 per 100 lb. and on pig iron to 90c.

Mill and blast furnace operations in this district are substantially unchanged.

Pig Iron.—As noted a week ago the advance in local iron brought considerable business to a head. Probably the largest individual order taken was 10,000 tons of basic bought by a local steel plant. A Wisconsin maker of sanitary goods closed for 5000 tons of foundry. While buying has not been so brisk during the past week as it was just before the advance, inquiries are numerous and some fair-sized lots have been purchased, including one of 800 tons of foundry iron. Outside of the agricultural implement manufacturers, there are few melters with heavy stocks of iron in their yards or on order. Some of these have already entered the market for their needs and others are expected to do likewise. That foundry operations are slowly improving is evidenced by a sustained betterment in the demand for coke. During the first fifteen days of this month, the local by-product maker shipped over twice the tonnage of coke shipped to melters during the first half of July. The change that has taken place in the pig iron market may be best appreciated by recalling conditions 90 days ago. Then the only purchases of any size were by radiator and boiler manufacturers. Since that time, however, buying has slowly increased, at first being confined largely to carload orders and later developing to the point where orders of from 100 to 1000 tons became more numerous. There are still many foundries that are idle but the progess that has been made up to date is impressive. Local furnaces are holding firmly at the new price of $20 and it is intimated in some quarters that prices may be again advanced to $21, base. With a sale of a carload of low phosphorus at $30, furnace, about two weeks ago, one Ohio producer disposed of the last of its yard stocks and, not being in blast, is now out of the market. Other makers are quoting $36 to $37, furnace. Some resale low phosphorus has been offered at $34, Chicago, but the tonnage is not large.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos	20.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent, copper free	$36.00 to 37.00
Silvery, sil. 8 per cent	31.82

Ferroalloys.—There has been no further activity in any of the ferroalloys. The Griffin Wheel Co. bought ferromanganese at $68, delivered, instead of $71, as reported last week. Spiegeleisen 18 to 22 per cent is quoted at $26 to $28, furnace, varying freight from different producing points bringing the delivered price to $36 to $37.

We quote 78 to 82 per cent ferromanganese, $68 to $71 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Rails and Track Supplies.—The Missouri Pacific has bought 2500 tons of tie plates at a price reported not to exceed 2c., mill. The order was divided between a Chicago and a Birmingham Mill. The New York Central has placed 22,000 kegs of track spikes with a Pittsburgh mill at 2.50c., f.o.b., Pittsburgh. Demand for track supplies is light and competition on business offered is sharp.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills.

Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Plates.—Railroad car repair programs continue to bring tonnage into the market. A car repair shop in this vicinity is inquiring for 2500 tons of plates. Orders for new cars to be let by the Kansas, Oklahoma & Gulf, will involve 5000 tons of plates, shapes and bars. The Chicago, Rock Island & Pacific is asking for figures on the construction of 200 hopper bottom coal cars of 50 tons capacity and on the repair of 250 50-ton general service cars. The Burlington is inquiring for material and miscellaneous parts for 100 Gondola cars which will be repaired in the railroad's own shops. Prices on tank plates still lack stability. Between 1.60c. and 1.65c., Pittsburgh, has not been uncommon, but some business has been closed at even lower figures, while other orders have been placed at the full official price of 1.85c., Pittsburgh.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Bids were taken on the commercial and technical high school, Omaha, last week, a project involving 1700 tons of fabricated steel and 1000 tons of reinforcing bars. No award has been made and it is intimated that it has been decided to go ahead with only three out of the five units comprising the project. The demand for fabricated steel shows no change for the better and shops continue to name rock bottom prices to secure business. On plain material 1.60c. to 1.65c., Pittsburgh, is not unusual, but some business still brings the full official price of 1.85c. Recent fabricating awards include:

Utah Oil Refining Co., three tanks, Salt Lake City, 656 tons, to American Bridge Co.

St. Louis County, Minn., Congdon Boulevard and Babcock Highway bridges, 377 tons, to Illinois Steel Bridge Co.

Highway truss span for Leonia Bridge in Idaho, 148 tons, to Illinois Steel Bridge Co.

Music Hall, University of Minnesota, Minneapolis, 108 tons, to Crown Iron Works.

Building for new Rosary College, Oak Park, Ill., 200 tons, to Worden Allen Co.

Sixth Street bridge, Racine, Wis., 200 tons, to Worden Allen Co.

Addition, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., 80 tons, to Worden Allen Co.

Pending business includes:

Frost National Bank, San Antonio, Tex., 382 tons.

Auditorium and Music Hall, College of Industrial Arts, Denton, Tex., 225 tons.

George Washington Hotel, Washington, Pa., 1000 tons.

Western Maryland Railroad, grain elevator, Baltimore, 265 tons.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts, Nuts and Rivets.—Railroad inquiries are increasing but in most cases they call for prompt shipment to apply against immediate requirements. Business from the automobile industry is of a similar character. Some buyers, however, regard present prices as low and have asked for fourth quarter contracts to protect them against possible advances. Current quotations continue to vary widely, but with slight modifications the discounts and prices published last week are representative. Rivets have firmed up slightly since a week ago and are quoted at $2.50 for structural and $2.60 for boiler rivets. The ruling quotation on large machine bolts appears to be 70 and 10 per cent off list. Attractive inquiries are bringing out exceptionally low prices, which, however, can hardly be considered as ruling quotations. Thus a Western railroad got a price of $6.10 off list on a desirable order for blank hot pressed nuts.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Keen competition has brought out wide variations in prices on mild steel bars. Quotations of 1.55c. to 1.65c., Pittsburgh, are not uncommon, but some orders have been booked at both higher and lower quotations. Railroad car repair work is resulting in the closing of some bar business and there is an encouraging number of reinforcing projects in the market. Bids will soon be taken on a sewage disposal station at Milwaukee, which calls for 1000 tons of reinforcing bars. Railroads continue to buy bar iron rather cautiously with the result that mill operations are still of an intermittent character. Prices are about the same as a week ago, possibly slightly weaker. There has been no change in the demand for rail carbon steel bars and 1.75c., mill, apears to be the top of the market.

Mill prices are: Mild steel bars, 1.55c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.38c. base.

Sheets.—There is more activity in sheets than in plates, shapes or bars and prices are holding more steadily.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Wire Products.—Mills are maintaining the improved rate of bookings noted last week and prices are steady. Chicago, Minneapolis, St. Louis and Eastern railroads have all been buying a little more freely of late. Their purchases are confined principally to nails, barbed wire and fencing. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 435.

We quote warehouse prices, f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Cast-Iron Pipe.—The Lynchburg Foundry Co., which, as was announced 2 weeks ago, was low bidder on 1500 tons for Detroit, has been awarded that tonnage. Milwaukee has let 3510 tons of pipe and fittings to the United States Cast Iron Pipe & Foundry Co. Most of the tonnage is made up of 54-in. Class C pipe, on which the accepted bid was $44.85, or approximately $35, Birmingham. The fact that so large a size brought out so high a price is regarded as evidence that the market has passed its low point and is now on a higher level. Ruling prices appear to lie between $33.50 and $36.50, Birmingham, for 6-in. and larger.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—Steel foundries and mills are feeling out the market for material, but are reluctant to pay the prices at which dealers are now holding. As a result trading is confined largely to the sellers, who are laying in stocks at advanced quotations in the belief that the market is on an upward swing. Thus far there has been no increase in mill operations to justify this belief and improvement in foundry operation has been slight. With the market in the hands of the dealers, prices of most grades have advanced from 50c. to $1 a ton. Railroad lists include Rock Island, 3000 tons; Northern Pacific, 2000 tons; Santa Fe, 1500 tons; Chicago Great Western, 600 tons; Soo Line, 400 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.50
Steel rails, less than 3 ft.	12.00 to 13.00
Heavy melting steel	10.75 to 11.25
Frogs, switches and guards cut apart	10.75 to 11.25
Shoveling steel	10.00 to 10.50
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	9.50 to 10.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

Federal Judge Westenhaver yesterday disapproved the application of a number of creditors of the Standard Parts Co. for the immediate sale of the property. The court granted the application of F. A. Scott, receiver, to pay creditors 10 per cent of the amount due them. The creditors will receive about $1,000,000 at this time.

British coal raised during the 13 weeks of the miners' strike is reported at 179,100 tons, or an average of 13,800 tons per week. This compares with previous and subsequent weeks as follows:

March 12	4,277,200 tons	During strike	13,800 tons
March 19	4,240,400 tons	July 9	2,355,000 tons
March 26	3,660,000 tons	July 16	2,928,000 tons
April 2	1,950,100 tons	Dec. 18, 1920	*5,307,000 tons

*The largest weekly figure of the past year.

Opposition to the proposed pontoon bridge across the Hudson at Yonkers is based on the narrowness of the channel through the draw span. Based on a floating structure—one of the wooden ships built by the Shipping Board—such a draw could not be given so long a span as if it were supported on the rigid foundation of a permanent structure.

George J. Hagan Co., Pittsburgh, recently secured a contract from the Coonley Mfg. Co., Cicero, Ill., for a 225-kw. electric vitreous enameling furnace.

New York

NEW YORK, Aug. 16.

Pig Iron.—Some fairly good-sized orders for foundry iron have been placed within the week, a few of them running from 500 to 1000 tons. A part of the week's business went at $18, Buffalo, and $18.50, eastern Pennsylvania furnace, for No. 2 plain and about 50c. advance for No. 2 X, but these prices are now said to have been withdrawn and a few orders have been taken at 50c. and $1 a ton higher. One sale of 1000 tons for delivery in Connecticut figured back slightly under $18, Buffalo. A Buffalo steel company, which had offered iron at $18, furnace, now quotes $20 as its minimum, while an eastern Pennsylvania furnace, which sold No. 2 plain at $18.50 and No. 2 X at $19, has disposed of the block of iron which it intended to sell at these prices and has raised its quotations $1 a ton. While the demand for iron is scarcely large enough to support an advancing market, the action of producers in withdrawing their low prices has had a favorable effect upon sentiment in the trade. Some buying has been done by consumers who recognized that such low quotations could not be expected to prevail for long in view of the high producing costs; in a few instances consumers have availed themselves of the opportunity to cover their requirements for the next few months, this being the first forward buying that has been done in a considerable period, probably a year, at least. In line with a firmer tendency in pig iron prices, producers of coke have also stiffened in their quotations. Foundry coke is now quoted at $4 to $4.50, Connellsville, the former minimum of $3.75 seeming to have disappeared. At any rate it probably would require a fairly good tonnage to bring out that price again. Furnace coke is still obtainable at $2.75 to $3, Connellsville.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	28.16 to 29.16

Ferroalloys.—New inquiries for ferromanganese continue to be reported, two of which call for 200 and 150 tons, respectively. Sales of carload lots are reported at the prevailing quotations. Demand for spiegeleisen is light and the manganese ore market is stagnant, it being impossible to sell any offerings that are available at prevailing quotations, and it is believed that 20c. per unit, seaboard, could easily be done. The 50 per cent ferrosilicon market is confined to small lot inquiries and sales at the prevailing quotations. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$65.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Ferrotungsten, per lb. of contained metal	50c. to 55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—A fairly good demand for pipe from gas and water companies exists, but municipal work is unimportant. Yonkers, N. Y., will let an order this week for 230 tons. The prices quoted apply usually to carload lots; on open bids for municipal work lower quotations have been made. We quote per gross ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30 with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—Mark Eidlitz & Co., general contractors for the new Federal Reserve Bank in New York, have asked for bids for the steel work, which will total about 15,000 tons, of which about 12,000 tons will be for the building and 3000 tons for the vaults. An addition to the Bamberger store, Newark, which originally called for 7000 tons of steel, is again in the market, the steel requirements having been pared to about 1800 tons. Three schoolhouses in Brooklyn, totaling about 1000 tons, and a building at Cornell University, Ithaca, N. Y., about 500 tons, are up for bids. No important jobs have been let within the week. More railroad car repair work is coming out, the Lehigh Valley Railroad having distributed 3200 cars among several companies as follows: American Car & Foundry Co., 1000 steel underframe box cars and 500 steel hopper cars; Magor Car Co., 1000 all wood box cars; Buffalo Steel Car Co., 500 steel hopper cars, and Lehigh Structural Steel Co., 200 steel hopper cars. About 6000 tons of steel will be required for the work. The Delaware, Lackawanna & Western has divided orders for 1500 cars for repair among the Buffalo Steel Car Co., Magor Car Co. and American Car & Foundry Co., 500 to each. The Pittsburgh & West Virginia has awarded an order for the repair of 250 steel hopper cars to the Pressed Steel Car Co. The Chicago, Rock Island & Pacific is in the market for 200 new composite gondola cars and the Kansas, Oklahoma & Gulf is inquiring for 250 gondolas. The inquiry of the Western Maryland Railroad for 5000 new car bodies is still active, and the order may be placed shortly. The demand for finished steel continues very light. Though some in the trade believe that prices are firmer than they have been for some months, there is not sufficient business in the market to indicate any definite trend one way or another. Some of the mills appear to be holding firmly at 1.75c. for steel bars and 1.85c. for plates and shapes, but there are intimations that these prices have been shaded from $1 to $3 a ton, particularly on plates, for which there is almost no demand worth mentioning. Some of the car repair work recently let and noted in this paragraph may bring out a few inquiries. Bar iron is available at 1.70c., Pittsburgh, but demand is limited to very small lots.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates, 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.08c.

Old Material.—A distinctly better tone is evident in the market, according to most dealers, despite the fact that order books show little change for the better. A tonnage of 1500 to 2000 tons of relaying rails was offered last week by the New York Central Railroad and is said to have been placed. A railroad recently sold a tonnage of scrap at $1.25 per ton higher price than was obtained for the same kind of material on Aug. 2. There is practically no buying by local foundries and prices of dealers for this purpose are largely nominal.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.50 to $8.75
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	5.00 to 5.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	8.50 to 9.50
Locomotive grate bars	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Warehouse Business.—Although there is a more optimistic tone to the market, inquiries continue in about the same volume. Prices are unchanged, all warehouses meeting competition where necessary. Galvanized sheets have registered another slight decline, No. 28 gage being obtainable as low as 5c. per lb.,

although the majority of warehouses continue to quote 5.25c. per lb. Brass and copper warehouses report no change, except for copper sheets, which in some cases are quoted as low as 20c. per lb. Sales of wrought iron and steel pipe show no increase, but some dealers expect August to show better results than July, which was extremely dull. We quote prices on page 450.

High Speed Steel.—The market is entirely nominal, 18 per cent tungsten high speed steel continuing at 90c. to $1 per lb., New York, with sales reported under special conditions at slightly lower prices. Inquiries show a slight increase.

St. Louis

ST. LOUIS, Aug. 16.

Pig Iron.—An improvement in the pig iron market is indicated by some heavy buying during the week at increased prices. The St. Louis Coke & Chemical Co. reported on Wednesday the sale of 6250 tons of foundry iron at the market levels of $22.88 to $23.38, f.o.b. St. Louis. Most of this was of 1.75 to 2.25 per cent silicon. The sales were made in lots ranging from 1250 to 2000 tons. This company also sold a number of smaller lots of up to 100 tons. Local brokers purchased from another concern 3500 tons of foundry iron at $18.50, f.o.b. Chicago. Foundries catering to railroad work are increasing activities. The Southern Wheel Co., St. Louis, which has been running as low as 10 per cent of normal, is now operating at a 50 per cent rate. The Mt. Vernon (Ill.) Car Works are now operating at full capacity; the Hannibal (Mo.) Car Wheel Co. has resumed operations after having been shut down for some time, and the Barry Iron & Steel Co., St. Joseph, Mo., is now operating. A survey made of the Davenport, Ia., Tri-cities district indicates some improvement in the agricultural implement district. Their stocks are low and they are buying a few cars of foundry iron. Other inquiries are out, and there is generally a better feeling in the pig iron market. The sale is reported of one car of Bessemer ferrosilicon at about $40 and one car of ferromanganese at about $75. There is an inquiry out for another car load of ferromanganese.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$22.88 to $23.38
Northern malleable	22 88 to 23.38
Basic	22.88 to 23.38
Southern foundry, sil. 1.75 to 2.25	24.74 to 25.74

Finished Iron and Steel.—The market has not shown the activity manifested in the pig iron trade. Local fabricators are figuring on several large-sized jobs and are hopeful. The most important development of the week was the placing of an order for 3000 tons of tie plates by the Missouri Pacific with the Illinois Steel Co. The Missouri Pacific also purchased 2000 kegs of track spikes at a reported price of $2.50, f.o.b. Pittsburgh. The requirements for the new Federal Reserve Bank Building will be approximately 3000 tons of structural steel and 350 tons of reinforcing bars. A very slight improvement is noted in the demand for warehouse steel.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—An increase in the number of inquiries for coke is reported not only from local consumers but from outlying territory. There is an inquiry out for 2500 tons from a Western smelter and one for 5000 tons from an Illinois operator, with various other requests of from 300 to 400 tons. Consumers in some instances are asking now for shipment of orders that had been temporarily held up. Prices are unchanged, Standard Connellsville foundry coke is being quoted at $4 to $4.50 ovens, with special brands up to $5.25, and the furnace product $1 lower.

Old Material.—There has been a decidedly better tone, due to the fact that some dealers have been buying railroad material at advanced quotations with the expectation of a rise in the market. However, all of the large consumers still decline to pay any advance for material, contending that the small amount of business on their books does not justify any advance in old material prices. It will be necessary for dealers either to lay this material down in their yards or sell at a loss to consumers. The following railroad lists are before the market this week: Baltimore & Ohio, 9000 tons; Great Northern, 2000 tons; Northern Pacific, 2500 tons; C. I. & L. Railway, 800 tons; Kansas City Southern, 150 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$12.50 to $13.00
Steel rails, rerolling	11.50 to 12.00
Steel rails, less than 3 ft	10.00 to 10.50
Relaying rails, standard section	28.00 to 30.00
Cast iron wheels	11.00 to 11.50
No. 1 heavy railroad melting steel	9.50 to 10.00
No. 1 heavy shoveling steel	9.00 to 9.50
Ordinary shoveling steel	8.50 to 9.00
Frogs, switches and guards, cut apart	9.50 to 10.00
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	$5.50 to $6.00
Iron angle bars	10.50 to 11.00
Steel angle bars	8.00 to 8.50
Iron car axles	16.00 to 16.50
Steel car axles	12.00 to 12.50
Wrought iron arch bars and transoms	12.50 to 13.00
No. 1 railroad wrought	9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Railroad springs	9.50 to 10.00
Steel couplers and knuckles	9.50 to 10.00
Locomotive tires, 42 in. and over, smooth inside	8.50 to 9.00
No. 1 dealers' forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	5.50 to 6.00
No. 1 railroad cast	11.50 to 12.00
Stove plate and light cast	10.50 to 11.00
Railroad malleable	9.00 to 9.50
Agricultural malleable	9.00 to 9.50
Pipes and flues	6.50 to 7.00
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	7.50 to 8.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	7.50 to 8.00
Horseshoes	9.50 to 10.00
Railroad brake shoes	8.00 to 8.50

Buffalo

BUFFALO, Aug. 16.

Pig Iron.—Announcement by a steel interest last week of intention to enter the selling field in foundry iron was followed by considerable business; approximately 18,000 tons of various grades were sold within the week at a base price ranging from $18.50 to $19.50. One of these sales was a lot of 5000 tons to an Eastern buyer. Other producers though encouraged have not found a great deal of buying. A sale of 200 tons of low silicon iron at $20 represents the sole transaction with one furnace but it received a number of inquiries from buyers who have been out of the market for some months. Inquiry and sales have fallen off; the total tonnage involved in inquiries is 20 per cent less than for the previous week. While the tendency of local producers is to refrain from future commitments, there is rumor of a sale of 1500 tons for delivery in April, 1922, at a price of $18.50. A furnace blown in Aug. 1 and producing basic iron may turn out foundry iron after its basic needs are filled.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil	19.00 to 20.00
Basic (nominal)	20.00 to 21'00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—There is little question that there is a greater volume of business with a

majority of sellers. In pipe and tubular products, structural shapes, sheet piling and wire, the improvement is manifest and there has been some increased demand for cold rolled material calling for immediate delivery. An interest sold 800 tons of billets, its first sale of this material this year. Several good-sized structural jobs, including one requiring more than 1000 tons of reinforcing bars for a terminal elevator in Baltimore, are noted. One inquiry is for 500 tons of bars for a Rochester apartment house. Tin plate inquiry is quiet and the same apathy in bolts and nuts is still shown. In black, galvanized and blue annealed sheets an increase is perceptible. A number of pipe inquiries in Canada for export are receiving attention. With one mill there is little moving in bars, plates or shapes, but up to date the current month shows improvement over its predecessor. Each mill of the largest local interest will run for a time in August.

Warehouse Business.—Increases in orders and inquiry continues with especially good business in sheets and structural shapes. Prices seem to be in favor and the tonnage per order shows improvement. Speculation is about evenly divided as to the possibility of any further price reductions. The better movement out of warehouses is regarded as more definite than any previous flurries this year.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets No. 10 gage 3.45c.; galvanized steel sheets, No. 28 gage, 5.30c.; black sheets, No. 28 gage, 4.30c.; cold rolled strip steel, 6.40c.

Old Material.—There is a more optimistic feeling and general belief that a more lively market is within sight. Inquiry has been received from points in the Pittsburgh and Valley districts for steel, borings and turnings. However, they are regarded as of much value to Buffalo dealers as the freight rate is prohibitive; they would have to sell steel at a figure near $8 to compete for the business. The general tendency is not to sell below the present quotation, about $10.50.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4 00 to 5.00
Heavy axle turnings	8.00 to 9 00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Birmingham

BIRMINGHAM, Aug. 16.

Pig Iron.—Sales of the past week did not total large, but the $19 base was maintained consistently and efforts to obtain concessions were futile. One maker sold 1000 tons in the first three days of the week, one order being for 300 tons for export out of New Orleans, two for 100 tons and the remainder for carload lots. Melters who wished a certain analysis and could not get that accepted the nearest substitute. Nearby consumers, who declared they would not buy at $19, wired orders at that base shortly after declining to place orders at that figure. The ill-assortment of stocks has produced its effect among the buyers. The disposition to get into the market for more than immediate requirements is beginning to manifest itself. Southern foundries are melting more iron. The market can the better afford to be stiff because it is confined to the South at this time owing to freight rates. The cast iron pipe makers seem on the eve of purchasing heavily following an increase in bookings that seems imminent. The melt of radiator plants and stove works is also larger than it has been. American sugar refineries have placed orders for considerable machinery in this district and that requires much iron. Southern iron makers will be slow in resuming, preferring to lose a little business in the hope of a market somewhat above the present level. The Woodward Iron Co. is understood to have the business in sight for the operation of its two merchant stacks. Several export inquiries have been received, but destination is not known. The Pacific Coast continues to take small amounts of iron on vessels taking cargoes of pipe and steel out of Mobile for that destination.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	32.00

Cast-Iron Pipe.—Phoenix, Ariz., has sent in specifications for 3000 tons of pipe to the United States Cast Iron Pipe & Foundry Co., and the National Cast Iron Pipe & Foundry Co. has taken numerous Middle West orders and is operating at around capacity. The Pacific Coast is taking about 4000 tons of high pressure pipe from the United States, the American, and the National companies. The base remains at $35 for 6 in. and upward, following acceptance of some business under that. The market seems to be hardening.

Finished Material.—The Tennessee company will operate its Bessemer plate mill in full this week in addition to continuing a rate of 50 per cent of capacity in other finishing mills. It has a rush order for 13,000 tons of heavy rails for the Huan Shan railroad in China. The order for 12,000 tons for Manchurian railroads has been delivered. The delivery of 12,000 tons of rails to Alaska will be completed out of Mobile this week. Ingalls Iron Works, steel fabricators, are at capacity on office and industrial buildings. The Gulf States Company's blooming mill resumed this week. Demand for wire mill products and for sheets has improved. Jobbers in the Southeast are placing larger orders.

Old Material.—Inquiries for stove plate and cast are fairly good, but steel remains inactive. Dealers have small stocks owing to heavy freight rates, which discourage country sellers from sending in supplies. Offers of 1000 cars of scrap from sawmills were not accepted on this account. Except as to stove plate and cast scrap the price list is nominal.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10 00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16 00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9 00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cincinnati

CINCINNATI, Aug. 16.

Pig Iron.—The stiffening of prices in the Chicago market, while it undoubtedly had the effect of bringing out some tonnage for immediate shipment, has not stimulated buying to any great extent. There is some evidence, however, that the situation is improving, as there is more demand for malleable iron and alloys. Stove foundries are now increasing their melt, and it is expected that inquiries from this source will soon be received. During the early part of the week some fair tonnages were disposed of. An Indiana melter took 1000 tons of malleable iron, and a northern Ohio melter 400 tons of foundry. An eastern Ohio interest was a purchaser of 300 tons of Buffalo iron and a West Virginia melter bought 200 tons of southern Ohio iron. Several sales of from 100 to 200 tons were made in this territory, several of them being made on the basis of $20, Chicago furnace. There is very little interest in Southern iron, and while reports are current that $18 has been quoted, there is apparently no foundation for them, as most furnaces are holding firm at $19. In the southern Ohio district the market remains firm at $20 to $20.50 with no disposition to quote these prices for extended delivery. One interest in the last few days turned down offers to buy 1000 tons for delivery during the rest of the year at today's prices.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—An inquiry for approximately 1000 tons of plates and 500 tons of structural shapes has been received from a manufacturer in this district. A Kentucky oil company is understood to have placed a number of oil tanks with an Eastern manufacturer. The tonnage of plates involved was about 900 tons. Some small inquiries for bars and shapes are also being figured on. There is no indication of lower quoted prices than those published recently, although on an attractive tonnage it is said that 1.65c. for bars and from 1.70c. to 1.75c. on plates can be done. Some sheet inquiries have been received and while they are mostly for carload lots for immediate shipment, several 100-ton inquiries are before the trade. While there are reports that prices on sheets are being shaded, most of the orders being placed are at 2.40c. for blue annealed, 3c. for black and 4c. for galvanized. A jobber in this district is reported to have placed an order for 10,000 kegs of nails on the basis of $2.50 per keg, Pittsburgh. Some low prices are being made on light rails and bolts and nuts. It is said that 1.55c. can be done on light rails from some of the smaller mills. Some small orders are being placed and in some instances the full price of 1.85c. was secured. The Big Four Railroad is taking bids on 16,300 angle bars. It is understood that this road has purchased 2500 tons of tie plates from Pittsburgh and Chicago manufacturers. There are no structural inquiries of any size, and no awards have been made. A school building at Dayton, Ohio, which was to have been up shortly, has been postponed indefinitely. The First National Bank of Ashland, Ky., is having plans prepared by Dayton, Ohio, architects for an 11-story office building. Plant operations will not materially change during the week. The American Rolling Mill Co. at Middletown, will have 10 sheet mills on. The sheet mill of the Ashland Iron & Mining Co., Ashland, Ky., is running at approximately 50 per cent of capacity and the plant of the Ashland Steel Co. will run full for this week.

Warehouse Business.—Local warehouses report business as spotty. One day there will be a flurry but the next day business will fall off to practically nothing. Only small orders are being received. No price changes have been made since the ones quoted last week.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—The coke market is dull. A sale of 600 tons of foundry coke was made at $4.50 per net ton Connelsville ovens, and another of 200 tons at $4.15. Producers are less anxious to quote for forward delivery than has been the case recently. Prices are unchanged from last week.

Old Material.—Speculative buying by dealers has given the scrap market some show of activity, but while the price situation may have a firmer tendency, prices are unchanged. Some inquiries for heavy melting steel are being figured on, but the tonnages are not large. There is practically nothing moving in foundry scrap.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

Strikers in Pennsylvania lost $25,413,305 in wages alone, during the first six months of 1921, according to figures compiled by the State Department of Labor and Industry. This loss, resulting from 323 strikes, is said to be greater than the amount for any previous full year, since the figures began to be compiled, in 1916.

Cleveland

CLEVELAND, Aug. 16.

Iron Ore.—All of the older ore selling companies are vigorously opposed to any reduction in prices of ore, and buyers, as a rule, are not urging such action. It is true that one company, which within a few years established offices in Duluth and Cleveland, has offered to sell at a large reduction from the prevailing rates, but no sales are reported and it is not believed that a general reduction would stimulate the market; it is feared that it would cause some banks to ask for additional security on ore on which money has been loaned. The movement continues light and one important shipper which owns 28 vessels and has had six in commission, has now tied up two of the six.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Looking at the market from week to week, it is not so easy to see much change, but taking into consideration a period of several months and all of the territory covered by Cleveland agencies, it is clear that a noteworthy change for the better has taken place. In some cases, sales have increased in three months from 50 to 75 per cent and shipments from 50 to 100 per cent. This week in the immediate Cleveland district, sales are light and shipments fair, but numerous inquiries have been received from, and a considerable number of sales made to, customers outside of the immediate district. A sanitary company has purchased 1000 tons of foundry iron on the basis of $20.50, Valley. Numerous sales have been made from $20.50 to $21, Valley. Some buyers are expressing a willingness to take contracts for round tonnages to be delivered during the next six months at present quotations, but furnaces are slow in making contracts so far in advance.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.00 to 20.50
Southern fdy., sil. 2.25 to 2.75	26.92
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Finished Iron and Steel.—The decision rendered by the Interstate Commerce Commission at Washington yesterday, refusing to authorize the issuing of $60,000,000 in bonds for the construction of the terminal on the Public Square, Cleveland, has removed from the market the largest pending structural contract. The original estimate was for 60,000 tons of shapes, plates and bars. If this project should ever be carried out it will be in the distant future. The 15,000 tons of steel for the Union Trust Co. building is being fabricated, delivered and stored by the American Bridge Co., but unlike the terminal project this one may go forward next year. Reports as to what, if any, progress has been made in the market the past week are conflicting. Most of the mills report a very moderate increase in buying. The car repair work recently awarded, some being taken in this district, has proved disappointing as far as new steel business is concerned, as most of the shops have plenty of steel in stock and they are using it. Prices are perhaps a little bit steadier, but reports of 1.75c. on plates continue to be heard. On hot rolled strips 2.25c. is still quoted. On a power plant at Ashtabula calling for 250 tons of structural steel, the McClintic-Marshall Co. is low bidder. Bids will soon be called for a number of school buildings in Cleveland and vicinity.

Bolts, Nuts and Rivets.—Cleveland manufacturers report a moderate improvement in business, especially in bolts and nuts, and are declining to meet concessions reported in other markets. Rivet manufacturers say that even if it is necessary to continue the present low rate of production, they will not meet the very low prices reported elsewhere.

Sheets.—The Canton Sheet Steel Co., Canton, Ohio, will resume operations in a few days and is buying sheet bars, which the mills have promised to deliver very quickly to meet early requirements. Quotations on sheets remain unchanged at 3c. for No. 28 black, 4c. for No. 28 galvanized and 2.25c. to 2.40c. for No. 10 blue annealed.

Warehouse Business.—Recent reductions in prices have brought out little if any new business and jobbers report the market extremely dull.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.25c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—Activity among dealers indicates that they at least believe that conditions are improving and there also has been a fair amount of buying by consumers. The result is that nearly all prices have advanced and $12.25 seems to be the minimum on heavy melting steel. Other grades show advances of from 25 to 75 cents.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	7.00 to 8.00
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Youngstown

YOUNGSTOWN, OHIO, Aug. 16.

Steel market in this district is still hesitant, though it is much improved over a month ago. The Brier Hill Steel Co. has followed the action of Inland Steel in advancing the price of standard basic pig iron to $20, though the $18 base is still being quoted by other steel works interests.

Through inability to meet delivery requirements, a district sheet maker was compelled to turn down an order for 10 carloads of galvanized sheets offered at 4c. Recent improved buying of steel products has strengthened the scrap market and prices are up from $1 to $1.50 per ton. In finished products sheets are most active.

The Youngstown Sheet & Tube Co., which is supplying the by-product coke for Mary blast furnace at Lowellville of the Sharon Steel Hoop Co., has added a third battery of by-product coke ovens to the active list, making three of six batteries in commission. The gas is being consumed in the pipe furnaces. Previous to its suspension, the Mary stack was run on beehive coke.

An encouraging feature of the black sheet market is the volume of inquiry from consumers in widely separated sections, who have been out of the market indefinitely in many cases. One maker is now rolling an order for 480 tons of black and has another for 350 tons. Several orders involving in excess of 200 tons are now going through the mills. Most of the transactions involve business up to 500 tons.

While jobbers have entered the market more freely, they are still buying largely against requirements and no general buying movement is as yet under way to replenish depleted stocks. Stocks in many cases are unbalanced, while in others they are exhausted.

More activity is being displayed in the strip market, though the Ford Motor Co. continues to take the bulk of the output of the leading district maker. Other interests, however, are entering the market in a quiet way. The price range in hot strip is from 2.25c. to 2.40c., with the spread on cold-rolled from 4c. to 4.25c.

Due to recent revival in buying, manufacturers have made substantial reductions in stocks, especially in sheet accumulations, the price reductions constituting a controlling factor in such movement. One independent interest, for instance, in this territory, recently sold several thousand tons of sheets from warehouse stocks, leaving it only about 3000 tons of such material. This applies to other finished commodities as well, especially where the orders are for small tonnages. Such business is usually transmitted directly from the order departments to the shipping department, and frequently the tonnage is shipped the same day the order is telegraphed. But for this fact, revival in buying the past three weeks would have produced a much larger operating rate.

One maker is rolling No. 9 gage sheet material for frame stock for the Ford Motor Co., this being a small preliminary order to be followed by others if the material is satisfactory. Existing schedules are being largely supported by demand from the automobile trade and any drop in that demand is certain to be immediately reflected in the Valley steel situation.

In the pipe market, lap weld continues to feel the effect of competition from the resale market in the oil fields. Comparatively large tonnages of lap weld pipe have recently been rolled for export to Mexico, while some European pipe has been produced. Butt weld pipe, however, continues to support production in large measure.

Price uncertainties still prevail in plates, the minimum in the Valley being apparently 1.70c., though other makers farther west are quoting lower prices. It is certain that Valley producers would have to make further concessions on attractive tonnage. The plate market is still spotty.

Consumers of tin plate are specifying against contracts but doing little new buying. The price of $5.25 per base box is generally being observed for production plate, though stock plate has sold down to $4.75.

Most of the business in steel bars at this time is coming from the automobile industry for rim sections calling for light material. Some railroad bar business is coming through. The 1.75c. base is being sustained.

Though $32 has been the basis for most of the transactions in sheet bars, the market is definitely trending to a $30 level. Non-integrated sheet makers are taking heavier tonnages.

Activity in the scrap market follows general improvement in steel buying. One company has purchased 2000 tons of hydraulically compressed scrap at prices ranging from $9 to $10.50. Another interest has taken 1000 tons of heavy melting. The market is $10.50 to $11 for hydraulic scrap and $12.75 to $14 for heavy melting.

Boston

BOSTON, Aug. 16.

Pig Iron.—The Whitin Machine Works, Whitingsville, Mass., textile machinery, this week was in the market for 3000 tons of iron, silicon 2.00 to 2.50 per cent, but as far as known has not covered. One 400-ton lot of Buffalo No. 1X sold at $18.50, furnace, and a like lot of eastern Pennsylvania at a low figure to Massachusetts consumers. Inquiries and actual sales otherwise appear to have dwindled to car lots. Buffalo $18.50 iron has disappeared from this market, the company heretofore quoting on that basis now asking $20, furnace for No. 2 plain and No. 2X. Eastern Pennsylvania $18.50 iron also has practically disappeared, and No. 2 plain and No. 2X are now obtainable at $19 and No. 1X for $21, where round tonnages are involved. It is generally conceded by sellers that with the Whitin Machine Works business out of the way, $18.50 eastern Pennsylvania iron will have passed from the New England field. Car lots of eastern Pennsylvania No. 1X sold this week as high as $24.50 furnace and No. 2X at $23.50. One carload of malleable iron was taken by a Massachusetts melter at $19.50, furnace. Those furnaces heretofore offering iron at $18.50 are understood to have secured a sufficient backlog to insure

operations for some time. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$23.06 to $25.56
East. Penn., silicon 1.75 to 2.25	23.06 to 25.06
Buffalo, silicon 2.25 to 2.75	24.46 to 25.96
Buffalo, silicon 1.75 to 2.25	24.46 to 25.46
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	30.16 to 31.16
Alabama, silicon 1.75 to 2.25	29.66 to 30.66

Finished Material.—A slump is noted in structural prospects and 2000 to 3000 tons figured on the past month remains uncovered. McClinitic-Marshall Co. has been awarded 190 tons for an Ansonia, Conn. electric plant. The Boston Structural Steel Co., Inc., Cambridge, Mass., is low bidder on 100 tons for a Great Northern Paper Co. machine shop. It recently was awarded 150 tons for a Northampton, Mass., college building, 100 tons for a Watertown, Mass., school, and about 100 tons for the Atlantic Dye Co., Millington, N. H. Stone & Webster have asked bids on 200 tons for the Ford, Green Island, N. Y., plant. The Lancaster Iron Works, Inc., Lancaster, Pa., is awarded 100 tons sheared plates for water pipes, Searsburg, Vt. Most mills quote plates at 1.85c., Pittsburgh, but 1.75c., was recently named. A Japanese consumer is inquiring on 350 tons, 3 x 6 ft., heavy gage blue annealed sheets. Domestic sheet business is confined to an occasional car-lot. Local July bar bookings were larger than those for June, and August will go well above July.

Warehouse Business.—While consumption of warehouse products in general throughout New England has not increased noticeably this month, better business is hoped for after Labor Day. Stocks of iron and steel bars and hoops and bands are gradually working downward and in certain cases are broken. Those of structural, plates and sheets show little shrinkage from week to week. Large stocks, coupled with keen competition for trade, have forced reductions of 5 to 10 per cent in machine and common carriage bolts and cap and set screws. The market appears amply supplied with wire and cut nails.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—The market for machinery cast is stronger, based on larger inquiries and purchases. Prices for cotton machinery cast are $1.50 to $2 under those for straight metal working machinery cast, the latter being in light supply. Little stove plate is available and prices are higher. Railroad malleable, although inactive, has strengthened with machinery cast and stove plate. Both New England and Pennsylvania consumers are buying borings more freely, one broker alone reporting sales of nine cars this week. On the other hand, machine shop turnings, forged scrap, bundled skeleton, street car axles and shafting have little, if any, call and quotations are largely nominal. One house sold a small tonnage of heavy street railway rails at 1c. per lb. at shipping point, otherwise the market for this old material is quiet. Pennsylvania mills will buy any tonnage of heavy melting steel available at $6.50, but yards, as a rule, are not willing to let go at any such figure.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 17.50
Stove plate	16.00 to 17.00
Railroad malleable	15.50 to 16.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.50
Cast iron borings, chemical	3.50 to 4.50
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 11.50
Rerolling rails	9.00 to 10.00

Philadelphia

PHILADELPHIA, Aug. 16.

A decidedly better tone is in evidence, particularly in the local pig iron trade, which has been encouraged by the marked betterment of demand within the past few weeks. Another week in which sales have exceeded 15,000 tons, including 7000 tons of steel-making iron, has placed the few Eastern furnaces which are in blast in a fairly comfortable position for the next few weeks. The extremely low prices on foundry iron have disappeared and foundry grades are at least 50c. a ton higher than last week with the possibility that the low-priced sellers may put up their prices another half dollar within the week.

Pig Iron.—Another week of fairly good pig iron sales has served to create a better sentiment among sellers, and this is reflected in slightly higher prices on foundry grades. Apparently all of the 10,000 tons of iron which was thrown upon the market by an eastern Pennsylvania furnace at prices based on $18.50, furnace, for No. 2 plain has been disposed of and this maker has advanced its prices 50c. per ton, now quoting $19, furnace, for No. 2 plain and $19.50, furnace, for No. 2X, with the possibility that another 50c. advance may be made before the end of the week. Two other Eastern makers of foundry iron are quoting $20, furnace, for No. 2X, and some business has been closed on this basis. Two factors stand out prominently in the present market situation. One is the apparent determination of producers to go no lower and the other is the increasing interest taken by those consumers who believe that pig iron is a "good buy" at present prices. The few furnaces in blast in eastern Pennsylvania were unable to sell all they were making a few weeks ago, but now they are comfortably fixed for the next three or four weeks and are booking new orders at a rate equal to or in excess of their output. The largest purchase of the past week was 5000 tons of basic iron by a Harrisburg consumer, the price being about $19.50, delivered. A later sale of 2000 tons of basic to a Delaware plate manufacturer established a lower delivered price, namely $19. Sales of foundry iron have been in lots ranging from a carload to 1000 tons. A Lansdale, Pa., foundry is reported to have purchased about 1500 tons. There have been several sales of 500 tons or more. Pig iron producers and selling agents are firmly of the opinion that the turn has come in the pig iron situation, and they are considerably cheered by reports of higher prices at Buffalo, Chicago and elsewhere.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$19.84 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.34 to 21.26
Virginia No. 2 plain, 1.75 to 2.75 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.74
Basic deliv. eastern Pa.	19.00
Gray forge	22.00 to 23.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—A slightly better inquiry for ferromanganese is reported. A sale is reported at about $68, delivered, for a single carload. American producers continue to quote $70, delivered as far west as the Pittsburgh district, and $75, delivered in the Chicago district. Spiegeleisen, 18 to 22 per cent, is quoted at $27, furnace.

Semi-Finished Steel.—A few sales of billets at $30, Pittsburgh, constitute the first real activity in semi-finished in some weeks. Forging billets are quoted at $35, Pittsburgh.

Plates.—No steel product is quite so inactive as plates, the demand for which is next to nothing. Prices are weak but are not well determined because of the small volume of business. On the ordinary run of small inquiries Eastern mills are disposed to qubte 1.85c., Pittsburgh, but on anything attractive 1.75c. can quite easily be done and quotations of 1.70c. have been reported. The market may be quoted at 1.75c. to 1.85c., Pittsburgh.

Structural Material.—Shapes are somewhat firmer than plates, but shading of prices is occasionally reported. Two local jobs that are up for bids are a moving picture theater for the Stanley Co., 1000 tons, and an addition to the Wesley Building, 400 tons. The general contract for the Chelsea National Bank at Atlantic City has been awarded to Warren Moore & Co., who will buy the steel, about 300 tons. We quote plain material at 1.85c., Pittsbrugh.

Rivets.—Further price cutting on rivets has brought structural quality down to 2.40c. per lb., Pittsburgh, and boiler quality to 2.50c. per lb. Railroads are more active buyers for car repair work.

Bars.—Soft steel bars are quite firmly held at 1.75c., Pittsburgh. A fair amount of buying of carload lots is reported. Bar iron is available at 1.70c., Pittsbrugh.

Sheets.—On small lots of blue annealed 2.40c., Pittsburgh, is the usual quotation, but on larger lots 2.25c. can be done. Black sheets are quoted at 2.90c. to 3. and galvanized sheets at 3.85c. to 4c., Pittsburgh.

Wire Products.—The price of wire nails is being firmly held at $2.75 per 100 lb. keg, Pittsburgh, and other wire products are also firm. A fair business in nails is being done.

Warehouse Business.—A slightly improved demand for steel out of stock has been noted in the past week. A feature of the demand is that sizes which have not been called for in months are now on the order sheets. Prices for Philadelphia delivery are unchanged as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.75c.; round edge iron, 3.05c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.65c.; light black sheets, No. 28 gage 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in.; 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 6.50c.; toe steel, 4.50c.

Coke.—Foundry coke is slightly firmer at $4 to $4.50, Connellsville. Apparently it is not so easy to buy at $3.75, the minimum which has been ruling. Furnace coke of good quality is obtainable at $2.75 to $3, while even as low as $2.60 has been quoted.

Old Material.—With very few transactions, the undertone of the scrap market is fairly strong. This is due principally to the belief of dealers that any important demand will send prices upward; hence they are not willing to sell anything but very small lots at the current prices. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	14.00 to 15.00
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	16.00 to 17.00
No 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	7.50 to 8.00
Mixed borings and turnings (for blast furnace use)	7.50 to 8.00
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	8.50 to 9.00
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

San Francisco

SAN FRANCISCO, Aug. 10.

Pig Iron.—Rather more business was reported for the past week or ten days on the Coast, but the general situation remains quiet. The most prominent inquiry was from the Southern Pacific Co., involving 300 tons of No. 1 foundry and 500 tons of No. 2. It is understood that 500 tons of Belgian material was sold at around $30, c.i.f. San Francisco. The Southern California Iron & Steel Co., Los Angeles, has placed an order for 150 tons of basic pig iron at around $31, c.i.f. San Pedro. The Puget Sound Navy Yard is asking for bids on 150 tons of foundry pig on Aug. 12. Late offerings of Belgian basic pig iron are reported at about $25 a gross ton, delivered consumers' works, which is an unusually low price. With the general curtailment of foundry operations, however, interest has not been pronounced. Business in coke has been small and principally of a routine nature.

Old Material.—This market remains almost completely dormant, and real trading is sporadic and on a small scale. Prices are nominal at around $9 a gross ton delivered for heavy melting steel and at about $20 a net ton delivered on cast iron scrap.

Cast Iron Pipe.—During the past fortnight, there is to be reported a limited business from municipal sources, and a little revival of private business, involving several hundred tons. The market has displayed another softening tendency, and the price is now ruling around $40 and even below. Douglas, Ariz., is calling bids on Aug. 12 for 30 tons of 4-in. pipe, and Sacramento is inquiring for 35 tons of 6-in. pipe. The Central Foundry Co. announces, effective here a reduction of $5 a ton on sanitary cast iron pipe.

Finished Iron and Steel.—Business is rather light the market restricted by labor troubles as well as by the prevailing depression. Steel interests can see little hope for a revival until the building trade contention is settled. Market prices continue unsettled. Considerable foreign material, largely in the form of Belgian billets and standard rails, is reported coming in and underselling domestic products by a good margin. The Southern Pacific Co. has again entered the market for materials, particularly sheets, plates and bars. From the South the Llewellyn Iron Works is inquiring for 300 tons of shapes, and another Los Angeles interest has contracted for 400 tons of bands.

Building Increases in Chicago

Building permits issued in Chicago in July showed an increase of 110 per cent in frontage covered over the same month a year ago. Permits were taken out for 754 buildings, fronting 21,403 ft. and involving a cost of $14,400,650, as against 253 permits, 9718 ft. of frontage, and $6,669,300 for July of last year. There was also a material gain over June, 1921, the permits for that month having numbered 675, covering 18,510 ft. of frontage, and involving $7,484,200. Figures for July covering the past ten years show that the frontage covered by permits issued in that month this year exceed those of all years back to 1916, and do not fall very far short of July, 1916, 1915, and 1913, and are exceeded by July, 1914, and 1912, by 10,000 and 13,000 ft. respectively. Small residences costing from $4,000 to $15,000 lead all other types of structures in the number of permits issued. The construction of a large number of apartments is also being undertaken. Permits for large office buildings and other structures involving fabricated steel are exceedingly few.

While fabricated steel tonnage bears a more or less definite ratio to the production of structural steel, the yearly percentages vary with exigencies of the time. In 1920, with the highest structural output on record, only 35 per cent of the tonnage reappeared in the fabricated reports. The usual percentage is about 45. In 1915, when structural tonnage reached an apex, the percentage reached the high figure of 61.

MEXICO BUYS LOCOMOTIVES

Places 110 with Two American Builders—Japanese Market Depressed—Venezuela Plans New Railraods

NEW YORK, Aug. 16.—Although there has come a distinctly quieter tone to the export market during the past fortnight, numerous and continued reports from various foreign markets of projects under consideration, which will involve large uses of iron and steel, pipe and machinery, give the near future an optimistic aspect. Mexico as a neighboring market is apparently becoming a safer customer for American sellers, evidenced by the recent credit of $2,000,000 for a period of three years and $500,000 in cash advanced for roadbed repairs and locomotive purchases by the Baldwin Locomotive Works. The National Railways of Mexico have placed in the United States with the two leading locomotive interests a total of 110 locomotives of various types, of which 83 are being constructed by the Baldwin Locomotive Works under the $2,000,000 credit arrangement and 27 by the American Locomotive Co. on a ten months extension of credit.

Japanese Market Dull

While buying from Japan is light and Japanese buyers are facing a declining rice and silk market as well as lower prices on iron and steel, the latter caused by the depressed situation in the United States, numerous large projects are planned throughout the Far East. German and Belgian low prices obviously are partly the underlying cause of the present cessation of purchases from Japan, as in a majority of cases, the Continental quotations are as much as 50 per cent below the American makers' price. In evidence of this, a quotation submitted recently by a Japanese branch in New York on No. 2 gage zinc sheets, used in the boxing of matches, was about $300 per ton, c.i.f. Japanese port, compared with a German price of $140 per ton, c.i.f. Japan.

The recent activity in purchases of electrolytic and casting copper, most of which was either for direct shipment to China or for trans-shipment from Japan, has dropped off considerably, through the action of the Chinese Government in temporarily prohibiting shipments of copper to the Chinese mints, because of difficulties between the political factions of the North and South of China. Japan, however, is expected by some to enter the market at a later date for copper to be used for drawing into wire for the various hydro-electric projects, now planned or under construction in Japan and throughout other Far Eastern countries.

Recent Japanese orders have been confined largely to light gage black sheets and small quantities of corrugated galvanized sheets. One exporter has booked an order for 7500 packages of oil size tin plate (slightly less than 10,000 base boxes) and a total of 200 tons of No. 30 gage black sheets. An inquiry now in the hands of exporters to the Far East is from the South Manchurian Railroad and calls for a 20-ton locomotive crane. An inquiry that recently appeared in the American market from Japan, but in which but little faith is placed, calls for about 500 tons of soft steel bars, ½-in. and ¾-in. An exporter with a tonnage of about 11,000 ft. of canceled locomotive boiler tubes at Kobe, Japan, has disposed of the entire lot for 3000 yen ($1,455).

Railroads Planned in Venezuela

Among the South American nations, either planning railroads, or attempting to interest foreign capital in the construction of additional railroad lines, is Venezuela. The present rail facilities of the country consist of about 600 miles and a total investment of $40,000,000. Four new roads are being considered; one connecting a cacao region with the coast; a second through the cattle, coffee and tobacco districts; a third running from the oil country to the coast and a fourth connecting the Yuruari gold mines directly with a port and opening rich iron ore deposits.

The United Engineering & Foundry Co., Pittsburgh, has completed shipment of 9500 tons of rolling mill and steel works equipment from its Youngstown plant to England, France, India and Australia. The Youngstown units of the company have been almost exclusively engaged on this work for several months. J. J. Choorin Co., Inc., general exporters of Harbin, Manchuria and Vladivostok, has opened an office for the United States and Canada at 149 Broadway, New York. This office has been opened for the purpose of buying for the general trade in Harbin and Vladivostok and supplying the four large department stores of the company.

R. G. Dun & Co. are in receipt of an inquiry from A. Galland, 125 bis Avenue Parmentier, Paris, mine and factory supplies, requesting price lists, etc., on a pipe threading machine, motor operated, for right and left hand American threading of pipe from 4 to 10 in. A 2-kg. capacity gasoline or kerosene air compressor is also wanted. Fn. Marechal & Co., Malines, Belgium, request catalogs and prices from manufacturers of pin and rivet making machinery and stamping machines. Ateliers Armand & Deoune, 56-64 Boulevard Oddo, Marseilles, France, is interested in lathes for roughing cast iron, tempered cylinders 0.425 meter in diameter and 1.10 meters long.

REFRACTORIES MARKET

Magnesite and Chrome Brick Reduced $5 Per Net Ton—Few Changes in Other Brick

PITTSBURGH, Aug. 15.—Inquiry for refractories has improved appreciably in the past week or 10 days; and while actual business still is of rather moderate proportions, the belief is gaining ground that a turn from the extreme dullness of the past several months is at hand. Since the first of the month all manufacturers have been able to make some inroads upon their stocks, and it is confidently expected that the monthly statement of stocks on hand as of Aug. 31 will be the most favorable of any so far this year. The increase in shipments has not been accompanied by any material increase in production, and the suggestion is made in some quarters that if much steel works capacity is started up during the latter part of this year, some difficulty might attend the getting of sufficient supplies of brick. The largest sale recently reported involved 300,000 ladle brick to the Republic Iron & Steel Co. The more general policy of the steel companies is to buy as supplies are required.

Effective, Aug. 10, makers of magnesite and chrome brick have announced a reduction in prices of $5 per net ton. Demand for these brick is exceedingly light, and the decline in prices also may be ascribed to the desire of makers to reduce their stocks. Magnesite brick in standard sizes now are quoted at $65, which compares with $110, the peak price of last year, and $135 the high point reached during the war period. We note no special change in prices of fire clay and silica brick, but if there is a definite tendency it is down. As matters stand, there is not especially close adherence to quotations, and it is frankly admitted that there would be considerable sharpening of pencils on the appearance of a really sizable inquiry.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 42.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		65.00
Chrome Brick:		
Standard size, per net ton		52.00

British Iron and Steel Market

Improved Activity All Along the Line—Cut in Coke Prices Stimulates Business

(*By Cable*)

LONDON, ENGLAND, Aug. 16.

Coke prices are falling in all districts. Nine Cleveland furnaces are now blowing and two more are to be started immediately. Others are expected to commence operations as early as possible, for there are prospects of a resumption of steel making. Number 3 G.M.B. is still officially quoted at £6 ($21.84) for home consumption, though prices were forced up during the stoppage of iron making operations, and sellers now quote £6 15s. ($24.57) for home buyers. The export premium has been dropped.

Luxemburg basic iron is arriving, priced at £4 10s. ($16.38) delivered Tees. Belgian foundry iron is being sold here at £5 ($18.20) c.i.f. Tees. Hematite makers are well booked up ahead, and are not anxious to cut export quotations.

Steel works generally are awaiting orders, and some are reducing export prices. Home quotations are unchanged, but consumers are showing little disposition to purchase. The ship joiners' strike still continues. The Yarrow shipbuilding and engineering works are to close Nov. 30, owing to labor troubles and other causes.

There is a fair demand for Continental steel, but little business is being placed. German merchant bars are quoted at £8 5s. (1.34c. per lb.) to £8 10s. (1.38c. per lb.) f.o.b., for November shipment, which is the earliest date for which sales arrangements are now entertained. Prices made to India were £8 17½s. (1.44c. per lb.) c.i.f. German billets are held at £6 10s. ($23.66) f.o.b., for November delivery; plates at £7 15s. (1.26c. per lb.) f.o.b., for October.

Luxemburg has sold to the United Kingdom good lines of sheet bars at £6 10c. ($23.66) f.o.b. Supplies are now becoming scarce, up to £6 15s. ($24.57) f.o.b. asked. Belgium is quoting on untested plates £8 (1.30c. per lb.) f.o.b.; on tested plates, £8 10s. (1.38c. per lb.) f.o.b. French billets are held at £6 10s. ($23.66) to £6 15s. ($24.57) f.o.b.

As Welsh coal has been reduced 8s. ($1.46) and tin plate bars £1 ($3.64), tin plate prices are consequently easier. Prompt delivery is quoted at 24s. ($4.37) basis f.o.b. and November at 23s. ($4.19) basis f.o.b. There is some revival of demand from India, the Far East, South Africa and South America, and small orders are being booked. Welsh tin plate workers are becoming alarmed at the fall in prices of their product, and the prospect of further reduction of their wages, owing to the drop in the steel on which the wages are based.

India has bought a fair line of 24-gage galvanized sheets at £21 10s. (3.49c. per lb.) f.o.b. Small sales have been made to South America, particularly to the Argentine, at £22 (3.575c. per lb.) f.o.b. in cases. Straits specifications are being sold at £29 10s. (4.79c. per lb.) f.o.b. Wales is offering to Japanese specifications black sheets at £22 10s. (3.66c. per lb.) to £23 (3.74c. per lb.) f.o.b., for October shipment. Belgium is quoting £20 (3.25c. per lb.) f.o.b., for October and November shipment, on the same specifications.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.64 per £1 as follows:

Durham coke, at ovens	£1 15	$6.37
Cleveland basic	7 7½ & £7 10*	26.85 & $27.30
Cleveland No. 1 foundry	7 0	25.48
Cleveland No. 3 foundry	6 15	24.57
Cleveland No. 4 foundry	6 10	23.66
Cleveland No. 4 forge	5 17½	21.39
Hematite	7 0*	25.48
East Coast mixed	8 0 & 7 5*	29.12 & 26.39
Ferromanganese	18 0 & 14 10*	65.52 & 52.78
Rails, 60 lb. and up	10 10 to 14 0	38.22 to 50.96
Billets	9 0 to 9 10	32.76 to 34.58
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.12 to 30.94
Tin plate base box	1 3 to 1 4½	4.19 to 4.46
		C. per Lb.
Ship plates	14 0 to 15 0	2.75 to 2.44
Boiler plates	19 0 to 21 0	3.09 to 3.41
Tees	14 0 to 15 10	2.75 to 2.52
Channels	13 5 to 14 15	2.15 to 2.39
Beams	13 0 to 14 10	2.11 to 2.36
Round bars, ¾ to 3 in.	13 0 to 13 10	2.11 to 2.19
Galvanized sheets, 24 g.	21 0 to 22 0	3.41 to 3.575
Black sheets	17 10	2.84
Steel hoops	17 0	2.76
Cold rolled steel strip, 20 g.	26 10	4.31

*Export price.

CZECHO-SLOVAKIAN MARKET

General Curtailment of Production—Further Combinations of Companies Planned

(*Special Correspondence*)

PRAGUE, CZECHO-SLOVAKIA, July 28.—The situation seems to be going from bad to worse in Czecho-Slovakian industry and conditions in the coal and coke industry are causing grave apprehension. The recent miners' strike in the United Kingdom and the political unrest in Upper Silesia brought but a short and almost imperceptible relief. Export channels are blocked by the high price of Czecho-Slovakian coke and Austria, hitherto the principal customer, has arranged to depend upon German supplies, shown by the recent Stinnes-Alpine Montan Gesellschaft transaction.

Steel Works Lay Off Thousands

Activity in the iron market has practically ceased and there is no evidence that the bottom of the slump has been reached. The Trzynietz iron works has blown out the third of its four blast furnaces and the rolling mills are operating four days a week. The works at Branka laid off 400 hands a fortnight ago and the Hahn tube rolling mills at Oderfurt, which have been operating part time, have announced a further curtailment of production. Tube mills and steel works are operating about four days per week. The Witkowitz steel works has shut down its open-hearth plant and approximately 8000 of its 20,000 workers will probably apply for unemployment benefit this month. The Prague Iron Industry Co. is closing down one plant after another and some 18,000 carloads of ore are stored at the Nucitz mines. Iron and steel works are operating at about 40 per cent of normal capacity.

Combinations in Steel Industry Continue

The tendency to establish communities of interests and working agreements in the iron and engineering industries has steadily gained ground during the past months and the present slump only serves to stimulate these activities. Following the recently announced formation of a community of interest among the three largest works, Prague Iron Industry Co., Witkowitz Steel Works and Mining & Smelting Co., plans are maturing for the establishment of close connections with the steel industry and negotiations with the Poldi steel works with plants at Komotau and Kladno are said to be pending.

In an effort to revive the export market, particular attention is being devoted to Russia and Poland, the two primary markets of the future. There are also indications that the iron industry combination is seeking to extend its influence to the metal-working industry and the name of the Ruston works is frequently mentioned in this connection.

The Towmotor Co., Cleveland, has received from one of the governments of South America an inquiry for 50 of its gasoline tractors with hoist attachment. Inquiries have also come in from British Columbia, Montreal, Seattle, New Orleans and Atlanta, indicating a considerable revival of interest.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.80c. to 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets	$2.50
Large boiler rivets	2.60
Small rivets	70, 10 and 10 per cent off list
Small machine bolts, rolled threads	65 and 10 per cent off list
Small sizes in cut threads	75 and 10 per cent off list
Longer and larger sizes of machine bolts,	75 and 10 per cent off list
Carriage bolts, ⅝ in. x 6 in.:	
Smaller and shorter, rolled threads	70 and 5 per cent off list
Cut threads	65 and 10 per cent off list
Longer and larger sizes	65 and 10 per cent off list
Lag bolts	70 and 5 per cent off list
Hot pressed sq. or hex. blank nuts	$5.25 off list
Hot pressed nuts, tapped	5.00 off list
C.p.c. and t. sq. or hex. nuts, blank	5.10 off list
C.p.c. and t. sq. or hex. nuts, tapped	4.75 off list
Stove bolts in packages	80, 10 and 10 per cent off list
Stove bolts in bulk	80, 10 and 2½ per cent off list
Track bolts	3.25c. to 3.75c. base

Square and Hex. Head Cap Screws

½ in. and under	70 per cent off list
9/16 in. to ¾ in.	70 per cent off list

Set Screws

½ in. and under	70 and 5 to 70 and 10 per cent off list
9/16 in. to ¾ in.	70 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.75 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $3 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.80 base per 100 lb. Tie plates, $2 to $2.05 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes.

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

	Cents per Lb.		Cents per Lb.
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

	Cents per Lb.		Cents per Lb.
Nos. 17 to 21	2.70	No. 28 (base)	3.00
Nos. 22 to 24	2.75	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

	Cents per Lb.		Cents per Lb.
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

	Cents per Lb.		Cents per Lb.
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
10	12.00	11.75	26.87½	4.40	4.25	4.75	4.25
11	12.00	11.75	26.50	4.40	4.25	4.75	4.25
12	12.00	11.75	26.32½	4.40	4.25	4.70	4.20
13	12.00	11.75	.....	4.40	4.25	4.70	4.20
15	12.00	11.75	26.25	4.40	4.25	4.70	4.20
16	12.00	11.75	26.12½	4.40	4.25	4.70	4.20

New York

NEW YORK, Aug. 16.

The better feeling which has been manifest for the last two or three weeks continues but buying has not increased. The copper market is quiet but firm. Buying of tin has been fair at lower prices. The lead market is a little more active with the tendency higher. The zinc market shows scarcely any improvement but prices are steady.

Copper.—While buying is limited both for domestic and foreign account, it is impossible to buy electrolytic copper below 11.75c., New York, or 12c., delivered, for early delivery. At these levels some business is reported by several sellers, but most of the large producers are still out of the market except under unusual circumstances. Future delivery is not freely quoted by all sellers, but can be obtained at about 12.12½c. for September and 12.25c. for October.

Tin.—On two days last week a fair business was done in future shipment, the total sales amounting to about 350 tons. On the first day dealers were the principal buyers, but on the second consumers were fairly liberal purchasers. Thus far this week the market has been stagnant. The buying last week was due to a recession in prices, the metal being regarded as cheap at the levels reached. Spot Straits tin to-day is quoted at 26.12½c., New York. The London quotations to-day were about £8 per ton lower than a week ago, with spot standard at £154 15s., future standard at £156 and spot Straits at £155 10s. Arrivals thus far this month have been 2710 tons with 2810 tons reported afloat.

Lead.—Some sellers report the market quiet, but others state that a good business has been done in the past week, which has resulted in a firmer market. The leading interest continues its quotation unchanged at 4.40c., New York and St. Louis, but independents are asking 4.45c., New York, and 4.25c., St. Louis, at which levels they are getting some business.

Zinc.—The livelier inquiry and the better business which were reported in the first two weeks of this month seem to have disappeared and the market has turned decidedly quiet, but not necessarily weaker. Prime Western is unobtainable apparently below 4.20c., St. Louis, or 4.70c., New York, at which the current small business reported is being done.

Old Metals.—While business is not active, there is a little better tone to the market. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.75
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Antimony.—In a quiet market prices have sagged until wholesale lots for early delivery are now obtainable at 4.50c., New York, duty paid.

Aluminum.—There is no change in the price of the leading interest for virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery which still stands at 24.50c., f.o.b. plant, but the same grade from foreign sources is available from American importers as low as 19c., New York, duty paid.

Chicago

AUG. 16.—Tin has declined in sympathy with the London market. Purchases of this metal are largely by dealers who consider it a good investment at the present price. Lead has declined slightly, while copper and spelter are unchanged. Users are buying lead and tin cautiously and in some instances are trying to buy for future delivery at lower prices. Producers are disinclined to quote on futures because every concession, no matter how slight, brings out still lower bids by users. Buyers of copper are offering less than producers will accept. The old metals are unchanged. We quote Lake copper at 12.50c. in carload lots; tin, 28.50c.; lead, 4.35c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 16.—Demand for lead and zinc amounts to virtually nothing. The markets were never so dull as now. There is no demand for copper. The old metal markets are without interest. Lead is quoted at 4.20c. and spelter 4.20c., car lots. We quote Lake copper, car lots, at 12.73½c. to 12.98½c.; tin, 27.11c.; antimony, 5.33½c. On old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c., and aluminum, 9c.

Pittsburgh Meeting of Industrial Cost Association

At the regular monthly meeting of the Pittsburgh section of the Industrial Cost Association, held at Seventh Avenue Hotel, Pittsburgh, Aug. 10, A. A. Alles, Jr., secretary and treasurer of the national association described cost systems used by the Fawcus Machine Co., Pittsburgh. James P. McLean, Pittsburgh Forge & Iron Co., chairman of the Pittsburgh section, discussed the industrial cost lexicon or handbook, which is to be published by the national organization and will standardize industrial cost termonology. At the next meeting of the Pittsburgh section, to be held at the Seventh Avenue Hotel, Pittsburgh, Sept. 14, Jay Chapin, assistant secretary of James H. Matthews Co., Pittsburgh, will describe the cost system of the Matthews company.

Tinplate Exports from Liverpool

Consular reports show in the following table the quantity in gross tons, and countries of destination, of the tinplates and tinned sheets exported from Liverpool in 1919 and 1920:

Countries of Destination	1919 Tons	1920 Tons	Countries of Destination	1919 Tons	1920 Tons
France	34 357	60 526	Germany	309	1,874
B. East Indies	33 760	51 579	Russia	1,303	1,504
Australia	36,033	47,336	Argentina	5,701	1,148
Netherlands	16,032	21,598	Rumania	2,574	1,004
Portugal	17,452	18,585	Canada	500	957
China	7,535	17,118	United States	254	625
Belgium	8,761	17,032	All other countries	85,449	73 359
Italy	6,056	16,073			
Norway	20,164	12,761			
Japan	13,222	9 958	Total	289.462	353.017

The total value of the tinplate and tinned-sheet exports in 1919 was $53,914,317 and $92,240,682 in 1920.

METAL SCHEDULE NEXT WEEK

Steel Interests Oppose Ferro Alloy Duties—Agreement Reached on American Valuation

WASHINGTON, Aug. 16.—Hearings before the Senate Committee on Finance on the metal schedule of the permanent tariff bill probably will not begin until next week. It had been hoped to reach them this week, but so many witnesses asked to be heard on the chemical and the earths, earthenware and glassware schedules, the two which precede the metal schedule, that this idea had to be abandoned. Efforts to expedite the hearings in order to prepare the bill for reporting have not been as successful as could be wished. Under a rule adopted by the committee each witness is allowed 15 minutes except where the subject under discussion is considered to be important enough to justify more time. The latter situation already has developed in a number of cases on the chemical schedule, hearings on which began yesterday.

The first witness to be heard on the metal schedule will be Chairman John A. Topping of the Republic Iron & Steel Co., who was in Washington yesterday. He will act as spokesman for the indepedent iron and steel interests of the country, covering the entire schedule. It is known that part of his testimony will be directed against the rates of duties carried in the ferro-alloy section, which has been the object of attack from many consumers. Vigorous efforts will be made to induce the committee to revise the section sharply downward, and in the case of some items, such as manganese ore, the request will be made for restoration to the free list. Mr. Topping, in addition to speaking on the metal schedule as it was passed by the House, will ask that raw materials used by the iron and steel trade be incorporated in the metal schedule, where duties are to apply, instead of being included in other schedules, as some of them are in the House bill. Among such items are magnesite, which was placed in the chemical schedule, and fluorspar, included in the earths, earthenware and glassware schedule. Refractory brick, limestone and graphite, used by steel works and foundry interests, are also carried in the earths schedule. It is pointed out that items of this character are so closely related to the iron, steel and foundry trades that logically they should be placed, when on the dutiable list, in the metal schedule. Names of witnesses other than Mr. Topping who are to appear before the committee in connection with the metal schedule hearings have not been given out, but it is understood that there will be a full presentation of views on the subject and that some of those to be heard will require more than 15 minutes to give their testimony. Plans have been made so that men of the trade specializing in certain products will speak on these lines.

There will be both opposing and supporting views with regard to rates in the metal schedule, and it is stated that domestic producers of manganese and other ores and ferroalloys will contend for the House bill rates as strongly as they are combatted. There will be a contest also, it is stated, over crucible steel products, some opposition having developed to the rates in the pending bill.

American Valuation Agreed Upon

Over and above the rates carried in the tariff bill, the steel trade is showing interest in the administrative features, which as adopted by the House have been quite acceptable to manufacturers. The American valuation plan has been favored by iron and steel interests, and they are satisfied with the compromise made on it last week between majority members of the Senate Committee on Finance and the House Committee on Ways and Means, which gives a rather definite promise that it will be enacted into law as agreed upon by the Senate and members of the two committees. This being the basis on which ad valorem rates are to be assessed, it was considered necessary by the majority members of the Finance Committee to arrive at an understanding regarding it before proceeding with hearings on the schedules. The subject brought out spirited contentions from witnesses before both committees.

Methods of Assessment

Chairman Fordney of the Committee on Ways and Means said that even with the changes made in the American valuation plan, which are relatively mild, a distinct victory had been won for the proposal. The changes were decided upon after conference between members of the Finance Committee and Treasury experts. It is claimed by the Senators that the changes will make the valuation plan more workable and less likely to result in litigation. Under the revised provision, ad valorem rates will be assessed on the basis of the American wholesale selling price on all imports, where comparable and competitive articles of domestic manufacture are found. Where no comparable and competitive articles exist, the duty will be assessed on the American wholesale selling price of a comparable and competitive imported commodity. In the event no such basis prevails, then the duty will be levied on the value of the articles in the country of origin at the time of export, plus necessary transportation and other expenses to an American port and a reasonable profit, totaling not less than 16 per cent of the value of the articles. If no basis is found in the first three alternatives, the plan of assessment will be to revert to the production cost, plus the expense of laying the shipments down in America. It has been stated that the provision as finally agreed upon would apply to about 75 per cent of all imports. In the case of iron and steel there will be few if any instances where the ad valorem duties cannot be based on comparable and competitive products. One of the important advantages the plan gives to domestic iron and steel makers, it has been stated, is on products carrying extras. Importations when coming under the classification of extras will be made dutiable, not on the base prices, but on the latter plus the extras.

With the American valuation plan adopted and with the anti-dumping act in effect, some American makers of steel believe there need be no cause for alarm over competition with German steel. Mr. Topping is among those who share this view.

Graphitization in Cast Iron

Microscopic study of graphitization in cast iron has been further studied by the Bureau of Standards, Washington. The investigation supplements that reported in technologic paper No. 129. After prolonged annealing considerable graphitization, that is, change in the combined carbon, occurs in the material below the thermal critical range (approximately 700 deg. C.). Below 500 deg. C., however, no change was detected even after a very prolonged heating period. In the low-temperature graphitization, only the pearlite is affected; the free carbide does not appear to be changed until the thermal critical point has been passed and solution of this constituent has begun. The form in which the graphite exists after annealing depends upon initial structural state of the iron. If any flakes of graphite exist, they act as nuclei for the deposition of the graphite formed during annealing; if no such flakes are present, the new graphite takes the form ol small globules rather than flakes.

The experimental work of this investigation, furnace work, chemical analyses, microscopic examination, has now been completed and the data are being put in shape for publication.

GERMAN PRICES HARDENING

Industrial Problems as Affected by Taxation at Home and Tariff Walls Abroad

(By Air Mail Express to London)

BERLIN, GERMANY, Aug. 1.

The past month has witnessed a hardening of most commodity prices and indications are not lacking that the increase in living costs—which will become more pronounced as autumn approaches and the proposed new taxes will come into force—will start a fresh period of wage claims. The recent price advance for certain grades of coal by the Rhenish-Westphalian Coal Syndicate has automatically brought about an increase in cement prices, which in turn are reacting upon the building trades, and the planned increase in potash prices will doubtlessly result in dearer agricultural product. One gains the impression that official circles are by no means wholly averse to the idea of sanctioning higher prices to agriculture, industry and trade, with a view to increasing public revenues by increasing the taxability of the three groups to the possible maximum. Whether the taxation dilemma can be solved without further inflation remains to be seen. Inflation and watering of capital stock are going hand in hand.

More Amalgamations

Plant extensions and formation of new combines or mergers are being announced almost daily. The Ottensener Eisenwerk Aktien Gesellschaft at Ottensen-Altona (near Hamburg) is negotiating with the Hamburg authorities for a site measuring 71,800 sq. yd. and located in the old petroleum harbor in Hamburg, where a ship's boiler plant is to be erected. One of the larger mining concerns, the Ilseder Hütte, is conducting iron ore mining operations in the Goslar district (Central Germany), where a new shaft is being sunk near Haverlahwiese. The Gelsenkirchner Bergwerks Aktien Gesellschaft is likewise showing activity in pushing mining operations. It is also announced that the idle pits at Wettin and Löbejün, owned by the State, will shortly be reopened and operated by the company.

Under the name of "Gesellschaft Aluminium Thermie—Professor Dr. H. Goldschmidt," a new company has been established by the inventor of the thermit patent, Dr. Hans Goldschmidt, in co-operation with the Mark steel works at Wengern-on-the-Ruhr. The company will primarily engage in welding operations, particularly rail welding on the road, as well as in the production of metals and alloys, both by the aluminum-thermit process and other new patented processes.

The tendency of merging of interests has been forming a feature in the metal working fields. The Deutsche Maschinenfabrik (Demag) at Duisburg has expanded. Interest is focussed on the Maschinenbauanstalt Humboldt at Cologne. There has lately been some heavy buying in Humboldt shares by a group believed to be connected with the Klöckner concern, while a foreign group is likewise reported to evince a strong interest in the shares of that company. The same parties are also stated to have their eyes on the Flander machine works.

Obstacles to Export Business

In the iron industry, the activity at wire mills, construction shops and rail mills deserves mention. Less satisfactory conditions appear to obtain in the Remscheid and Solingen tool and cutlery industry, where the lag in sales is largely accounted for by the severe customs restrictions by Spain, Italy, Norway and Canada. The Bergische Chamber of Commerce has petitioned the Government to intervene at the Spanish and Italian Governments with a view to having the customs rates on small iron ware reduced in order to avoid hardships to the industry.

The overseas market seems to be somewhat slow in developing but your correspondent learns from an authentic source that trade in hardware and small iron and steel ware with China has been gaining in volume at a marked rate since the conclusion of the commercial treaty between China and Germany. Inquiries for fairly large shipments are being received and substantial orders have already been closed. Most of the business is being done by firms who were catering to the Chinese market before the war. The enamel ware industry is showing activity in working the South American market, where, according to a prominent Saxon firm, kitchen ware is meeting with a good demand.

A leading Hanover works has just entered an order by the Dutch State Railroads for 2000 cars and 100 coaches. Krupp's are known to have sent a representative to Riga, who was received by the ministers of traffic and finances and apparently is testing the market for rolling stock, motors, agricultural machinery, etc. Bulgaria is in the market for railroad material and mining equipment. The purchasing commission of the Bulgarian State Railroads has established an office at Berlin and so has a mission representing the State mines at Pernik.

Quotations are as follows, per metric ton with the mark at 1.24c.:

	Marks	
Billets	1550–1580	$19.22 to $19.59
Sheet bars	1530–1580	18.97 to 19.59
Blooms	1400	17.36
Ingots	1300	16.12
Bar iron	1900–2000	23.56 to 24.80
Structural shapes	1800–2100	22.32 to 26.04
Squares	2100–2200	26.04 to 27.28
Concrete bars	1850–1950	22.94 to 24.18
Rounds, drawn	2600	32.24
Hoop iron, cold rolled, annealed	3400	42.16
Rails, standard sections	2350–2400	29.14 to 29.76
Wire rods	2000	24.80
Sheets, heavy	1750–1850	21.70 to 22.94
Sheets, medium	1850–1950	22.94 to 24.18
Plates, light	2200–2300	27.28 to 28.52
Sheets for stamping, double plan	3900–4200	48.36 to 52.08
Steel pipe, welded, per meter	3.50	.04

Increased Activity in Mahoning Valley

YOUNGSTOWN, OHIO, Aug. 16.—Maintenance of finished steel production around 50 per cent of capacity, a substantial increase over a month ago when it averaged 25 per cent or less, is one of the encouraging features of the industry in the Mahoning Valley.

Of the 105 sheet mills in the Valley, 54 are under power. Following a long suspension, the Mahoning Valley Steel Co. started five of its eight mills on Monday. The Falcon Steel Co., which has been idle for two months, is also preparing to resume.

Independent steel making units are operating at fully 50 per cent, while similar units of the Carnegie Steel Co. are engaged to the extent of 40 per cent. At Girard, the A. M. Byers Co. is operating 22 puddle furnaces in No. 1 puddle mill, and one bar mill. The full strip capacity of the Trumbull Steel Co. is active, largely on orders from the Ford Motor Co. Nine of the 17 tube mills in this district are in commission, while only one plate mill is rolling, the 84-in. mill of the Brier Hill Steel Co. Sharon Steel Hoop Co. reports considerable enlargement in production of sheet steel, operating seven mills.

Comparative figures for July and August on railroads serving the Youngstown district show an increase in the movement of freight during the first 12 days of this month. The New York Central, Erie, Pennsylvania and Baltimore & Ohio report increased movements of loaded cars since the beginning of August. The Ohio region of the Erie reports an increase in the daily movement of loaded cars of 349 since Aug. 1, as compared with July. The increase in short-haul movements averages nearly 150 cars a day. Railroad officials say there has been a sharp increase in the movement of semi-finished steel.

Mattie blast furnace, at Girard, Ohio, of the A. M. Byers Co., Pittsburgh, is being overhauled and repaired preparatory to having the blast turned on.

Ore piles are rapidly being built up at the new furnace at Warren, Ohio, built by the Trumbull-Cliffs Furnace Co. for the Trumbull Steel Co., and it is expected this 600-ton stack will be started for the first time in the fall.

Because of its abundant ore stocks, the Brier Hill Steel Co., Youngstown, is preparing to dock its lake steamer, the H. H. Porter, at the end of August, much earlier than usual.

United States Pig Iron Production in the First Half of 1921

The American Iron and Steel Institute in its special statistical bulletin No. 4 gives the production of all kinds of pig iron in this country for the first six months of the present year. Aside from the showing that output was barely one-half of the production of either half of 1920, outstanding features are the small amount of iron made with the use of anthracite coal or anthracite mixed with coke, and the drop in the amount of charcoal pig iron made.

Anthracite iron is less than 1/7 per cent of the total production, lower by a wider margin than ever before, though the tendency has of course been downward. Charcoal iron for this year is less than ¾ per cent of the total.

HALF-YEARLY OUTPUT OF PIG IRON BY STATES.

HALF-YEARLY PRODUCTION OF ALL KINDS OF PIG IRON.

States.	Blast furnaces. In blast Dec. 31 1920.	Blast furnaces. June 30, 1921. In.	Out.	Total	Production—Gross tons. (Includes spiegeleisen, ferro-mang., ferro-silicon, ferro-phosphorus, etc.) First half of 1920.	Second half of 1920.	First half of 1921.
Maine	0	0	0	0			
Massachusetts	1	0	1	1	6,180	4,101	1,537
Connecticut	0	0	2	2			
New York	16	3	24	27	1,207,475	1,393 659	506,113
New Jersey	1	1	3	4			
Pennsylvania	73	27	134	161	7 241,726	6,741,408	3,577,570
Maryland	2	1	6	7	254,420	269,313	75,130
Virginia	4	2	15	17	223,522	205,780	53,519
Alabama	15	8	35	43	1,225,236	1,167,726	659,225
Georgia	0	0	4	4			
Texas	0	0	1	1	374,906	397,473	117,215
West Virginia	3	1	4	5			
Kentucky	0	0	7	7			
Mississippi	0	0	1	1			
Tennessee	3	0	17	17	159,041	124,166	12,369
Ohio	49	14	66	80	4,130,811	4,402,659	2,081,847
Illinois	16	6	20	26	1,634,164	1,646,711	1,030,801
Indiana	12	7	9	16	1,426,045	1,513 476	1,019 010
Michigan	10	2	11	13			
Wisconsin	3	1	6	7	345,091	366,314	211,574
Minnesota	2	0	3	3			
Missouri	3	1	3	4			
Iowa	0	0	0	0			
Montana	0	0	0	0			
Colorado	3	2	3	5	206,985	257,599	185,071
Oregon	0	0	1	1			
Washington	0	0	0	0			
Total	216	76	376	452	18,435,602	18,490,385	9,530,981

HALF-YEARLY PRODUCTION OF COKE PIG IRON.*

Maine	0	0	0	0			
New York	16	3	23	26	1,211,475	1,393 659	507,108
New Jersey	1	1	3	4			
Pennsylvania	71	27	120	147	7,094,917	6,585,086	3,564,406
Maryland	2	1	5	6	254,420	269,313	75,130
Virginia	4	2	15	17			
Georgia	0	0	2	2	223,522	205,780	53,519
Texas	0	0	1	1			
Alabama	14	8	32	40	1,212,718	1,154,404	655,693
West Virginia	3	1	4	5			
Kentucky	0	0	7	7	374,906	397,473	117,215
Tennessee	3	0	14	14	155,897	115,104	12,369
Ohio	49	14	66	80	4,130,811	4,402,659	2,081,847
Illinois	16	6	20	26	1,634,164	1,646,711	1,030,801
Indiana	12	7	9	16			
Michigan	2	1	3	4	1,502,165	1,558,526	1,060,523
Wisconsin	2	1	5	6			
Minnesota	2	0	3	3			
Missouri	1	0	1	1			
Iowa	0	0	0	0			
Montana	0	0	0	0			
Colorado	3	2	3	5	338,616	437,698	289,612
Washington	0	0	0	0			
Oregon	0	0	1	1			
Total	201	74	337	411	18,133,611	18,166,413	9,448,223

*Includes ferro-alloys made with electricity, electricity and coke, etc.

HALF-YEARLY PRODUCTION OF ANTHRACITE AND MIXED ANTHRACITE AND COKE PIG IRON.

Pennsylvania	2	0	10	10	146,379	156,188	12,823
Total	2	0	10	10	146,379	156,188	12,823

HALF-YEARLY PRODUCTION OF CHARCOAL PIG IRON.

Massachusetts	1	0	1	1			
Connecticut	0	0	2	2	2,610	4,235	883
New York	0	0	1	1			
Pennsylvania	0	0	4	4			
Maryland	0	0	1	1			
Alabama	1	0	3	3			
Georgia	0	0	2	2	15,662	22,384	3,532
Tennessee	0	0	3	3			
Mississippi	0	0	1	1			
Michigan	8	1	8	9	92,382	113,141	41,346
Wisconsin	1	0	1	1	44,958	28,024	24,174
Missouri	2	1	2	3			
Total	13	2	29	31	155,612	167,784	69,935

TOTAL PRODUCTION OF PIG IRON ACCORDING TO FUEL USED.

Coke*	201	74	337	411	18,133,611	18,166,413	9,448,223
Anthracite†	2	0	10	10	146,379	156,188	12,823
Charcoal	13	2	29	31	155,612	167,784	69,935
Total	216	76	376	452	18,435,602	18,490,385	9,530,981

* Includes ferro-alloys made with electricity, electricity and coke, etc.
† Includes mixed anthracite and coke pig iron.

HALF-YEARLY OUTPUT OF PIG IRON BY GRADES.

HALF-YEARLY PRODUCTION OF BASIC PIG IRON.

States.	First half of 1920.	Second half of 1920.	First half of 1921.
New York, New Jersey	513,327	623,977	199,568
Pennsylvania—Allegheny County	1,646,540	1,498,938	1,024,302
Other counties	2,180,007	1,970,770	736,305
West Virginia, Alabama, Kentucky	691,574	707,124	438,730
Ohio	1,442,867	1,505,444	685,788
Indiana, Illinois	1,754,077	1,699,669	1,149,432
Michigan, Minnesota, Missouri, Colorado	221,402	281,106	270,306
Total	8,450,694	8,287,028	4,504,431

HALF-YEARLY PRODUCTION OF BESSEMER AND LOW-PHOSPHORUS PIG IRON.

New York	193,096	181,992	61,225
Pennsylvania	2,523,457	2,432,309	1,381,591
Maryland	247,070	274,663	74,660
West Virginia, Kentucky, Tennessee, Alabama	193,426	218,097	73,816
Ohio	1,899,250	2,079,537	1,081,868
Illinois, Colorado	862,225	956,962	606,912
Total	5,918,524	6,143,560	*3,280,072

* Includes 62,908 tons of low-phosphorus pig iron.

HALF-YEARLY PRODUCTION OF FOUNDRY PIG IRON AND FERRO-SILICON.

Maine, Massachusetts, Connecticut	6,173	4,062	1,537
New York, New Jersey	398,765	456,003	215,512
Pennsylvania	539,707	531,617	285,798
Maryland, Virginia, West Virginia	236,597	200,405	
Kentucky	42,601	29,378	67,138
Tennessee	136,692	103,942	
Alabama	644,494	582,360	241,091
Ohio	488,448	528,463	219,004
Indiana, Illinois	107,572	83,876	104,944
Michigan	170,099	249,587	118,110
Wisconsin	171,416	163,736	85,800
Missouri, Iowa, Colorado, Washington	37,637	44,102	36,465
Total	2,980,201	2,977,581	*1,375,399

* Includes 55,180 tons of ferro-silicon.

HALF-YEARLY PRODUCTION OF MALLEABLE PIG IRON.

New York	90,320	114,168	22,533
Pennsylvania	68,880	40,820	14,099
Kentucky, Ohio	245,221	210,993	62,267
Indiana, Illinois, Michigan, Wisconsin, Minn	261,744	278,805	66,623
Total	666,165	644,786	165,522

HALF-YEARLY PRODUCTION OF FORGE PIG IRON.

New Jersey, Pennsylvania	104,818	70,985	13,280
Virginia, Tennessee	2,366	710	
Alabama	9,441	8,258	5,276
Ohio	52,244	69,226	30,381
Total	168,869	149,179	48,937

HALF-YEARLY PRODUCTION OF SPIEGELEISEN AND FERRO-MANGANESE.

New York, Pennsylvania	170,706	191,670	122,093
Virginia, Alabama, Tennessee	4,287	12,602	9,646
Illinois, Colorado, Montana, Washington	11,968	15,663	4,530
Total	186,961	219,935	*136,269

* Includes 83,861 tons of ferro-manganese and 52,408 tons of spiegeleisen.

HALF-YEARLY PRODUCTION OF OTHER GRADES.

Connecticut, New York, New Jersey	7,984	8,478	4,482
Pennsylvania	11,601	13,329	2,895
Maryland, Va., West Va., Ky., Tenn., Alabama	21,587	26,923	7,101
Ohio	9,771	8,992	2,539
Indiana, Illinois, Michigan, Wisconsin, Missouri, Colorado	13,245	10,594	3,334
Total	64,188	68,316	20,351

PIG IRON MADE FOR SALE OR FOR USE OF MAKERS IN THE FIRST HALF OF 1921.

Grades.	For sale.	For maker's use.	Total. Gross tons.
Basic	361,884	4,142,547	4,504,431
Bessemer and low-phosphorus	263,964	3,016,108	3,280,072
Foundry, including ferro-silicon	1,211,014	164,385	1,375,399
Malleable	132,673	32,849	165,522
Forge or mill	20,291	28,646	48,937
Ferro-manganese	22,797	61,064	83,861
Spiegeleisen	5,745	46,663	52,408
All other grades	10,314	10,037	20,351
Total	2,028,682	7,502,299	9,530,981

PERSONAL

E. Dana Durand has been appointed chief of the newly created eastern European division of the Bureau of Foreign and Domestic Commerce. Mr. Durand was director of the Bureau of the Census from 1909 to 1913 and from 1903 to 1909 was connected with the Bureau of Corporations of the Department of Commerce and Labor, first as economic expert and later as deputy commissioner. As an instructor in economics he has served at Harvard, Stanford and Minnesota universities. He is author of "The Finances of New York City," "The Trust Problem," and numerous magazine articles and Government reports.

G. St. J. Perrott, associate physical chemist of the Bureau of Mines experiment station, Pittsburgh, will go to Birmingham, Ala., to study the physical properties of coke in relation to its production and use in the blast furnace. Conditions are favorable for conducting these investigations at the Tuscaloosa experiment station of the Bureau of Mines, with the co-operation of a number of companies operating blast furnaces and by-product plants in Alabama.

R. A. Lundquist, Minneapolis, has been appointed head of the newly created electrical machinery division in the Bureau of Foreign and Domestic Commerce, Department of Commerce. He is a graduate of the University of Minnesota. He has made extensive studies of the possibilities for the sale of American electrical goods and machinery in Australia, New Zealand, China, Japan and South Africa, the results of which have been published by the Bureau. He is author of "Transmission Line Construction-Methods and Cost" (McGraw-Hill Publishing Co.) and various articles for engineering and other technical journals. Like heads of other divisions already set up in the Bureau, including iron and steel, lumber and heavy machinery, Mr. Lundquist will specialize on work looking to the expansion of foreign markets for American interests.

C. R. White, for many years connected with the New York office of Alfred Herbert, Ltd., British machine-tool manufacturer, as assistant manager, is no longer associated with that company.

Fred C. Severin, for the past few years manager of the New York office of the Betts Machine Co. of Rochester, N. Y., and before that with the Niles-Bement-Pond Co., has resigned. The Betts Machine Co. has not yet appointed his successor.

Walter G. Bunzel, formerly chief engineer of the Richmond Radiator Co., is now associated with the Pittsburgh Electric Furnace Co. at its New York office, 149 Broadway.

T. A. O'Leary Co., Keenan Building, Pittsburgh, effective Aug. 6, relinquished the representation in the Pittsburgh district of the Farber Fire Brick Co., St. Louis, and hereafter will devote its attention to Pennsylvania fire clay brick as sales agent for the Climax Fire Brick Co., Climax, Pa.

Carl A. Johnson, president Gisholt Machine Co., Madison, Wis., was elected a director at the formal organization meeting of stockholders in the Northwestern Casualty & Surety Co., Milwaukee, which was incorporated some time ago with a capital stock of $1,000,000 and a surplus of $750,000. Other directors elected include: K. K. Knapp, general counsel Illinois Steel Co., Chicago; Norval A. Hawkins, sales director General Motors Corporation, Detroit.

H. M. Schwartze, for 15 years electrical engineer for the Cadillac Motor Car Co., Detroit, has resigned to join the engineering staff of the new Collins Motor Car Co.

E. W. Seaholm, for several years assistant, has been appointed chief engineer of the Cadillac Motor Car Co., Detroit.

J. C. Ward, director Edgar Allen & Co., Ltd., Sheffield, England, left on Aug. 13 on the Aquitania for a visit to the New York and Chicago offices of the Edgar Allen Steel Co., Inc., manufacturer of high speed, carbon and alloy tool steels.

J. Leonard Replogle, chairman Replogle Steel Co., and president Vanadium Corporation of America, recently returned from a trip to Europe, where he has been studying business conditions.

Ralph C. Schwarz has taken over the Northwestern New York territory for the distribution and sale of Stewart industrial furnaces and appliances. His address will be 921 Granite Building, Rochester, N. Y.

James H. Nutt, 306 Mahoning Bank Building, Youngstown, Ohio, secretary of the Western Bar Iron Association and the Western Sheet & Tinplate Manufacturers' Association, has recently added to the records of the office three bound volumes containing copies of the annual wage agreements with the Amalgamated Association of Iron, Steel and Tin Workers since 1881. The sole purpose of the two manufacturers' organizations is to deal with employees at the annual conferences and at the bi-monthly settlements. Mr. Nutt has been secretary since 1892, when the association embraced but a few members. The Amalgamated Association was formed in 1876. For many years Mr. Nutt served as a puddler in the mills.

Samuel M. Vauclain, president Baldwin Locomotive Works, Philadelphia, inspected the plant of the St. Louis Coke & Chemical Co. at Granite City, Ill., on Aug. 13, stopping on his return to Philadelphia from a trip to Mexico. He was met in St. Louis by Clarence H. Howard, president Commonwealth Steel Co., St. Louis, and William B. Dickson, vice-president Midvale Steel & Ordnance Co., New York.

Lyman M. Waite, formerly with the National Acme Co. and recently with the Springfield Automatic Screw Machine Corporation, Fitchburg, Mass., has been appointed sales manager of the Garvin Machine Co., New York, succeeding Frank A. Power, who has resigned.

Mason B. McLaughlin, manager of the central sales department, Cleveland, of the White Co., has been elected a vice-president, as has also Robert W. Woodruff, manager of the southeastern sales department with headquarters at Atlanta Ga.

Horton Penrose, for a number of years Pittsburgh and Philadelphia representative of Shimer & Co., has become connected with the Cleveland-Cliffs Iron Co., Cleveland, as a salesman in the pig iron department.

C. T. Stewart, Harbison-Walker Refractories Co., Pittsburgh, and R. T. Blair, Pittsburgh Gage & Supply Co., Pittsburgh, have been chosen delegates of the Purchasing Agents' Association of Pittsburgh to the national convention of the Purchasing Agents' Association of the United States, to be held in Indianapolis, Oct. 13 to 15, inclusive.

W. S. Pilling of the pig iron firm of Pilling & Co., Philadelphia, sailed on Saturday, Aug. 13, for England. He will be gone several weeks.

The recent reduction in prices of shovels, spades and scoops of $3.40 per dozen by Hubbard & Co., Pittsburgh, has been followed, in part, by other large manufacturers who have announced a cut of $3 per dozen, effective Aug. 15. The new quotations now quoted by the Ames Shovel & Tool Co., Boston, the Baldwin Tool Co., Parkersburg, W. Va., the Pittsburgh Shovel Co., Pittsburgh, the Wood Shovel & Tool Co., Piqua, Ohio, follow: Black, first grade, $10.14; per doz., second grade, $9.40; third grade, $8.75; fourth grade, $7.90, to which must be added $1 per doz. for polishing.

Working forces in factories in New York State have fallen approximately 30 per cent since March, 1920, according to a report of the State Industrial Commission. This represents a reduction of about 450,000 workers. The metal industries are reported to have sustained the largest recent losses. Lack of orders is the main reason for curtailment.

OBITUARY

AUGUST A. FRAUENHEIM, president of the Iron City Sanitary Mfg. Co., Pittsburgh, died at his country home, Kittanning pike, O'Hara Township, Pa., Aug. 10. He was prominently connected with the business and industrial life of Pittsburgh. For a number of years he was president of the Epping-Carpenter Pump Co., serving in that capacity until the concern merged with the Worthington Pump & Machinery Corporation. He was a director of the Pennsylvania National Bank, the East Williston Land Co., New York and the Pittsburgh Hospital. He was a member of the Duquesne Club, the Pittsburgh Country Club and the Pittsburgh Athletic Association in Pittsburgh.

JOHN A. HANLON, vice-president and general manager of the Hanlon-Gregory Galvanizing Co., Pittsburgh, died suddenly in his home in that city, Aug. 11. Mr. Hanlon, who was 41 years old, was born in Pittsburgh, and had been active in the galvanizing industry for the past 15 years. Prior to 1913 when the Hanlon-Gregory company was organized, he had been affiliated with the Pittsburgh Galvanizing Co. He was a member of the National Galvanizers Association, serving several terms as president of that organization.

WILLIAM H. GRIFFITHS, 67 years old, president of the Griffiths Charcoal Iron Mills, Washington, Pa., died at his home there Aug. 12. He was born in Boston, England, coming to this country when a boy of 17 years, and locating in Pittsburgh. He went to Washington, Pa., in 1895 and established the first tin plate plant in that district.

THOMAS W. HOLMES, 27 years old, superintendent of the Twenty-fifth Street plant, Pittsburgh, Railway Steel Spring Co., died in Erie, Pa., Aug. 11, following a brief illness. He was born in Pittsburgh and had been affiliated with the Railway Steel Spring Co. for the past 12 years.

JULIAN BURDICK, president of the West Penn Steel Co., Pittsburgh, has the sympathy of his friends in the sudden death of his son, Julian Burdick, Jr., aged 13 years, who was killed Aug. 9, as the result of a fall from a cliff at Eaton's Ranch, Wyo., where the family of Mr. Burdick had been summering.

FREDERICK ERDLE, founder of the Erdle Perforating Co., perforated metals, Rochester, N. Y., died at his home in that city on Aug. 2 at the age of 81 years. He retired 12 years ago from active participation in the business.

CHARLES HAINES WILLIAMS, first vice-president Chicago Railway Equipment Co., Chicago, died at his home in that city on Aug. 8, aged 46.

The production of by-product coke in the United States in July showed a decrease of 8.9 per cent, when compared with that for June. The total output was 1,285,000 tons as against 1,410,000 tons, the revised figure for June. These statistics, issued by the Geological Survey, show that the July production was 35 per cent of the maximum capacity of the ovens. Fifty-five plants were in operation and 15 were idle. The output of beehive coke during July was only 181,000 tons.

A. M. Castle & Co., jobbers in iron and steel, Chicago, have commenced the construction of a new warehouse at the northwest corner of Blackhawk and North Branch streets. It will be 211 x 232 ft. and will cost $350,000. The west 75 ft. is to be two stories in height and the second floor will be used for the general offices of the company, giving a floor area for that purpose of 72 x 211 ft.

Railroad track abandoned in the United States during 1917, 1918, 1919 and 1920 exceeded the new mileage built by more than 1000 miles. Abandonment has averaged more than 1000 miles annually for some years.

Office and Trade Changes

Altemus & Prindle, room 5726, Grand Central Terminal, New York, have been appointed exclusive selling agents in the United States for the Compagnie Belge des Mines, Minerais et Metaux, Antwerp, Belgium, a mining and smelting concern. They are now in position to offer in this market phosphoric and non-phosphoric Swedish iron ores, Barreiro iron ore, Douaria, Rif and Rubios iron ore, Indian manganese and chrome ores, and alloys such as standard 80 per cent ferromanganese, silicomanganese, ferrosilicon, ferrochrome and pyrites. C. L. Altemus and H. B. Prindle, who established themselves in the iron and steel business some time ago, with quarters at 101 Park Avenue, New York, recently moved to the Grand Central Terminal.

O. J. Abell & Co., 29 South La Salle Street, Chicago, has added to its existing lines in the machinery and machine products field representation of the Jefferson Forge Products Co., Detroit, maker of automotive forgings and the Jefferson one-piece drop-forged steel wheel; and the Pittsburgh Electric Furnace Corporation, Pittsburgh, builder of the Moore 'Lectromelt furnace for the manufacture of electric steel, malleable and gray iron.

The Metals Coating Co. of America, manufacturer and distributor of the Schoop metal spraying process, by which metallic coatings may be sprayed upon any surface, is now in full operation at its new plant, 495-497 North Third Street, Philadelphia, having removed from its former Boston, Mass. and Woonsocket, R. I. locations.

The New York office of the Matthew-Addy Co., has been moved to 90 West Street.

The name of the Kendall Hardware Co., 421 Main Street, Cambridge, Mass., has been changed to the Kendall Nail & Hardware Co. Peter C. Welch is president and John B. Welch, treasurer.

The Eastern Steel Co. announces the discontinuance of its Boston office. Harry O. Russ will continue to represent the company in that territory with headquarters in the New York office, 50 East Forty-second Street.

The Boston office of the Eastern Steel Co. has been discontinued, effective Aug. 10. Harry O. Russ, who has been New England sales agent since 1907, will continue to represent the company in that territory, with headquarters in the New York office, 50 East Forty-second Street.

T. J. Rafferty & Co., iron and steel scrap and steel, Worcester, Mass., have removed their offices from the Park Building, to their new warehouse at 21-23 Ellsworth Street. With the erection of three new buildings, a full line of hot and cold rolled strip steel, cold rolled shafting and screw stock, tool steel, machine steel, etc. will be stocked.

Medley Scovil Co., New York advertising firm, have moved to new and larger offices in the new Cunard Building, 25 Broadway.

The Schaffer Engineering & Equipment Co., Pittsburgh, has combined its administrative, sales and manufacturing departments in its new general offices at 2828 Smallman Street, Pittsburgh.

Earle S. Barber, who recently resigned as director and sales advertising manager of Alfred Decker & Cohn, Chicago, has engaged in business as Earle S. Barber & Co., commercial councillors, with offices in the new Wrigley Building. They will cover the various branches of business and will maintain a sales organization for obtaining distribution and maintaining efficient representation in five states—Illinois, Indiana, Iowa, Michigan and Wisconsin.

The Cincinnati office of the Cutler-Hammer Mfg. Co., Milwaukee, has been removed from the Gwynne Building, to the Dixie Terminal Building. A. R. Maujer, formerly of the sales-engineering force of the Pittsburgh office, is now in charge of the Cincinnati office.

The Eastern Agencies Co., manufacturers' representative, 79 Main Street, Yokohama, Japan, opened an office on July 15 in Tokio in charge of Edwin Russell, at 3 Uchisaiwai-cho, Itchome Kojimachi-ku. The company represents the Steel Producers Export Corporation, New York, and the Western Clock Co., La Salle, Ill., among others.

The Societe Ànonyme des Usines Giulini, Basel, Switzerland, manufacturer of virgin aluminum ingots, notched bars, bars, plates and sheets, have appointed C. W. Leavitt & Co., New York, sole selling agents for the United States and Canada.

Record of many months of decreasing index figures for the cost of living has been broken by July, which recorded a slight advance. Metals, foods and farm products are the lowest of all groups studied, while furniture and building materials are highest. The average is now about 50 per cent above 1913.

IRON AND INDUSTRIAL STOCKS

Lower Prices Have Ruled Much of the Time the Past Week

Prices for securities in general have been under pressure much of the time recently, but whenever it has relaxed they have snapped back quickly. Selling, in a large measure, is believed to have been based on the fear that some national disaster is imminent, either as a result of the foreign credit situation, or a nation-wide tie-up in transportation. The frequency with which new foreign issues are offered in and absorbed by this country (something more than $1,000,000,000, it is estimated, having been sold in this country since the signing of the armistice) is held to demonstrate faith in the ability of Europe and South America at large to weather in time their financial problems.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	29¾ - 31	Nat.-Acme	14¼ - 14¼
Allis-Chalm. pf..	71½ - 73¾	Nat. E. & S. com.	47⅜ - 48¼
Am. Can com....	25½ - 26¾	Nat. E. & S. pf..	.. - 45
Am. Can pf.....	81½ - 82	N. Y. Air Brake.	54½ - 55
Am. C. & F. com.	122½ - 124	Nova Scotia Stl..	22¼ - 22½
Am. C. & F. pf..	.. - 109½	Pressed Stl. com.	57⅞ - 60½
Am. Loco. com..	82⅛ - 86¼	Ry. Stl. Sp. com.	72⅝ - 76½
Am. Stl. Fd. com.	25⅝ - 25½	Replogle Steel...	21 - 21¼
Bald. Loco. com.	72⅛ - 77⅝	Republic com....	45¼ - 47½
Beth. Stl. com...	48 - 50	Republic pf.....	.. - 84
Beth. Stl. Cl. B..	48⅛ - 51	Sloss com.....	33 - 34
Beth. Stl. 8% pf.	97½ - 99	Sup. Stl.	.. - 33⅛
Chi. Pneu. Tool..	.. - 48	Sup. Stl. 1st pf..	.. - 94
Colo. Fuel.....	22½ - 24	Un. Alloy Stl....	23½ - 25
Cru. Stl. com....	52½ - 55	U. S. Pipe com..	13 - 14⅞
Gen. Electric....	112½-118⅛	U. S. Steel com..	73⅜ - 74½
Gt. No. Ore Cert.	28¼ - 29⅜	U. S. Steel pf....	108⅞-109¼
Gulf States Stl..	30½ - 31¼	Vanadium Steel.	27⅝ - 29½
Int. Har. com...	71½ - 74⅝	Va. I. C. & Coke.	63 - 69
Lackawanna Stl.	38 - 39¼	Westingh'se Elec.	42½ - 44⅜
Midvale Steel....	23¼ - 24⅝		

Half-Year Report of American Locomotive Co.

Gross earnings of the American Locomotive Co. for the six months, ended June 30, were $25,989,781, compared with $45,114,934 for the previous six months, ended Dec. 31, 1920. The net profit for the last six months amounted to $4,556,043, compared with $5,660,494 for the previous period. An amount equal to $12.10 per share was earned on the common stock in this last period after paying the dividend on the preferred stock. There was a surplus of $2,276,043 for the period.

According to President Andrew Fletcher, "There has been no money spent on the proposed new plant in the St. Louis district other than the cost of the land, and it is the present intention of the company to withhold active development of that property until general business requirements of the company warrant it. The total unfilled orders for new locomotives, reconditioning of old locomotives and miscellaneous work on June 30 was $4,595,958, of which domestic business was 16.5 per cent and foreign business 83.5 per cent, the foreign business being mostly for Japan, China and South Africa. At present there are but few inquiries for new locomotives either for foreign or domestic use."

Industrial Finance

Stockholders of the Baush Machine Tool Co., Springfield, Mass., have voted to exchange the 12,500 outstanding shares of common stock, par value $100, for an equal number of shares having no par value, and to issue 37,500 additional shares of common stock, no par value, to be sold from time to time. The capital now is 50,000 shares common stock, no par, and 6100 shares preferred, par $100. Willoughby H. Stuart, Jr., is president, and George D. Haskell, treasurer.

Shipments by the Westinghouse Electric & Mfg. Co. are at the rate of slightly less than $10,000,000 a month. Those for April and May were above $20,000,000, and those for June and July approximately that much, while so far this month they average less than $10,000,000. Unfilled orders on the books of the corporation are in the neighborhood of $50,000,000, whereas on April 1 they were $65,621,000.

The American Bosch Magneto Corporation, Springfield, Mass., in the six months ended June 30, operated at a loss of $40,000 to $50,000. The financial condition of the concern, however, shows its current debts amount to but $400,000, whereas its quick assets total $5,700,000. The company recently sold $2,500,000 8 per cent 15-year notes. After making allowance for these notes, there are net tangible assets of $75 a share on the 100,000 share capital, of which $28 represent net quick assets.

The earnings statement of the National Acme Co. for the three months ended June 30 shows an operating deficit of $834,362, contrasted with a deficit of $354,074 for the previous quarter, and a net profit amounting to $1,385,925 for the corresponding period last year. Sales for the second quarter were $1,435,722, as against $1,041,840 for the preceding period. The increased deficit was due, in a large measure, to the marking down of inventories, which showed a shrinkage of $523,835. Total sales for the first six months this year were $3,047,566, as compared with $9,582,369 last year, or about one-third.

The Allis-Chalmers Mfg. Co. in the quarter ended June 30 billed out $7,014,373 goods, and showed net profits after taxes of $635,879, as compared with $7,369,106 goods billed out and $832,750 net profits for the corresponding three months last year. The net profits equal, after all charges and preferred dividends, $1.34 a share earned on the $26,000,000 common stock, contrasted with $1.87 a share for the quarter ended March 31 and $2.13 for the quarter ended June 30, 1920. The total unfilled orders on the books as of June 30 last were $9,472,772, against $12,943,633 at the close of the preceding quarter.

The consolidated income account of the Steel & Tube Co. of America for the six months ended June 30 last shows gross profits of $1,555,849 and miscellaneous income of $694,377, making a total income of $2,250,226, contrasted with $6,732,006, $231,733 and $6,963,739, respectively, for the corresponding period last year. Miscellaneous charges, including taxes, amounting to $906,037, left a balance of $1,344,178, as against a balance of $6,158,912 for the six months ended June 30, 1920. Interest charges, depreciation and depletion cut down the net earnings to $25,969. Last year nothing was allowed for depreciation and depletion, consequently the net earnings before dividends were $5,325,877.

The American Heater Corporation, St. Louis, has been reorganized following the death of its president, Walter Hennig. The reorganized corporation has a capital stock of $250,000, of which $160,000 is paid. C. Norman Jones, chairman of the board, Title Guaranty Trust Co., St. Louis, is president of the new corporation, and his associates are a number of St. Louis business men. The company manufactures automatic gas-fired water heaters. Extensions are said to be planned.

During the first half of 1921, the Newton Steel Co., Youngstown, Ohio, producer of full finished sheets, earned all charges before dividends, its preferred dividend for the period and made some addition to surplus. The company started six mills in March, following a suspension, and subsequently increased the number of active units to eight. At the end of May the full complement of 10 mills was placed on the active list and the company has been operating to capacity since July 1. Orders in hand insure production at the current rate well into September. An official of the company anticipates a better showing during the second half. From 85 to 90 per cent of its output has consisted of automobile body stock.

The Franklin Tractor Co., Greenville, Ohio, on the application of a number of its stockholders, has been placed in the hands of a temporary receiver. Fred D. Koppock has been named receiver and it is likely that the plant will be operating under his management.

A suit for the appointment of a receiver for the Lane & Bodley Co., Cincinnati, has been filed in the Common Pleas Court by the administrator of the estate of H. T. Lane, who was a stockholder in the company. The company recently sold a part of its Bond Hill plant and its equipment to the American Blower Co.

The New-Way Motor Co., Lansing, Mich., manufacturer of air-cooled engines and parts, has arranged for a stock issue of $500,000.

The Midvale Steel & Ordnance Co. reports a deficit of $1,289,393 for the quarter, ended June 30, after charges, taxes, depreciation and depletion, compared with a deficit of $1,395,202 in the preceding quarter and a surplus of $4,349,498, equal to $2.17 a share on the $100,000,000 capital stock, in the corresponding quarter of 1920.

The Electro Sherardizing Co., 1743 North Randolph Street, Philadelphia, has been incorporated with a capital of $25,000, primarily to coat metals by either plating or sherardizing. At the present time the company is devoting its entire energy to the sherardizing end of the business. The company is not in the market for any equipment as it took over the equipment which was being used by the General Electric Co., Seventh and Willow streets works, as a jobbing sherardizing proposition. The company is ready to take care of custom sherardizing work, rust proofing such material as bolts, nuts, stampings, castings, nails, chains, etc. The operation of the plant is in charge of T. Liggett, Jr., who has had about 15 years experience in the sherardizing business, first being with the United States Sherardizing Co., New Castle, Pa., and then having charge of the General Electric Co.'s, Philadelphia sherardizing plant.

Machinery Markets and News of the Works

SOME PRICE REDUCTIONS

Announcements Made on Milling Machines, Turret Lathes and Sensitive Drills

No Marked Improvement in Machine-Tool Business but Inquiries Are More Numerous and Sentiment Is Better

Since the first of the month some leading manufacturers of milling machines and sensitive drills have reduced their list prices about 15 per cent, while an Ohio maker of turret lathes has reduced prices about 16 per cent. A general reduction on some types of grinders is expected, a leading manufacturer having led the way a few weeks ago. Machine-tool prices on the average are now fully 25 per cent below the peak prices of 1920.

No important business is being closed, buying in all markets being confined to single tools. A slow improvement is noted, however, in some centers and the tone is more cheerful, due doubtless to a little gain in the number of inquiries.

At Cincinnati it is expected that the Big Four Railroad will soon buy tools for which it inquired some time ago, and the list of the Missouri, Kansas & Texas, issued a few months ago, may be revived shortly. The American Sugar Refining Co., New York, is expected to close soon on about 15 tools. An Eastern car equipment manufacturer is in the market for several punches and shears. The Huckabee Tractor & Mfg. Co., Little Rock, Ark., has issued a list of about 12 machines.

It is reported from Chicago that machine-tool trade during the first half of 1921 was about 25 or 30 per cent of the volume in the first half of 1920. A slow but steady improvement over the remainder of the year is expected. July was the poorest month and August sales at Chicago have shown a slight gain.

New York

NEW YORK, Aug. 16.

A little business in machine tools has been closed within the past week and there is a slight improvement in the number of inquiries, but on the whole trade is very dull. The Dexter Folder Co., New York, bought about 12 drills, mostly single spindle, and the Durant Motor Co. bought four drills for its assembling plant at Long Island City.

Several important price reductions have been made affecting leading makes of tools. A large maker of turret lathes announced a 16 per cent cut; the principal makers of milling machines have reduced about 15 per cent; sensitive drills have been cut 15 per cent and some makes of lathes have been reduced. A general reduction on grinding machines is expected, a leading maker having reduced its prices last month. A certain low-priced lathe was cut fully 50 per cent on at least one quotation in an effort to secure the order. Machine-tool prices on the average are now from 25 to 40 per cent below the peak prices in 1920.

A better tone is evident in the crane market, but new inquiries are still rare. The greatest activity at present seems to be in the hand power crane and hoist field. Bidding on the 25-ton, 50-ft. span hand power crane with alternate quotations on the same crane electrically operated, which was inquired for by the United States Machinery Export Co., 136 Liberty Street, New York, for export to Mexico, has been closed and the order will be placed shortly. Another inquiry in the market from a Mexican source is from E. T. Bailey, Mexico City, and calls for a 2-ton hand power crane. Bidding has also closed on the 10-ton, 27-ft. span hand power crane for the New York & Pennsylvania Co., 200 Fifth Avenue, New York. The Centre Iron Works, 608 East 137th Street, New York, which recently purchased a 5-ton electric traveling crane is receiving bids on two 3-ton hand power cranes, either single I beam or underslung type.

Among recent sales are: B. M. Weiss, Philadelphia, a second-hand 15-ton Brown hoist locomotive crane to the Carrol Contracting Co., 103 Park Avenue, New York; Thomas Elevator Co., four 3-ton concrete tower hoists and the American Hoist & Derrick Co., 11 8000-lb. derrick hoists, to Dwight P. Robinson, Inc., New York, for export to Brazil. The 60-ton overhead traveling crane inquired for by the Amoskeag Mfg. Co., Boston, Mass., is reported to have been placed with the Northern Engineering Works. W. J. Rainey, Inc., 52 Vanderbilt Concourse, New York, has purchased a 10-ton hand power crane from Alfred Box & Co. The Third Avenue Railroad Co., New York, has purchased a 3-ton pillar crane from the Chesapeake Iron Works.

Blue prints and specifications covering the contract for the supply and erection at Vereeniging, Transvaal Province, of two horizontal-spindle centrifugal pumps and motors with all accessories, and one 10-ton traveling crane have been forwarded to the Bureau of Foreign and Domestic Commerce by Consul Fred D. Fisher, Johannesburg, South Africa. This material is for use in connection with the Vaal River scheme. The specifications may be examined at the bureau's district office, 734 Custom House, New York, or they will be made available at any other district or co-operative office upon request. Those interested should refer to file No. 33,592.

The Multiple Storage Battery Co., Van Wyck Avenue, Jamaica, L. I., manufacturer of storage batteries, has filed plans for a one-story addition, 60 x 120 ft., to cost about $55,000, including improvements to be made in the present plant.

The United Lamp Manufacturers' Corporation, New York, has been incorporated with a capital of $75,000 by H. Wolff, R. Press and S. Math, to manufacture electric lamps and kindred products. It is represented by E. Hollander, 8 Bline Avenue, Union, N. J.

The Pure Aluminum Co. of America, New York, has been incorporated with a capital of $100,000 by B. L. Shaw, E. E. Grabo and H. P. Armstrong, to manufacture aluminum and other metal products. It is represented by J. M. Coleman, 29 Broadway.

E. L. Westervelt, Inc., Lawrence, N. Y., has been incorporated with a capital of $50,000 by E. L. Westervelt, L. H. Hall and W. Schneider, to manufacture electric motors and kindred equipment. It is represented by Putney, Twombly & Putney, 2 Rector Street, New York.

M. T. Kelly, 249 Green Street, Brooklyn, has filed plans for a one-story foundry, 50 x 60 ft., on Provost Street, to cost about $20,000.

The Seabring Machine & Repair Co., Brooklyn, has been chartered under State laws to manufacture machinery and parts, and operate a general repair works. The incorporators are J. M. Larson, T. Carlsen and J. Johansen. The company is represented by Crowell & Rouse, 24 Broad Street, New York.

The New York Central Railroad Co., Grand Central Terminal, New York, will take bids at once for shop requirements until Oct. 1 of flexible staybolts and parts, steel wheels for locomotive and passenger car repairs, and one portable electric arc welding machine and accessories, all as per standard drawings and specifications on file at the office of W. C. Bower, general purchasing agent, Grand Central Terminal.

Frank B. Rown has leased the building at 527-33 West Fifty-fifth Street, New York, extending through to West Fifty-sixth Street, for the establishment of an automobile service and repair works.

The Bottle Guard Cap Corporation, New York, has been chartered under State laws to manufacture metal caps and kindred specialties for bottle sealing. The incorporators are E. R. Hooper, R. O. Glasser and A. Westlake. It is represented by Edwards & Bryan, 31 Nassau Street.

The Pignolet Instrument Co., 78 Cortlandt Street, New York, manufacturer of electrical instruments, has leased space in the building at 76 Greenwich Street for new works.

The Fenlind Corporation, New York, has been chartered under State laws to manufacture machinery and tools. The incorporators are C. U. Ackerlind, L. Fendrich and C. E. Lage. It is represented by V. Yardum, 110 East Fifty-ninth Street.

The Phoenix Battery Co., Inc., Brooklyn, has been incorporated under Delaware laws with capital of $1,250.000 to manufacture storage batteries and other electrical products. The incorporators are Gustav J. Frickmann, Edward Sokal, and William M. Hawkins, Brooklyn. It is represented by Arley B. Magee, 33 South State Street, Dover, Del.

The Thatcher Propeller & Machine Co., Learned Street, Albany, N. Y., is arranging a list of equipment for installation in its two one-story buildings, 120 x 270 ft., to be used as a foundry and machine works. Pember & Campaigne, 24 James Street, are architects. George Thatcher is president.

The Denby Motor Truck Co., 49 West Sixty-third Street, New York, manufacturer of motor trucks and parts, is arranging for a bond issue to total $600,000. It will also double its capital from $750,000 to $1,400,000 for proposed expansion. The main plant is located at Detroit.

The Southern Dutchess Gas & Electric Co., 89 Main Street, Beacon, N. Y., is planning for the erection of an addition to its electric power plant at East Fishkill.

The Oakfield Gypsum Products Corporation, Alabama, Genesee County, N. Y., has been incorporated with a capital of $150,000 by J. L. Hughes, J. R. Swan and H. F. Weaver, Alabama, to manufacture building blocks and other machine-pressed building products. It is represented by Hart & Senior, attorneys, Utica, N. Y.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, will build two one-story coaling towers at its power plant on Walnut Avenue, 133rd to 134th Street, 17 x 67 x 187 ft. high, to cost about $200,000, including machinery. Thomas E. Murray, Inc., 65 Duane Street, is engineer.

The Curtiss Aeroplane Export Corporation, New York, has been incorporated with a capital of $650,000 to manufacture aircraft and parts for export distribution. The incorporators are L. B. Case, W. W. Webster and P. M. Crichton, 41 East Forty-second Street.

The plant of the Sonora Co., Degraw Street and Tiffany Place, Brooklyn, manufacturer of talking machine cabinets, etc., has been purchased by David Kramer, 76-84 Ninth Street, manufacturer of woodwork products, for occupancy. The sale includes the machinery and equipment, the property being held at $400,000. Mr. Kramer has disposed of his former works to Herman Schwartz, 99 Richardson Street, Greenpoint section, cabinet manufacturer, who will establish works at this location.

The Corinth Electric Light & Power Co., Corinth, N. Y., is planning for the erection of a new electric power house.

The Excel All Puncture Proof Tube Co., Inc., Jersey City, N. J., has been incorporated with a capital of $125,000 by David A. Farrington, E. L. Williams and Frank G. Schafer, 673 Summit Avenue, to manufacture tubes for automobile tires and other rubber products.

The Joseph Foy Co., 353 Bank Street, Bridgeton, N. J., has had plans prepared for the erection of a new one-story foundry to cost about $12,000. The W. P. Cameron Engineering Co., Witherspoon Building, Philadelphia, is engineer.

The Sterling Watch Co., West Orange, N. J., has been incorporated with a capital of $200,000 by Benjamin Webster, C. B. Lee and G. H. Barbour, 100 Northfield Avenue, to manufacture watch mechanisms, precision parts, etc.

George W. Smith, Hackettstown, N. J., is planning for the erection of a one-story machine shop on North Main Street.

The General Steel Casting & Machine Co., Jersey City, N. J., has been incorporated with a capital of $125,000, to manufacture steel and other metal castings, etc. It is represented by Alfred F. McCabe, 15 Exchange Place.

The Bureau of Yards and Docks, Navy Department, Washington, is completing plans for the erection of a new power house at Lake Denmark, N. J.

The Caloric Furnace Co., 36 New Street, Newark, has been incorporated with a capital of $100,000 by Oscar H. Cushwa, W. Howard Demarest and L. M. Mullany, to manufacture pipeless furnaces and parts.

The Clinton Electric Co., 266 Springfield Avenue, Newark, has been organized to manufacture parts for electric motors and operate a general motor construction and repair works. Edward Snyder heads the company.

The Westinghouse Electric & Mfg. Co., 95 Orange Street, Newark, has discontinued the manufacture of arc lamps, arc lamp repair parts, fixtures, etc., at its local works, and in the future this line of production will be carried on at its plant at South Bend, Ind. Machinery and equipment will be transferred from Newark.

The Essex Electric Supply Co., Newark, has been incorporated with a capital of $100,000 by Harry J. and Morris Levy, and Emanuel D. Lasher, to manufacture electrical appliances. Harry J. Levy, 277 Market Street, represents the company.

New England

BOSTON, Aug. 15.

A new low record business in machine tools was made the past week in this market. Sales were confined to less than a half dozen tools, the highest price being $750, and about as many used machines were moved. In addition, several dealers have abandoned what they previously considered live prospects involving several thousand dollars' worth of equipment. School business has been disappointing also. Only one local dealer reported any increase in prospective business. Inquiries in this instance, however, are confined to single machines and all are either low or medium-priced tools.

Sentiment regarding business this fall nevertheless is cheerful, although no great expansion is anticipated. The United Shoe Machinery Corporation, Boston, in July had the best month since March and the cotton and woolen industries are more active. Many metal-working plants now closed are expected to resume operations after Labor Day, and more activity among foundries is anticipated, especially in the textile machinery and heating appliance lines. In contrast, the electrical appliance business gives little evidence of improving in the near future and machine-tool houses have given up hope of purchases by New England railroads this year.

Stone & Webster are asking bids on one 50 and one 10-ton crane for the Ford plant at Green Island, N. Y.; the Power Construction Co., Worcester, Mass., on a 15 or 20-ton motor-driven or hand-operated crane, and the Government on one 50-ton crane for South Boston, bids for which will close Sept. 7.

The Chisholm-Moore Mfg. Co., Cleveland, has reduced prices 10 points on chain hoists. The Stanley Rule & Level Co., New Britain, Conn., has reduced prices on gages approximately 10 per cent.

The Great Northern Paper Co., Millinocket, Me., has awarded contract for a one-story repair shop, 102 x 218 ft., at Greenville, Me.

C. G. Garrigus, Bristol, Conn., has purchased 50 acres in Tylerville, Conn., and is perfecting plans for the erection of a plant to manufacture machinery.

The State of Maine has awarded contract for the erection of a State training school at Fort Kent. Augustus O. Thomas, superintendent of public schools, Augusta, Me., is supervising the work.

The metal and wooden toy business conducted by Rene P. Provencal, West Brookfield, Mass., has been acquired by Dubois Brothers, Inc., that town, capitalized for $25,000, recently granted a Massachusetts charter.

Plans are being prepared by Westcott & Mapes, Inc., engineers, New Haven, Conn., for a one-story, 80 x 100 ft. power plant in the rear of 170 Temple Street, for the Edward Malley estate, to cost about $150,000.

A charter has been granted the Arrow Light Co., Inc., Springfield, Mass., to manufacture an automobile traffic signal indicator. It is capitalized for $30,000. Gordon W. Gordon, Springfield, is president, and T. M. Marczal, Chicopee, treasurer.

Anton J. Haug, Taylor Road, Nashua, N. H., is president, and Joseph Simon, 11 Orvis Road, Arlington, Mass., treasurer of the Haug Paper Machine Co., 135 Essex Street, Boston, capitalized for $100,000, recently granted a Massachusetts charter to manufacture paper machinery.

The Baum Dairy Appliance Co., Natick, capitalized for $175,000, has been granted a Massachusetts charter to manufacture dairy, surgical and hospital supplies, machines, dies, tools, etc. Ewald C. Baum, 19½ West Central Street, is president, and Hallett E. Jones, 66 Walnut Street, treasurer.

The New Haven Sherardizing Co., Hartford, Conn., will move its subsidiary, the Middlesex Machine Co., Bridge Street, Middletown, Conn., to Hartford, where it will be operated in connection with the plant at 868 Windsor Street. The Middlesex company manufactures the Connecticut universal grinding machine and special machinery.

The Williams & Anderson Co., 33 Broad Street, Providence, R. I., manufacturer of emblems and other metal specialties, has acquired property, comprising about 70,700 sq. ft., as a site for a new plant.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Aug. 24 for equipment for in-

stallation at the power house at the naval plant, Boston; also, until Sept. 7, for one 50-ton steam crane for use at the Government drydocks, South Boston.

The H. L. Judd Co., Wallingford, Conn., manufacturer of iron and brass beds, brass hardware specialties, etc., has plans under way for an addition to cost about $100,000, including equipment.

C. F. Luce, 36 Pearl Street, Hartford, Conn., architect, is preparing plans for a new six-story machine and repair works, and automobile service building, 150 x 150 ft., on Hicks Street, estimated to cost in excess of $300,000. The owner's name will be announced at an early date.

The Waterbury Metal Mfg. Co., Waterbury, Conn., recently incorporated to manufacture metal products, has been organized with Hans Rasmussen, Bradley Avenue, as president and treasurer; and A. R. Rasmussen, same address, as vice-president.

Otto W. Siebert, Gardner, Mass., formerly treasurer and general manager of the Bay State Metal Wheel Co. and the Children's Vehicle Co., both of East Templeton, Mass., has leased buildings on Main and Logan streets, Gardner, for the establishment of a new plant to manufacture fiber products. The two factories total about 50,000 sq. ft. of floor space. Later it is proposed to construct a new plant.

The Malden Electric Co., Malden, Mass., has filed plans for an addition to its power house at Broadway and Oakland Avenue, to cost about $75,000.

The Osgood-Bradley Car Co., Worcester, Mass., has taken an order from the New York, New Haven & Hartford Railroad Co., New Haven, Conn., for the construction of 22 electric cars for its electrified zone, to cost about $1,400,000. The electric equipment will be furnished by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

James F. Cleary, Jr., 112 Maple Street, Holyoke, Mass., has filed plans for a one-story machine shop on Maple Street, to cost about $15,000.

A one-story power house will be erected by the Gardner Reed & Rattan Co., 323 Pleasant Street, Gardner, Mass., in connection with the construction of a new factory on West Broadway.

The Yankee Carbon Monoxide Burner Co., Providence, R. I., recently organized, has been chartered under State laws with capital of $50,000 to manufacture oil-burning heating devices and equipment. The incorporators are R. A. Morse and Roy J. Oberemeyer, 59 Park Street.

Chicago

CHICAGO, Aug. 15.

It is believed that machine tool sales in this district reached the low water mark in July. One representative dealer reports that he has closed twice as much business thus far in August as was booked in the entire previous month. While orders are still light, the situation is slowly improving. Store trade has picked up and small miscellaneous orders, particularly from automobile accessory makers and repair shops, are more numerous. A fair-sized automobile accessory plant in this vicinity is reported to be running full. There has been no further business from the railroads. The formal letting of the Illinois Central machine tool orders has not yet been made, but is expected at any time. The Santa Fe is again taking figures on a number of large cranes for its Albuquerque, N. M., shops and is expected to place orders in the near future. It is also considering the revival of inquiries for the tools which were not bought when the first purchases were made for Albuquerque some months ago. The Marvel Machinery Co., Minneapolis, manufacturer of automobile axles and other accessories, has issued a list of about 75 tools, part of which are understood to have been placed. Buying is being handled in Chicago by Mr. Bouthinon at the offices of the F. C. West Corporation.

The Huckabee Tractor & Mfg. Co., 704 South Valmar Street, Little Rock, Ark., recently organized, has issued the following list:

One No. 2 universal milling machine with vertical head.
One 26-in. x 14-ft. engine lathe.
One 16-in. x 8-ft. heavy duty precision lathe.
One ½-ton electric crucible.
One power hack saw.
One emery stand.
One 15-hp. high-speed electric motor.
One No. 2 universal grinding machine.
One automatic or semi-automatic gear machine with capacity to cut gears up to 24 in.
One 20-in. crank shaper.
One 24-in. drill press.
One molding machine with 24-in. x 48-in. table.

The city of Chicago, Department of Supplies, is in the market for a 20-in. upright drill, and the Board of Education is inquiring for a three-spindle drill for the Senn High School and three bench lathes for the Harrison Technical High School.

A review of the first half of this year indicates that sales by dealers did not average more than 25 or 30 per cent of those for the first six months of 1920. A slow but steady increase in buying is looked for in the next six months.

A number of important price changes have been made recently. Two Western manufacturers of milling machines have reduced prices 15 and 12½ to 15 per cent respectively, and an Ohio maker of turret lathes has cut quotations 16 per cent.

The Kaestner & Hecht Co., manufacturer of elevators, now at Throop and Harrison streets, Chicago, has bought from A. M. Castle & Co., 102,000 sq. ft. at the northeast corner of Blackhawk and North Branch streets, improved with two seven-story buildings. It will spend $100,000 on improvements and alterations before occupying.

The Campbell Mfg. & Foundry Co., Lake front and Lake Street, Muskegon, Mich., has changed its name to the Muskegon Castings Co.

The Sapihl Electric Tool Co., Galesburg, Ill., has been incorporated with $36,000 capital stock to manufacture machinery and electrical appliances. The incorporators include G. A. Swenson, Fred Peterson, Henry M. Hawkinson, Karl Pihl and G. H. Lorberg.

The Illinois Steel Co., South Chicago, Ill., has a permit to construct a three-story electric power station, 93 x 375 ft., between Eighty-sixth and Eighty-seventh streets, to cost $250,000.

The Advance-Rumely Co., La Porte, Ind., manufacturer of farm implements, has preliminary plans under way for a one-story brick and concrete addition. J. C. Llewellyn, 38 South Dearborn Street, Chicago, is architect.

The North American Car Co., 328 South La Salle Street, Chicago, has preliminary plans under way for a one-story shop, 80 x 120 ft., at 135th Street and California Avenue, Blue Island, Ill., to cost $40,000. Bids are expected to be asked for some time this month.

The Niagara Radiator & Boiler Co., North Tonawanda, N. Y., has purchased from Briggs & Turivas 10 acres at the southwest corner of Eighty-third Street and Woodlawn Avenue, Chicago, and plans to improve the property with a foundry, 140 x 175 ft. Ultimately a four-story warehouse will also be built, the total contemplated improvements involving about $250,000.

The Equipment Corporation of America, represented by H. M. Capron, 11 South La Salle Street, Chicago, has postponed for two years the erection of a large plant at Maywood, Ill., for rebuilding contractors' equipment.

The Sheridan-Wilson Garage Co., 64 West Randolph Street, Chicago, will receive bids through W. G. Uffendell, 39 South State Street, on a three-story reinforced concrete garage, 75 x 200 ft., at 4616-32 Winthrop Avenue, to cost $150,000.

John E. Decker has leased to the Yellow Cab Co., Chicago, a tract, 140 x 260 ft., at the northeast corner of Flournoy Street and La Vergne Avenue, and will erect a one-story plant to cover the area at a cost of $100,000. The lease is for a 20-year term.

The Middle West Utilities Co., 72 West Adams Street, Chicago, has arranged for a note issue of $1,500,000, the proceeds to be used for extensions, improvements and general operation of power plants and system.

The Producers & Refiners Corporation, Waterloo, Iowa, operating the plant of the Hawkeye Oil Co., recently acquired, has plans under way for its new refinery at Casper, Wyo., with initial unit of about 3000 bbl. per day capacity. Later the plant will be extended with output of close to 10,000 barrels daily, with lubricating oil manufacturing works. The complete project is estimated to cost close to $5,000,000, including machinery.

The G. A. Ball Bearing Co., 3051 West Lake Street, Chicago, will call for bids at once for its one-story addition, 205 x 230 ft., at West Lake Street and Albany Avenue, estimated to cost about $65,000. Burrett H. Stephens, 37 West Van Buren Street, is architect.

The Great Western Automobile Co., 22 East Michigan Street, Duluth, Minn., is completing plans for a new two-story and basement automobile service and repair works, 100 x 400 ft., at 2533 West Superior Street, estimated to cost about $200,000 with equipment. Gustave Berquist is president.

The Board of Education, Dubuque, Iowa, is arranging a list of equipment for installation in the manual training de-

partment at the proposed new high school. N. Palen, Bank and Insurance Building, Dubuque, is secretary of the board.

The American Wire Fabric Co., 208 South La Salle Street, Chicago, has filed plans for a new one-story building, 47 x 145 ft., at Blue Island, Ill., to be equipped as a galvanizing works. A warehouse will also be erected. The structures are estimated to cost $100,000.

Buffalo

BUFFALO, Aug. 15.

The Positive Traction Motors Corporation, Buffalo, has been incorporated with a capital of $500,000 by F. X. Irr, R. E. and M. G. Dussau, to manufacture automotive machinery, motors, etc. It is represented by W. J. Bullion, Ellicott Square.

The Milling & Lighting Co., Brasher Falls, N. Y., is planning for the construction of a new electric power plant at St. Lawrence.

The Crostholz-Treiber Co., Rochester, N. Y., has been incorporated with a capital of $24,000 by C. C. and J. N. Crostholz, and W. C. Treiber, Rochester, to manufacture tools, piston rings and kindred products. It is represented by Melvin & Melvin, White Memorial Building, Syracuse, N. Y.

The Buffalo Aeroplane Corporation, 1059 Main Street, Buffalo, has filed notice of dissolution under State laws.

The Rochester Automatic Tool Corporation, Rochester, N. Y., has been incorporated with a capital of $100,000 by J. J. Appel, H. F. Stablerodt and M. J. Landau, to manufacture machinery, tools and dies. It is represented by Bryan & Bryan, Powers Building.

The Reznoir Corporation, Alden, N. Y., has been incorporated with a capital of $30,000 by H. M. Dent, C. E. Leffel and F. J. Moore, Alden, to manufacture molded mechanical products, etc. It is represented by A. W. Plumley, Mutual Life Building, Buffalo.

The Hogle Motor Sales Co., East Main Street, Malone, N. Y., is completing plans for a new three-story automobile service and repair works on East Main Street, to cost about $150,000. W. Hogle is head of the company.

Generators and transformers were damaged beyond repair when fire destroyed the power house of the Wickwire Limestone Co., Gasport, N. Y., Aug. 7. The loss is estimated at $30,000.

Philadelphia

PHILADELPHIA, Aug. 15.

The Richter Machine Co., Van Kirk and Erdrick streets, Philadelphia, manufacturer of textile machinery and parts, has filed plans for a one-story addition, estimated to cost about $10,000. Wolfang Richter is head.

The American Steel Equipment Co., Philadelphia, has been incorporated with a capital of $25,000 to manufacture steel specialties. H. C. Ramsberger, 18 South Eleventh Street, is treasurer.

The United States Heating Appliance Co., Philadelphia, has been chartered under Delaware laws to manufacture heating equipment and appliances. The incorporators are Harold C. Lansinger, Frank A. Cabeen, Jr., Philadelphia; and Edward L. Reeves, Paulsboro, N. J. The company is represented by the United States Corporation Co., Commonwealth Building.

Thomas McGinnis, 1752 North American Street, Philadelphia, has filed plans for a one-story addition to his machine shop at 1716-18 North American Street.

The Philadelphia Rapid Transit Co., 1520 Spruce Street, Philadelphia, has awarded contract to Henry E. Baton, 1713 Sansom Street, for a new one-story car repair works at Thirty-first and Dauphin streets, to cost about $50,000.

The Electro Self-Winding Phonograph Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture talking machines with self-winding spring motors and parts. It is represented by F. R. Hansell, Land Title Building.

Plans for a new power house for the Logan Baking Co., Philadelphia, are being prepared by T. F. Miller, 1012 Walnut Street, Philadelphia, architect, in connection with a new three-story plant.

The Motor Theft Protector Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 by Ralph C. Stewart, Lansdowne, Pa.; William B. Lex and Harry S. Mangin, Philadelphia, to manufacture safety devices and appliances. It is represented by the Corporation Trust Co., Land Title Building.

The Victor Lens Mfg. Co., Camden, N. J., has been incorporated with a capital of $125,000 by Clifford A. Baldwin, George D. Rothermel and Albert E. Burling, 520 Market Street, to manufacture lenses and kindred products.

The Witte Sales Co., Camden, N. J., has been incorporated with a capital of $100,000 by Stephen M. Paschall, John E. Fennell and Edmund A. Witte, 214 Broadway, to manufacture electrical appliances and equipment.

The Universal Coal Machine Co., Little Building, Boston, manufacturer of coal-working machinery, is planning for the establishment of new works in the vicinity of Trenton, N. J., and is in communication with the Chamber of Commerce for the purchase of an existing plant.

The State Purchasing Department, Capitol Building, Trenton, N. J., is considering the installation of a refrigerating plant in the building on Perrine Avenue, recently acquired for $58,800, and heretofore owned by F. A. Poth & Sons. Edward E. Grosscup is State purchasing agent.

The Daniels Motor Co., Reading, Pa., manufacturer of automobiles, has tentative plans under way for new works at Philadelphia for complete car manufacture, including motors and chassis, estimated to cost close to $500,000 with machinery. George E. Daniels is president.

The Harrisburg Corporation, Harrisburg, Pa., operating the Harrisburg Foundry & Machine Co., Seventh and Curtin streets, has acquired a substantial interest in the plant and business of the Henry, Millard & Henry Co., Inc., 1059-65 West Market Street, York, Pa., manufacturer of gasoline engines and tractors, and operating general machine repair works. Plans are under way for enlargements.

The Keystone Supply & Mfg. Co., Bethlehem, Pa., manufacturer of pipe, steam supplies, plumbing equipment, etc., has plans under way for a new two-story factory to cost about $200,000, with equipment.

F. A. Seiberling, formerly president of the Goodyear Tire & Rubber Co., and now head of the Lehigh Tire & Rubber Co., New Castle, Pa., comprising the plant and business of the New Castle Tire & Rubber Co., recently acquired, is said to have merger plans in preparation for a consolidation of the local works with the Republic Rubber Co., Akron and Canton, Ohio, now operating under a receivership, and the Portage Rubber Co., Akron, in which a substantial interest has been secured. The Republic Rubber plants will be made the principal units in the merger.

The Bessemer Truck Co., Grove City, Pa., has been incorporated under Delaware laws, with capital of $100,000 by L. M. Monroe, I. M. Lewis and C. G. Keller, Grove City, to manufacture automobile trucks. The company is represented by the Capital Trust Co., Dover, Del.

The International Mfg. Co., Weatherly, Pa., recently organized, has arranged for the immediate operation of a plant for the manufacture of metal screens and kindred specialties.

The Fayetteville Electric Light & Power Co., Fayetteville, Pa., is being organized by I. S. and C. W. Sollenberger, Greene Township, Franklin County, for the operation of an electric power plant. Application for a State charter will be made on Aug. 22.

Samuel L. and Harry H. Light, and Thomas S. Quinn, all of Lebanon, Pa., and interested in local iron and steel companies, have acquired the plant of the Rivetless Chain & Engineering Co., Avon, Pa., specializing in the manufacture of chains, iron and steel forgings, etc. The new owners will continue the operation of the works.

Pittsburgh

PITTSBURGH, Aug. 15.

A more cheerful tone is observed in the machine tool market, due to inquiries being more numerous. While many of these are merely for the purpose of getting quotations for appropriation purposes, hopes run strong that the last quarter of the year will see a definite increase in orders. The Wheeling Steel Corporation is going ahead with its program of improvements at the LaBelle Iron Works, Steubenville, and has placed an order for a 19-in. 6-stand, continuous bar mill with the Morgan Constructions Co., Worcester, Mass. In the next few days it is expected to put out a formal request for bids on a 35-in. blooming mill and a blooming mill engine. Informal inquiries on this equipment were issued recently. Through the John F. Casey Co., Pittsburgh, the Toledo Crane Co. has secured an order for a 20-ton, 67-ft. overhead crane for installation at the municipal pumping station of Nashville, Tenn. In machine tools is noted the sale of three Fay & Egan motor-driven wood-working machines to a West Virginia lumber company. Machine tool business, as far as actual orders are concerned, still is limited, but dealers are working on several promising inquiries which they hope to close in the near future. The question of price is the dominant factor in sales at present. The Westcott

Chuck Co., Oneida, N. Y., has issued a new list cutting prices from 16⅔ to 25 per cent.

The Ephrata Metal Products Corporation, Ephrata, Pa., has issued an inquiry for a 12-in. or 14-in. x 6-ft. engine lathe, a No. 3 V & O 30-ton inclinable power press, No. 1½ Brown & Sharpe or Rockford universal milling machine, Norton or Greenfield tool grinder, and a small portable filing machine.

The Pennsylvania Tank Car Co., Sharon, Pa., will build an addition costing about $100,000 to its plant at Petroleum, to be used as a repair shop. Machinery for the fabrication of steel parts entering into the manufacture of cars will also be installed. An appropriation of $100,000 for the erection of a similar plant at Argentine, Mo., has also been made. Construction will start immediately and is to be completed in 90 days.

The American Steel & Wire Co., Fifteenth Street and Pennsylvania Avenue, Pittsburgh, has acquired property at Braddock, 76 x 100 ft., for $35,000, to be used for extensions.

The West Penn Power Co., Pittsburgh, has arranged for a bond issue of $3,000,000 for extensions, improvements, general operations, etc.

The Wire Products Corporation, Oakmont, Pa., has been chartered under State laws to manufacture wire goods and other steel products. James W. MacFarlane, Woodland Road, Pittsburgh, is treasurer.

The Du Roth Steel Truck & Car Wheel Co., Pittsburgh, has been incorporated under Delaware laws with capital of $500,000 to manufacture steel trucks, car wheels and other iron and steel products. It is represented by Wilber A. McCoy, 237 Fourth Avenue.

The Union Ice Co., Pittsburgh, has filed plans for the erection of a two-story plant, 75 x 100 ft., at 817 Beaver Avenue, to cost about $100,000 with equipment.

The United States Engineer Office, Pittsburgh, will receive bids until 12 noon, Sept. 2, for the construction of 3 steel deck barges. Plans and specifications are on file at the local office.

The Seyler Mfg. Co., Pittsburgh, has been incorporated with a capital of $100,000, to manufacture hardware products. J. T. Seyler, 525 Aspen Street, is treasurer.

The Brownsville Window Glass Co., Brownsville, Pa., is planning to rebuild its plant destroyed by fire Aug. 6, with loss estimated at about $300,000, including machinery. W. S. Phillips is general manager.

The Leevale Coal Co., Leevale, W. Va., is planning for the construction of a new steel tipple at its local properties. Headquarters of the company are at Charleston, W. Va. D. H. Morton is general manager.

The Holdred Collieries Co., Blair, W. Va., will build a new tipple, install shaker screens and make other extensions and improvements at its local properties. R. S. Wing is manager.

The Ohio & Pennsylvania Coal Co., Wheeling, W. Va., has completed plans for the construction of a new tipple at its Yorkville mine, near Wheeling.

Detroit

DETROIT, Aug. 15.

The local machine-tool market is improving slightly. Inquiries are on the increase and a larger number of single orders are coming through. No great betterment is expected, however, in the immediate future.

The plant of the American Car & Foundry Co. in Detroit will reopen the middle of September with an order for 500 new steel hoppper cars from the New York Central Railroad. This will give employment to about 1000 men, although the normal force is 2000. Two months ago the plant was closed after finishing the overhauling of 5000 freight cars.

The Hart Quick Change Rim Co., Hart, Mich., has been organized with a capitalization of $100,000 by L. P. Hyde, George W. Powers and Frank Demmon, Hart, to manufacture a new collapsible rim attachment for motor cars.

The Cameron Motors Corporation, New York, has purchased the implement plant of Cass T. Wright, Greenville, Mich., for the production of parts for the Cameron air-cooled car and Sandusky tractor. About 400 men will be employed.

M. Brownell, Battle Creek, Mich., who recently purchased the business and patents of the True Mfg. Co. of that city, states that the business will be located in Eaton Rapids, Mich. Construction on a new factory will be started soon.

King Brothers, Marquette, Mich., will establish a boiler and iron works at Houghton, Mich., to be known as the Northern Boiler & Iron Works. It will specialize in boiler repairing and acetylene welding.

Everett Winters, contractor, Detroit, has begun work on the construction of a $250,000 hydroelectric plant on the Boardman River for Traverse City, Mich.

The Howell Washing Machine Co., Howell, Mich., has been incorporated with a capital of $60,000 by William M. and Chester L. Schwartz, Howell, and Julius Englander, 59 Forty-second Boulevard, Detroit, to manufacture electrically operated washing machines and parts.

The American Forging & Socket Co., Branch and Air Line streets, Pontiac, Mich., is completing plans for a new one-story foundry, estimated to cost about $30,000.

The Morton Mfg. Co., Muskegon Heights, Mich., has been incorporated with a capital of $150,000 by Henry E. Morton, Mason B. Morton and William Rowan, Jr., Muskegon Heights, to manufacture agricultural machinery and implements.

The Reynolds Roofing Co., Grand Rapids, Mich., is planning to rebuild its main plant, destroyed by fire, Aug. 3, with loss reported in excess of $200,000, including equipment.

The Forth Resilience Mfg. Co., Detroit, has been incorporated with a capital of $100,000 by William Edelstein, W. J. Spearman and Charles Forth, 66 Lawrence Avenue, Royal Oak, Detroit, to manufacture automobile parts and other automotive equipment.

The Ravena-Conklin Electric Light & Power Co., Ravena, Mich., will soon take bids for the construction of a new hydroelectric power plant, to cost about $85,000. Holland, Akerman & Holland, 106 East Liberty Avenue, Ann Arbor, Mich., are engineers.

The Kess-Line Motors, Inc., Detroit, has been incorporated with a capital of $500,000 by Peter De Vries, William L. Kraetke and Charles A. Greenwood, 626 Orange Street, Wyandotte, Mich., to manufacture automobile tractors, engines and similar products.

The Ford Motor Co., Detroit, has construction under way on a new building at Northville to be equipped as a welding works, and used primarily in connection with the manufacture of valves and valve stems.

Baltimore

BALTIMORE, Aug. 15.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturers of sheet metal products, have arranged with the city for the closing of a portion of Race Street, the property to be used in connection with the erection of an addition.

The Bull Dog Lock Washer Co., Baltimore, care of the Industrial Bureau, Board of Trade, Munsey Building, is arranging for the establishment of a local plant to manufacture special lock washers and kindred products.

The National Differential Mfg. Co., Takoma Park, Washington, has been incorporated under Delaware laws, with capital of $250,000, by Anthony J. Casel, and George E. Gaylord, Takoma Park, and Joseph B. Simpson, Brightwood, D. C., to manufacture axles and similar equipment for automobiles. It is represented by the Capital Trust Co., Dover, Del.

Considerable electrical and mechanical equipment, including loaders, conveyors, transmission machinery, etc., will be installed at the new grain elevator of the Western Maryland Railroad Co., Continental Building, Baltimore, to be located at Port Covington. It will duplicate the company's present plant here and is estimated to cost in excess of $1,000,000. Plans have been completed.

The Phillips Steam Car Co., Wilmington, Del., has been incorporated with a capital of $5,000,000 to manufacture steam-driven automobiles. It is represented by the Colonial Charter Co., Ford Building.

The Board of Harbor Commissioners, Wilmington, Del., has awarded a contract to the du Pont Engineering Co., du Pont Building, for the construction of its proposed new marine terminal at a cost of $1,372,570. It will be equipped with loading and unloading machinery, hoisting and conveying apparatus, etc.

Plans are nearing completion for the proposed new paper mill to be erected by the Gwynns Falls Paper Co., 517 Calvert Building, Baltimore, on property recently acquired at Gwynns Falls, and bids will soon be asked. The main mill will be one, two and three-stories, 75 x 400 ft., estimated to cost about $250,000 with machinery. Joseph H. Wallace, 5 Beekman Street, New York, is engineer. George W. Davis is head.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until Aug. 31, for the construction of an addition to the power house at the naval grounds, Annapolis, Md., including ash bunker, coal bunker and other work. On the same date, the department will receive bids for a new gun shed at the Marine Barracks Reservation, Navy Yard, Norfolk, Va. Until Sept. 21, the department will receive bids for a one-story machine shop, 181 x 520 ft., at

the Naval Station, Pearl Harbor, H. T. C. W. Parks is chief of the bureau.

The Norfolk & Western Railway Co., Norfolk, Va., Room 351, J. H. Clemmitt, purchasing agent, will receive bids until 12 o'clock noon, Aug. 24, for about 75,000 lb. of soft steel bars, 120 rods of wire fencing, electrical material, parts for electrical apparatus, and parts for pumping machinery.

The Atlantic Ice & Coal Corporation, Atlanta, Ga., is planning for extensions and improvements in its ice-manufacturing and cold storage plants at Atlanta, Decatur and Fort Valley, Ga. The work is estimated to cost about $700,000, of which about $500,000 will be used for doubling the capacity of the Atlanta plant, and $100,000, each, for work and equipment at the two other points.

The Earley Process Materials Co., Washington, has been incorporated with a capital of $25,000 by John B. Earley, B. B. Taylor and Henry W. Heine, Washington, to manufacture concrete products and other materials. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Carolina Shipyards, Wilmington, N. C., have been purchased by the Maryland Wrecking Co., Baltimore, which plans for the early dismantling of the plant. John E. Smith is president of the purchasing company.

Milwaukee

MILWAUKEE, Aug. 15.

Conditions in the machine tool market appear somewhat brighter, inquiries as well as actual orders placed having shown at least slight improvement in the last two weeks. Volume is lacking, however, and transactions almost invariably involve a single machine. Orders originate in a scattering way, with the automotive industries predominating as the source. A few orders from railroads have been booked. Production remains at a low ebb and it is not believed that any material increase in output will be necessary until after Sept. 1.

The Chicago, Milwaukee & St. Paul Railway Co., 80 East Jackson Boulevard, Chicago, is reported to have instructed its engineering department to prepare tentative plans and secure estimates of the cost of erecting a new grain elevator and storehouse at Lake and Greenbush streets, in Milwaukee, to replace the plant known as Elevator A, which was destroyed by fire Jan. 16. It is to be of reinforced concrete, 85 x 285 ft., 85 ft. high, and cost about $1,500,000, including a full complement of new elevator, electric motor and power equipment, boilers, etc. Work probably will be undertaken early next spring, but the substructure may be built during the fall and winter. C. F. Loweth is chief engineer, and C. P. Rawson, chief architect, with offices at Chicago. The company is also making preliminary plans to rebuild the main car repair department of the West Milwaukee car and locomotive shops, destroyed by fire a year ago. The investment in buildings and equipment will be about $350,000. C. F. Loweth, 80 East Jackson Boulevard, Chicago, is chief engineer.

The Capital City Pattern Co., Madison, Wis., will build an addition at 613 Williamson Street, to cost about $15,000, including equipment. W. J. Gregerson is president.

The Andrew Mfg. Co., 533-545 Thirtieth Street, Milwaukee, has changed its corporate title to the Wehr Co. It was originally founded as the Andrew Motor Mfg. Co., at 736 Windlake Avenue, to manufacture rowboat and canoe motors. Later it was converted into a commercial machine shop. About a year ago the business was acquired by members of the Wehr Steel Co., Milwaukee, a manufacturer of electric steel castings for the automotive and agricultural machinery industries, and moved to its present location. E. R. Wehr is president, and William K. Andrew, vice-president and general manager.

The Service Auto Spring Co., 426 Sycamore Street, Milwaukee, manufacturer of motor vehicle springs and accessories, has changed its name to the Widmeyer Auto Spring Co., E. F. Widmeyer, secretary-treasurer and general manager.

The Lincoln Light Corporation, Milwaukee, organized several months ago with a capital stock of $150,000, has started operations in its new factory erected as an addition to the plant of the Jungers Stove & Range Co., at Grafton, Wis. The offices also have been moved from Milwaukee to Grafton. The Lincoln company will manufacture a self-contained electro-generating unit designed for lighting farms and other isolated places.

The Silent Washer Mfg. Co., Clintonville, Wis., which erected a new factory the past year, has completed all experimental work and is starting quality production of domestic washing machines with manual, belt power and direct electric motor power. For the present it is buying its castings from outside foundries, but it is planned to erect an addition to house a casting shop within the coming year. O. R. Schwantes is president.

Cincinnati

CINCINNATI, Aug. 15.

No material improvement is noted in the machinery market. While undoubtedly a better feeling prevails, it has not yet been demonstrated in the number of orders placed. Local manufacturers report scattered orders for one or two machines, but business continues light. A number of lists, however, are expected to close during the week, including those of the American Sugar Refining Co. and the Big Four Railroad. A list issued some months ago by the Missouri, Kansas & Texas Railroad, and on which no action has been taken, will likely be revived shortly. An Eastern car equipment company is inquiring for several punches and shears and the Ford Motor Co. is reported to be in the market for at least one planer. Several machine-tool manufacturers in this district have completed contracts on which they had been working for some months for duplication of rolling mill equipment for India.

Local jobbing foundries are running at approximately 15 per cent of capacity. Stove shops in the district, however, are showing some improvement and some estimates place their rate of operation at approximately 60 per cent.

No price changes on machine tools are reported. In this connection an item in last week's issue stating that an Eastern manufacturer of shapers had reduced prices approximately 15 per cent has been denied.

The Merkel Brothers Co., Cincinnati, jobber in plumbing supplies, is having plans prepared for a warehouse containing 200,000 sq. ft. of floor space in the Walnut Hills section. The building will be 100 x 400 ft., five stories. Bert Baldwin, Second National Bank Building, Cincinnati, is the architect.

The Dayton Paper Products Machine Co., Dayton, Ohio, has been incorporated with a capitalization of $10,000 to manufacture machines for assembling paper milk bottles. The machine is the invention of William Brown, Dayton, who, with Otto C. Crisp and W. J. Seifried, is one of the incorporators.

The Central South

ST. LOUIS, Aug. 15.

The first large order to be placed by the railroads for some time is reported this week. Manning, Maxwell & Moore, Inc., sold the Missouri Pacific a 42-in. motor-driven drill press for its shops, at Sedalia, Mo., and a 23B Greenlee Brothers mortiser for the Dupo, Ill., shops.

The Yard-O-Meter Corporation, St. Louis, manufacturer of measuring and computing machines for textiles, has leased larger quarters, in the Lucas Building, at Fourth and Locust streets.

The Standard Machine Works, Memphis, Tenn., is planning for enlargements in its plant for the manufacture of locomotive equipment. W. W. Jones is head.

The United Light & Power Co., Abilene, Kan., and the Pawnee Power & Water Co., Larned, Kan., have been merged under the name of the United Light & Power Systems, Inc. The consolidated company is planning for extensions and improvements in its different power plants and systems.

The Kentucky Block Fuel Co., Pikeville, Ky., has completed plans for the construction of a new tipple at its plant, estimated to cost about $25,000. Charles K. Wagner is vice-president in charge.

The Mississippi River Commission, Customhouse, Memphis, Tenn., will receive bids until 11 a. m., Sept. 5, for the construction of 13 steel barges, as per plans and specifications on file.

The Board of Directors, State Hospital, Fulton, Mo., is considering plans for a new power house to cost about $45,000. M. O. Biggs is superintendent.

The Missouri, Kansas & Texas Railroad Co., St. Louis, is planning for the conversion of its steam locomotives to oil burning operation, and will begin work at an early date. The improvements, including equipment for storing and handling oil, etc., is estimated to cost about $1,000,000.

C. W. Squires, Galena, Kan., is planning for the construction of a new rock crushing plant, with initial capacity of about 225 tons per day.

The Lock Joint Pipe Co., Kansas City, Mo., will commence the erection at once of its new plant at Webb City, Mo., for the manufacture of reinforced cement pipe and kindred products. The initial plant will cost about $125,000.

The Arkansas Royalty Co., Little Rock, Ark., has plans under way for a new refinery at El Dorado, Ark., with initial output of about 5000 gal. per day. Lee Miles is president.

The Board of Directors, Federal Penitentiary, Leavenworth, Kan., W. I. Biddle, warden, has approved plans for the construction of a new power plant at the institution to cost about $145,000, including boilers, engines and auxiliary machinery.

The Board of City Commissioners, Pawhuska, Okla., has plans under way for an addition to the municipal electric power plant. A list of equipment will be prepared at an early date.

The Kansas City Power & Light Co., Kansas City, Mo., has completed plans for the construction of a new one-story power house at Sixty-first and Forest streets 60 x 90 ft. A. E. Beltis is chief engineer.

Indiana

INDIANAPOLIS, Aug. 15.

The Active Coal Co., 607 Board of Trade Building, Indianapolis, Ind., has plans under way for a new coal-handling plant at Fourteenth and Senate streets, to cost about $50,000. Bacon & Teislow, 30 West Ohio Street, are engineers. P. M. Gale is president.

The Arctic Corporation, Michigan City, Ind., has been incorporated with a capital of $200,000, by E. E. Mikesell, H. L. Henry and S. W. Wilhelm, Michigan City, to manufacture refrigerating machinery and parts.

The Interstate Car Co., Massachusetts Avenue and Sherman Drive, Indianapolis, manufacturer of automobiles, has filed plans for a one-story addition to cost about $25,000.

The Standard Electric Co., Hammond, Ind., has been incorporated with a capital of $25,000 by W. R. Wermine, Ernest Freeman and Oliver W. Hershman, Hammond, to manufacture electrical equipment.

The Spurgeon Brothers Mfg. Co., Muncie, Ind., has been chartered under State laws to manufacture automobile equipment and parts. The incorporators are K. A., W. W. and W. C. Spurgeon, Muncie.

The United States Radiator Corporation, Indianapolis, has leased a building, 50 x 150 ft., on Senate Avenue, now being constructed by Marks Brothers, for the establishment of a new assembling plant. A portion of the structure will be used for storage. Harry L. Repp is local manager.

The New Castle-O'Brien Woven Lath Co., New Castle, Ind., has been chartered under State laws to manufacture wire lath and kindred products. The incorporators are W. F. Wilkinson, Claude Byers and B. F. Netz, New Castle.

The Gulf States

BIRMINGHAM, Aug. 15.

The Peninsular Tire & Rubber Co., Tampa, Fla., recently incorporated with a capital of $1,000,000, has plans under way for a new two-story plant, 100 x 300 ft., for the manufacture of automobile tires. The initial works will have an output of about 300 tires per day, and will cost about $200,000, including equipment. A. H. Van Auken is general manager.

The Oldsmar Tractor Co., Oldsmar, Fla., is planning for an addition to its plant for the manufacture of oil heaters and heating equipment. It will be operated as a branch of the tractor works. H. J. Keller is vice-president and general manager.

The Humble Oil & Refining Co., Corpus Christi, Tex., is considering the erection of a new refinery in the vicinity of Benavides, Tex.

The Southern Railway Co., Charlotte, N. C., is planning to rebuild its coal tipple at Chamett, La. L. S. Lemond is chief engineer.

The Peninsula Ice & Cold Storage Co., Daytona Beach, Fla., recently organized, has plans under way for a new ice-manufacturing plant with initial output of about 30 tons per day. A new cold storage plant will also be constructed. Guy G. Bailey is president, and E. B. Parker, secretary and treasurer.

The Panhandle Brick & Tile Co., Amarillo, Tex., has been incorporated with a capital of $80,000, by W. C. Pope, H. B. Boyle and A. S. Stinnett, Amarillo, to manufacture brick, tile and kindred products.

The Chapman Carriage Works, Jacksonville, Fla., is having plans prepared for the construction of a three-story addition for the manufacture of automobile bodies and tops, estimated to cost about $100,000, with machinery. Marks & Shettall, Jacksonville, are architects. W. E. Sweney, 332 West Forsythe Street, is president.

Ernest Lynn, Hartsells, Ala., and associates, are planning the construction of a hydroelectric power plant in the vicinity of the Big Four Ranch, to cost about $100,000, including equipment.

The Kelsite Stone Products Co., 210 Seward Building, West Palm Beach, Fla., has had plans prepared for a factory to manufacture concrete building blocks, tile and kindred products. A list of machinery is being arranged, estimated to cost close to $15,000. H. G. Mitchell is president.

R. L. Spann, Dallas, Tex., has had plans prepared for a three-story machine and automobile service work, including department for equipment manufacture, estimated to cost about $85,000.

California

SAN FRANCISCO, Aug. 10.

The local market for machine tools is narrow and uninteresting. Business in new materials has been very small and is handicapped by the surplus of second-hand tools, to which most buyers are turning. Shop activities have also been curtailed, thereby reducing the demand for equipment.

The Tunison Motor Co., Thayer Building, Oakland, has plans under way for a new one-story, reinforced concrete factory, 150 x 450 ft., for the manufacture of automobiles and parts, estimated to cost about $250,000. It is proposed to begin construction early in the fall.

Reed Brothers, Inc., 91 Drumm Street, San Francisco, manufacturer of surgical instruments, rubber goods and similar products, has preliminary plans under way for a new branch factory at Irvington, Cal., estimated to cost about $100,000, with equipment. The first unit will be supplemented later by additions.

The California Gypsum Corporation, 731 Pacific Finance Building, Los Angeles, has preliminary plans under way for a new works at Coyote Wells, Imperial County, estimated to cost about $350,000 with equipment. A crushing plant with steam shovel and other machinery is estimated to cost approximately $100,000. A 16-mile narrow-gage railroad will also be constructed at an estimated cost of $200,000, including locomotive and rolling stock. R. W. Waterman is construction engineer.

The Pruden-Burr Unitsteel Construction Co., Douglas Building, Los Angeles, a subsidiary of the Metal Shelter Co., St. Paul, Minn., has preliminary plans under way for the establishment of a local plant for the manufacture of unit steel products for building construction.

The Severin Motor Co., Oakland, Cal., formerly located at Kansas City, Mo., is having plans prepared for a one-story, reinforced-concrete factory, 60 x 450 ft., for the manufacture of automobiles and parts. It is estimated to cost about $100,000. Maury I. Diggs, Easton Building, Oakland, is architect.

R. F. Angulo, Santa Barbara, Cal., manufacturer of building tile and kindred products, is considering plans for a new branch factory at Monterey, Cal.

The Los Angeles Street Railway Co., Pacific Electric Building, Los Angeles, will make extensions and improvements in its electric power plants and lines, to cost about $500,000.

The California Car Co., 496 Twelfth Street, Oakland, Cal., has leased the plant of the Enterprise Foundry Co., Richmond, Cal., for temporary works, pending the erection of its new plant at Oakland, plans for which are being prepared. The company manufactures automobile equipment and parts.

The T. H. Symington Co. has established a northwestern district with headquarters in St. Paul, Minn. J. F. Schurch, vice-president of the company and president of the Railway Supply Manufacturers' Association, who has been head of the company's Chicago office for several years, will have charge of the new district. In the Chicago office he will be succeeded by Le Roy Kramer, who has been elected a vice-president and director of the company. Mr. Kramer was for years identified with the operating department of the Frisco and Rock Island railroads and for six years was vice-president in charge of manufacturing for the Pullman Co. During the war he was Federal manager of the Frisco and the Missouri, Kansas & Texas railroads at St. Louis under the United States Railroad Administration. In the spring of 1919 he became vice-president in charge of production of the Willys-Overland plant at Toledo, and for a short time was vice-president of the Pierce-Arrow motor car plant at Buffalo.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

Bars:	Per Lb.
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅝ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¼ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.25c. to 4.50c.
Annealed soft	4.25c. to 4.50c.
Galvanized annealed	5.00c. to 5.25c.
Coppered basic	4.75c. to 5.00c.
Tinned soft Bessemer	6.25c. to 6.50c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	18½c. to 20 c.
Copper tube, seamless	20 c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb.... 30c. to 32c.

Old Metals

The market is quiet but there is a little better feeling regarding the future. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.75
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

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Primitive Iron Smelting in China

Tubal Cains of Today—How Natives Make Cast Iron and Put Phosphorus Into It Without Knowing It

BY THOMAS T. READ*

TUBAL CAIN, according to Biblical tradition, was the first ancestor of every worker in brass and iron. It seems a far cry from that legendary gentleman and his methods to the modern iron blast furnace, with an output of 500 tons of pig iron per day, and the open-hearth furnace with its correspondingly great yield of steel, but a more surprising thing is that, in the far corners of the earth, methods essentially the same as those primitive beginnings are still being practiced.

One of the most famous centers of iron smelting by primitive methods is the Ping-ting-chou region of Shansi province, China. How long ago the art of iron smelting was developed there we have no certain knowledge, for iron yields so readily to corrosion and cast iron is so difficult to engrave and lends itself so readily to being broken up and remelted that it does not yield the ancient records that make bronzes so valuable to the student of history. The cast iron cooking kettles and other objects collected from this region by Berthold Laufer are quite certainly ascribed to the Han dynasty, but whether the industry in Shansi had its beginning in this dynasty, which was so active in bringing to China the arts and products of distant lands, we do not know.

Since iron is mentioned in Chinese records nearly 20 centuries before the Christian era, it is not at all improbable that the art was practiced much earlier than 200 B. C., and at any rate we have before us the picture of the metallurgists' art practiced in essentially the same way for over 20 centuries. It seems probable that the method used was devised in this region, because it differs markedly from the

*Bureau of Mines, Washington.

The Hoisting Engine Used to Raise the Ore Wears a Cheerful Expression. The small shafts are shallow and the workings very narrow. The small brick structure at the right is the shrine of the local deity

usual method of iron smelting followed by primitive peoples. Usually a small rude furnace is constructed by digging a shallow hole in the earth, such as the Japanese used to use for copper smelting, and through improvements the artisans gradually arrive at such furnaces as can be found in Szu-chuan and the Philippines today. Those about to be described are quite unusual and therefore it is probable that they originated at the place where they are now found.

It was my privilege, a few years ago, to traverse this region on foot, thus affording ample opportunity to make observations and secure photographs. F. A. Foster has kindly given permission for the use of some of his own photographs, secured subsequently, that supplement my own.

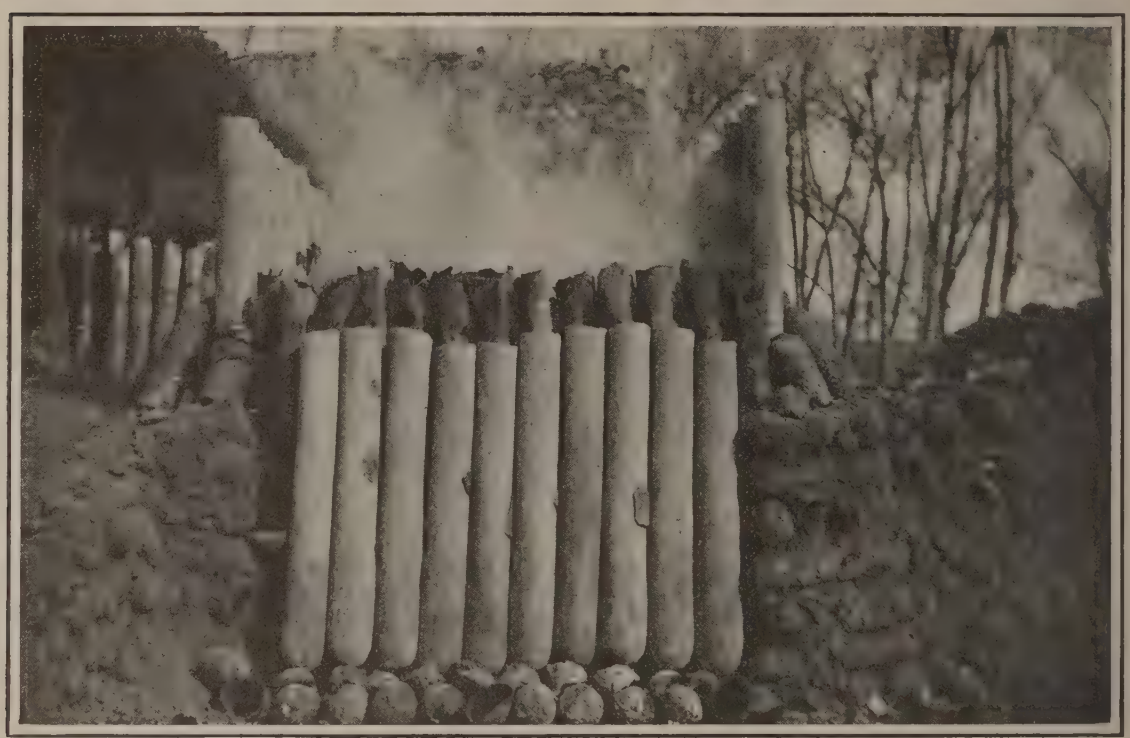
The Chinese have until the introduction of modern civilization exhibited little need for iron; cast iron pans for cooking, chilled cast iron points for ploughs, axles for carts and a few more objects of a simple nature being the principal forms in which cast iron was used. To provide saws, axes, knives, razors, etc., for so primitive a civilization, even a smaller quantity of steel was necessary. It so happened that in this region, lying near the center of the ancient civilization of the "Sons of Han," coal and iron ore are found in close proximity and thus formed the basis of essential enterprise.

The iron ore is not of especially good quality, according to modern standards, and the deposits are small, seldom being over 3 ft. in thickness. They are worked in the most primitive way, one of the illustrations showing how simple is the hoisting equipment and how small the shafts, which are also relatively shallow. The ore, after being brought to the surface, is sorted by hand into several grades and sold to the smelters. The grading seems to be purely empirical, for I could not learn that any method of ascertaining the iron content was ever practised.

At the smelter the ore is mixed with half its weight of coal (not coke) and packed into cylindrically formed clay crucibles, 5 in. in diameter and a little less than 4 ft. long. From 250 to 275 of these crucibles are set upright inside an inclosure 12 by 6 by 4 ft. Spaces for the entrance of air beneath the crucibles are provided by the interstices between the loosely laid butts of old crucibles which form the floor of the inclosure. Over these is spread a layer of coal; the crucibles are set in place, with coal between them, until the inclosure is full, when the front is closed up, the furnace lighted at the bottom and allowed to burn by natural draft for three days. Then the front is taken down and the crucibles removed, a row at a time.

In the meantime, the coal in the crucible has robbed the iron ore of its oxygen and reduced it to metallic iron. Near the bottom of the crucible the heat has been sufficiently intense so the particles of iron have fused together into an irregular "bloom," but near the top the iron is in separate particles, from the size of a nut down to fine shot. The native hunters used the finer particles as shot and one evening I dined off a fine roast partridge which had been slain with this very material. Being pure iron it is relatively soft and therefore does not wear away the barrel, as cast iron particles would, and the smooth-bore matchlock which the hunter used was probably not dependent on fine adjustments.

The coal which was inside the crucible is not all consumed in the process but is partly converted into coke. This is carefully saved and used to mix with clay in making the crucibles. Rigid economy is characteristic of all the operations and the tops of the crucibles, which usually come through unharmed, are carefully saved. Thus the tops of the crucibles of one operation become the bottoms of the next set. The thick portion at the bottom fuses very hard and is used to make the porous bottom



Iron Ore Mixed with Half Its Weight of Coal Is Packed into These Crucibles. After the front is closed it is lighted and burned for three days; then the iron is taken out

Labor Is So Cheap and Economy Is So Necessary That the Used Crucibles Are Repaired and Used a Second Time. These are patched crucibles drying in the sun

for the furnace, as building material in constructing the sides and also in building house and courtyard walls. Even these manifold uses do not absorb all the supply available.

These primitive artisans are economical of labor as well as of materials. The clay from which the crucibles are made is spread in the roadway and the hoofs of the passing pack trains pulverize it, work organic matter into it and develop its plasticity. The crucible maker screens out the fine clay and throws the coarser portions back under the feet of the passing mules for further pulverizing.

The bloom of iron at the bottom of the crucible is worked up into wrought iron objects of every conceivable description. It is heated in a wood fire (so that it will not absorb carbon and become hard) and hammered until it is free of slag and earthy matter and gradually becomes welded into a solid ingot. These ingots are sold to iron-workers who work them up into the finished product, at the ex-

The Furnace for Melting Down the Cast Iron Has a Blower at the Back to Give a More Intense Heat. The crucibles are corrugated to give greater strength

This Tilting Furnace Is a Modern Improvement. A stream of molten iron is running into the casting ladle. The blowing engine is inside the box-line structure at the right

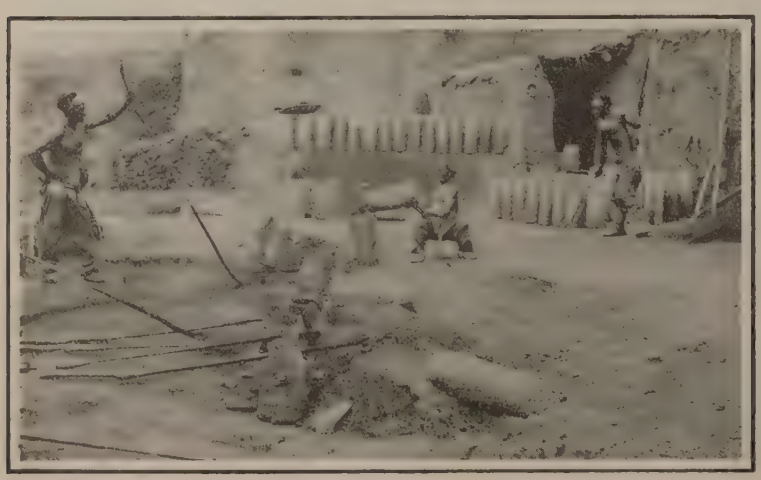
penditure of almost infinite labor. Mostly this is done by heating and hammering but the final finishing of thin tools, such as knives and razors, is done by scraping. The tool is finally converted into steel by the cementation process, which seems to be the common practice of all peoples. The finished tool is packed in charcoal and heated until it absorbs enough carbon to be converted into steel of the requisite hardness.

Wrought iron made in this way was at one time the sole source of supply of the Chinese artificer of wrought iron and steel, but for many years now scrap steel from foreign countries, especially old horseshoes, have become increasingly popular with the ironworkers as the source of raw materials for their trade. This competition of foreign materials in the principal centers of population has led to the modern decline of the industry, which Von Richthofen says was much more extensive at the time of his visit, 40 years ago, than it is now.

The small, loose particles of iron in the crucibles are used for making cast iron objects. They must be made to take up carbon so they will melt at a workable temperature and this is done in the following ingenious way. The smaller pieces of iron are mixed with coal and put into crucibles about 7 by 14 in. in size, and 70 to 80 of these crucibles are put into a furnace for which the draft is furnished by a hand blower. The original material is fairly pure iron but during the melting it takes up both carbon and phosphorus from the coal. The smelterman adds some impure coal, which they call "hei-tu" and which probably serves to introduce more phosphorus, making the melted cast iron very fluid, so that it runs well in the molds in casting. These primitive metallurgists do not know there is phosphorus and carbon in their cast iron and are quite unaware of the effect of these elements on iron and yet through experience they have worked out an elaborate technology that produces the desired result.

In preparing the molds for casting, these native artisans display extraordinary skill. The smaller objects are cast very thin and are yet quite perfect. In some cases wrought iron parts are placed in the molds and the cast iron poured around them, thus making a composite object, which is better for some purposes than one made wholly of cast iron.

A Fairly Extensive Operation Is the Casting of Small Objects



It Is a Practice to Dump the Contents of Several Crucibles into One Before Pouring

Copper and Brass Research Association

The formation of the Copper and Brass Research Association, an unincorporated, voluntary organization of the copper, brass and copper-alloy interests, has been announced by its president, R. L. Agassiz, president Calumet & Hecla Mining Co. The purpose of the association as stated in its by-laws is to stimulate by co-operative effort the use of copper, brass and copper-alloy products. Membership is open to producers of copper sold here or selling agents of copper in the United States, to fabricators of copper, brass and copper products generally in the United States and Canada, and to others directly engaged in or connected with the copper and brass industries.

Eligibility for membership in the association is determined by the Board of Directors, which is composed of the following:

Walter Douglas, Phelps Dodge Corporation; C. F. Kelley, Anaconda Copper Mining Co.; H. C. Bellinger, Chile Exploration Co.; Stephen Birch, Braden Copper Co. and Kennecott Copper Corporation; F. H. Brownell, American Smelting & Refining Co.; R. L. Agassiz, Calumet & Hecla Mining Co.; Charles Hayden, Utah Copper Co. and Chino Copper Co.; C. V. Jenkins, Ray Consolidated Copper Co. and Nevada Consolidated Copper Co.; H. B. Paull, Calumet & Arizona Mining Co. and New Cornelia Copper Co.; W. Parsons Tod, Copper Range Co. and Quincy Mining Co.; Robert H. Gross, East Butte Copper Mining Co.; J. Parke Channing, Miami Copper Co.; Fred S. Chase, Chase Rolling Mills Co. and Chase Metal Works; Henry F. Bassett, Taunton-New Bedford Copper Co.; Edward H. Binns, C. G. Hussey & Co.; H. J. Rowland, Rome Brass & Copper Co., and U. T. Hungerford, U. T. Hungerford Brass & Copper Co.

Making Molds for Cart Axles. A mold for a bell is seen at the left

The officers of the association are: R. L. Agassiz, president; Fred S. Chase and C. F. Kelley, vice-presidents; Stephen Birch, treasurer; W. S. Eckert, secretary. William A. Willis has been appointed manager of the association, which has offices at 25 Broadway.

A Small Cast-Iron Cook Stove and the Mold

Membership in the association now includes the following:

American Smelting & Refining Co., Anaconda Copper Mining Co., Braden Copper Co., Calumet & Hecla Mining Co., Calumet-Arizona Mining Co., Chile Exploration Co., Chino Copper Co., Chase Metal Works, Chase Rolling Mills Co., Copper Range Co., East Butte Copper Mining Co., U. T. Hungerford Brass & Copper Co., C. G. Hussey & Co., Kennecott Copper Corporation, Lake Copper Co., Michigan Copper & Brass Co., Miami Copper Co., Mother Lode Coalition Mines Co., National Brass & Copper Co., Nevada Consolidated Copper Co., North Butte Mining Co., New Cornelia Copper Co., Phelps Dodge Corporation, Quincy Mining Co., Ray Consolidated Copper Co., Rome Brass & Copper Co., Scoville Mfg. Co., Shattuck Arizona Copper Co., Taunton-New Bedford Copper Co. and Utah Copper Co.

Last year, the Pennsylvania is reported to have laid 82,500 tons of 130-lb. rails, enough for 404 miles of single track.

Automobile Race for the Steel Treaters Convention

George Desautels, chairman of the entertainment committee for the convention and exhibition of the American Society for Steel Treating in Indianapolis, Sept. 19 to 24, has issued an announcement of a match race between Frontenac and Duesenberg automobiles. This 50-mile race will be staged on the speedway, Wednesday, Sept. 21, at 10.00 a. m. This is the first time in the history of the speedway that the authorities have ever consented to let anyone stage a race of any kind on this track other than the annual race meet on Decoration Day. There will be three or four Frontenac cars and three Duesenberg machines. The manufacturers of these machines are located in Indianapolis and are great rivals. Other races are possible.

While the race will probably be the largest event and probably of the greatest interest to the visitors, Chairman Desautels has, nevertheless, arranged for golf and tennis tournaments and ball games between the Eastern and Western delegates. Dances, smokers, vaudeville and a continual round of enjoyment are promised for the visitors. The steel treaters are looking forward to having the largest convention and most enjoyable occasion in their history. Prospects for technical papers are up to expectations. The hotels are already reporting heavy reservations for the week of Sept. 19.

The importing of agricultural implements into Cuba is under consideration by Gil & Co., E. En. C., Compostela, Num. 135, Havana, Cuba, who are importers. They desire to deal directly with manufacturers. Samuel A. Jenkins, of the company, should be addressed on the subject.

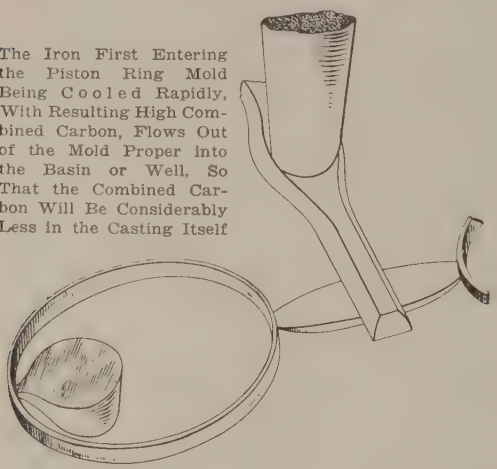
Casting Grate Bars for the Ordinary Clay Stove on Which the Cast-Iron Pans Are Set for Cooking

Mechanical Control in Foundry Problems

Several Cases Discussed Showing How the Application of Simple Mechanics Produced Results Which Chemistry Alone Did Not

BY J. H. HOPP*

FOUNDRIES generally accept patterns and equipment with approval or criticism based upon a superficial examination rather than a close study. At times designers are at fault in endeavoring to carry out certain theories; again, the pattern maker views the product of his art—he would call it—from a standpoint of simplicity of construction or beauty of finish, rather than from the practical utility of the pattern to that joint end of simplifying and foolproofing the molding and producing quality product. To indicate the need of a close co-operation between—not only the foundry superintendent and the pattern department—but the engineering department and machine shop superintendent also, certain simple examples have been selected to convey the value of an application of mechanical control of the product. Both mechanical and chemical control are essential; results, whether good or otherwise, are attributed to but one of these factors, which, it is hoped, will be clearly shown as erroneous.



The Iron First Entering the Piston Ring Mold Being Cooled Rapidly, With Resulting High Combined Carbon, Flows Out of the Mold Proper into the Basin or Well, So That the Combined Carbon Will Be Considerably Less in the Casting Itself

The first example is that of individual piston ring castings, commonly used by automobile and tractor engine builders. Individual piston ring castings, to meet the exacting requirements of present day machining operations, must be soft and particularly free from hard spots. It must be evident that first of all the proportions of the various elements must be suited to light castings requiring soft metal and having sufficient spring to meet the conditions imposed in a gas engine cylinder under heat.

Assume the conditions are piston ring castings of extremely light metal section, naturally subject to rapid cooling, and a complaint of hard spots, resulting in too much time required for machining and a high machine shop loss. It is an entirely conservative statement that 98 per cent of the foundrymen of the United States or Canada would attack that problem first, if not for all time to come, from a chemical and metallurgical standpoint.

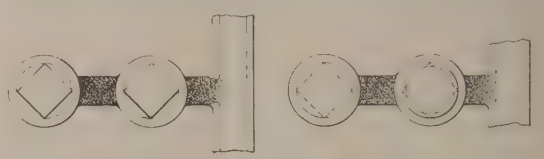
In a majority of castings, when the chemical proportions of the elements are correct, or shop conditions preclude the practicability of altering the mixture, it is possible mechanically to eliminate the difficulties encountered, or reduce them at least very materially, as will be shown. My recommendation would be, first, study the metal content of the castings. An accurate analysis, coupled with a simple knowledge of the action of the various elements, in combination, will generally show whether or not the metal mixture is satisfactory.

Referring to the accompanying drawing of a single ring, one will note at a point diametrically opposite to the point of entrance of the metal into the mold, but on the inside of the ring casting—to conserve flask space—a basin or well of a size dependent upon the size of the casting in question. The temper of the sand forming this mold, acting upon the fine stream of molten metal entering it, tends to increase the rate of cooling to an extent depending upon the amount of moisture present, and as a result we have higher combined carbon.

The addition of this basin or well permits the first iron entering the mold, which cooled rather rapidly, with a resulting high combined carbon, to flow out of the mold proper. In the interval the sand has become heated, and following this a more normal rate of cooling results. As a consequence of this drawing off of the original metal poured into the mold, the combined carbon will be considerably less in the casting itself. This practice has been universally adopted and eliminates "hard spots."

The method of controlling the piston ring castings in reality makes the molding operation foolproof against the tendency of using sand too wet or of uneven ramming or squeezing. The principle underlying the control can be applied with variations in many ways and will be found practicable and profitable. With a very desirable mixture, 50 per cent, say, of all the castings produced cannot be machined or at least only at a very considerable expense over and above that required to machine the other 50 per cent of castings.

Another example is shown in the molding of plugs for steel barrels, threaded as indicated and provided with square head for application of wrench. One hundred per cent appear acceptable, but 50 per cent, to repeat, are machinable and 50 per cent are not considered to have satisfactory metal for machining, though all metal came from the same ladle and through the same gate.



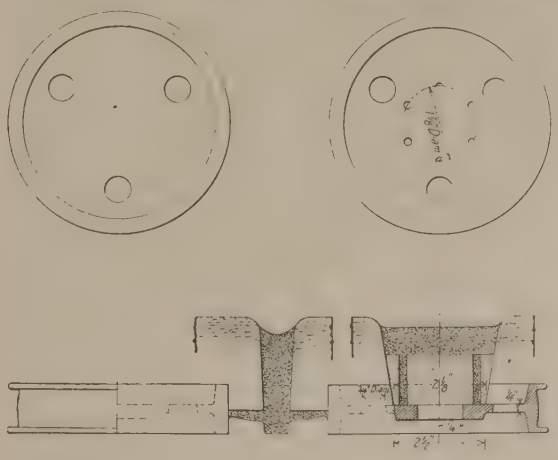
In Molding Threaded Plugs As Indicated, Half of the Castings Were Found Not Satisfactory for Machining, Although All the Metal Came from the Same Ladle and Through the Same Gate

By Making the Molds, Not in the Drag, but in the Opposite Manner, and Filling Up the Section of the Casting Originally Cupped to Save Weight and to Eliminate Hanging Sand in the Cope, the Trouble Was Overcome

The flask used was a 10 x 24-in. snap type and the match-plate actually contained 60 patterns, four rows of 15 each, and a single gate with a single main runner lengthwise, from which at various points the metal was conducted to the central rows of patterns on either side of main runner and by small gates from these castings to the two outer rows of patterns.

*From an address delivered before the Southern Metal Trades Association. Mr. Hopp is secretary and chief engineer of the Charles C. Kawin Co., Chicago.

The importance of the case may be apprehended by suggesting a contract's being involved stipulating the furnishing and machining at a fixed price of 250,000 pieces and yet half of the foundry production proved too hard to machine. One could stop off the outer rows of molds, which are the ones containing hard castings,



By Rearranging the Method, Shown in the Upper Part, of Molding Gas Stove Hose Connection Fittings, Castings Resulted When Molded as in the Lower Arrangement, Which Could Be Threaded in the Interior

but this would be very costly because production would be reduced. One could make new pattern equipment with less patterns in a smaller size of flask, but proportionately one would not get as many patterns in the same equivalent area. On an order of 250,000 pieces the pattern expense could be considered negligible, but as all of these are items of cost they must be considered.

The castings under consideration were in the drag of the mold, and the molding was done in the opposite manner from that originally planned. The sketch shows this change together with one other, that of filling up the section of the casting which originally was cupped out to save weight. This last change being made necessary to eliminate the hanging sand in the cope. Production as a result was not decreased.

Each casting weighed slightly more than under the previous arrangement. Rejections due to hardness were entirely eliminated. There were, of course, the usual rejections due to various molding causes. The added weight of metal, however, was an item in the total order, but insomuch as the contract was taken at a fixed price, and under the conditions of pattern equipment offered, the foundry had no recourse, whereas a careful diagnosis of the problems at hand before bidding upon the work or accepting the contract would undoubtedly have placed the foundryman in a position to quote a price including the additional metal.

An example of chemical control that should prove interesting is one of a product mechanically correct and upon which fact the manufacturer fought until bankrupt. The castings failed in service principally from leakage. The class of castings is best described as seamless steam jacketed kettles and evaporating pans, tested to 150 lb. hydrostatic pressure, and in daily use for rendering, refining, soap making, cooling fluids and semi-fluid substances, preparing food specialties, candies, medicines, tooth paste, drilling compounds, paints, etc.

In explanation the kettle, exterior jacket, stay-bolts and outlet are cast complete in one piece. The inner shell of kettle is very thin, resulting in quick heating; and casting the stay-bolts between inner shell and steam jacket outer shell as an integral part of the casting results in unusual strength and reinforcement of the thin shell.

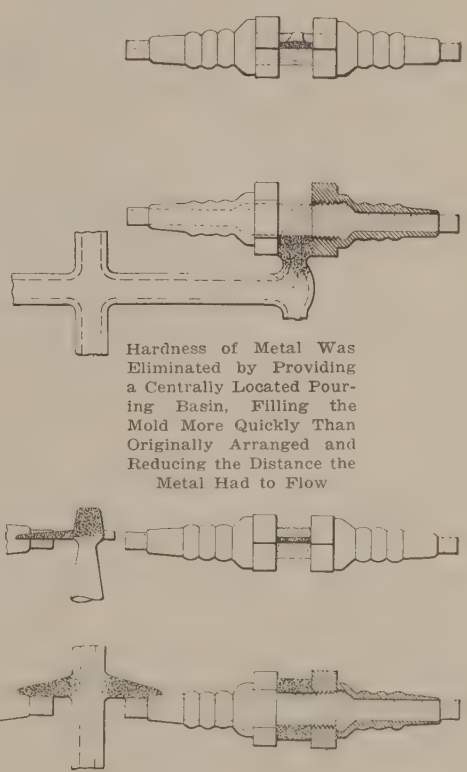
The original company produced kettles of 175 gal. capacity, maximum, but the metal problem was not solved and the losses were of such moment as to bring on bankruptcy. The parties who purchased the rights, etc., at the bankrupt sale, and who have made these seamless kettles satisfactorily, now manufacture kettles up to 1200 gal. capacity.

To appreciate fully the complexity of these castings conceive a kettle of 800 gal. capacity. That means about 6 ft. diameter by 6 ft. high, with 90 sq. ft. of heating surface. This 90 sq. ft. of surface has 480 stay-bolts connecting it to the heavier outer steam jacket shell. This means 960 points of metal junction and that many possibilities of a leak.

The metal mixture was perfected and then a "guarantee without limit" was given. I believe it is the only guarantee of its kind in connection with pressure apparatus or, in fact, any kind of machinery. The guarantee is as follows: "To at *any time* replace any kettle or parts found defective in workmanship or material upon return of part claimed defective, transportation charges prepaid." The pig iron is not judged by fracture nor charged into the cupola by rule of thumb. Coke and pig iron are not bought without certainty of high quality.

Another sketch covers the molding of a pulley 6 in. in diameter, the rim of which is machined on both sides and the face machined to form a double shrouded idler pulley. These castings are machined in an automatic machine performing the several operations simultaneously. Should any tool become dulled its replacement requires complete shutdown of machine.

A study of this casting revealed on the drag side of the rim—and after eliminating such factors as cold



Hardness of Metal Was Eliminated by Providing a Centrally Located Pouring Basin, Filling the Mold More Quickly Than Originally Arranged and Reducing the Distance the Metal Had to Flow

iron, too wet a sand and unnecessarily hard ramming—that the time of pouring the casting was too great and the distance that the metal had to travel was too long. A casting of 6 in. in diameter having a circumference of approximately 19 in., resulting in the metal having to travel 9½ in. in each direction from the gate.

The sketch will show that a centrally located pouring basin was recommended, which permitted filling of the mold much more quickly than before. Of course, the total area of the pencil gates—as we term them—was greater than that of the single gate, but the metal in no case was required to travel more than one-sixth of the circumference and therefore would not give up its heat as rapidly and as a consequence the combined carbon would be more nearly uniform throughout the casting. In the practice as found, the combined carbon

was from 10 to 20 points higher on the drag side. This change in pouring, without any alterations in the metal mixture, will eliminate we believe the difficulties causing rejection.

Innumerable examples of this general sort of thing could be given, but the cases cited, it is believed, will suffice to show that one cannot afford to pour castings too slowly. On the other hand, it can also be said that castings should not be poured too fast. In substantiation of this, consider a six-cylinder automobile casting weighing approximately 240 lb. The production in this particular case was 38 to 40 per day for a given number of core fitters and assemblers and the scrap generally equalled the production. The entire mold in every particular was made of dry sand and it was the contention of the manufacturer that he followed good accepted foundry practice and in so doing could see no reason why he should not expect a practically perfect production of these castings.

As stated before, the casting weighed 240 lb. A cubic inch of cast iron weighs approximately ¼ lb. Roughly speaking, the contents of this mold was 960 cu. in. The manufacturer's contention was that the iron entered the mold so fast that the gases did not have time to form and, therefore, he could not account for the gas pockets in the bore of these cylinders, which caused their rejection.

It was pointed out that irrespective of any gas formed by contact of the molten iron in the cores, there had to be removed from this mold 960 cu. in. of air. It was proved quite conclusively that the practice followed was in reality preventing the escape of a portion of this air—and by placing four small risers in various parts of the cope side of the mold and pouring the mold in 12 sec. instead of 8, giving the air a chance to be liberated, there was produced virtually 100 per cent perfect castings, that is, free from the defects causing their rejection prior to this change.

It can be stated safely that but a small proportion of all castings finding their way to the scrap heap are produced by pouring too fast, but the illustration mentioned is convincing of one thing and that is that we cannot carry the speed of pouring to the extreme and secure quality any more than we can increase production indefinitely and still maintain quality.

As a further illustration of the principle governing the rejection of the castings discussed previously, attention is called to the gas stove hose connection fittings shown in another sketch. This shows the improper method of making these and one which has resulted in a casting too hard to be threaded in the interior, and it also shows the proper way of pouring to assure ease of machining.

My conclusion must be plain. The co-partners contributing jointly to foundry results are chemistry and simple mechanics.

SILICON ADDITIONS TO STEEL

Effect of Early and Late Introduction on Gas Content and Rolling Discard

The effect of the time of adding silicon in the physical properties and the gas content of open-hearth steel is exhaustively discussed by E. Piwowarsky in *Stahl und Eisen* for June 10, 1920. An abstract of this important article has been published by *Technical Review*, London, as follows:

A number of opinions are held regarding the deterioration of steel by the small quantities of silicon present in the ordinary commercial steels, principal among these being the view that the silicic acid formed by the action of the ferrous oxide is retained by the steel in the form of a finely divided emulsified product, and that this weakens the cohesion of the steel, while the excess of silicon impairs the weldability of the material. The writer carried out a number of experiments and observations in steel works, with a view to clearing up this question, and determining whether and how it would be possible to enhance the good effects of silicon and to suppress the deleterious effects. A number of test heats were made, and the silicon added (in the form of ferrosilicon) at different stages of the pouring. It was found that when the ferrosilicon was added too early, the silicon losses were considerable and the quantity of silicon left in the final product was smaller than when the addition was made as late as possible.

A further series of heats was carried out to determine the effect of the gases, incorporated in the steel, on its qualities. For this purpose, the melts were made, as far as possible, using the same material and the same furnace. The ferromanganese required for deoxidizing the bath was added when the charge was completed, and time had been allowed for a state of equilibrium to set in between the bath and the slag. The ferrosilicon in half the heats was added by placing it in the bottom of the ladle at the usual time and in the other half it was added as late as possible by means of a special box arranged over the ladle and fitted with a flap-door at the bottom. The quantities of silicon were so selected as to give a final percentage of 0.20 to 0.22 per cent in the steel, as it was found that only with these percentages was the difference between the methods of adding the silicon to the bath sufficiently marked to be observed.

The charges were cast in round chill molds of 540 kg. in sets of 34 ingots, except in the case of the heats containing over 0.5 per cent carbon, which were cast in 750 kg. square ingots. The ingots were always cast from the bottom. Before the steel was cast, the ladle was left standing for 10 minutes or so, this measure being necessary especially in the case of cold charges, as otherwise the rolling discard of the steel is increased, due to the presence of the "emulsified" silicic-acid in the steel. Gas samples were then drawn off by a special arrangement. The results show that the gases given off by the liquid steel, where the silicon is added prematurely, contain a very large proportion of CO, which is the most harmful gas as regards the formation of blowholes. Further, when the silicon is added late, the hydrogen content falls with decreasing temperature, and finally ceases, whereas it increases when the silicon is added too early.

Rolling tests were also carried out to show the amount of discard resulting (from the presence of occluded gases) when the silicon was added early and late. The following table shows the results:

Test No.	C.	Mn.	P.	S.	Si.	Results of Rolling—Good Material, Kg.	Results of Rolling—Discard, Kg.	Discard, Per Cent
			(a) *Ferrosilicon Added at Usual Time*					
1.	0.30	0.69	0.051	0.028	0.18	24,200	14,000	36.50
2.	0.39	0.63	0.060	0.036	0.20	27,200	12,800	32.00
3.	0.37	0.51	0.053	0.044	0.20	34,400	12,100	26.00
4.	0.32	0.47	0.014	0.037	0.19	9,300	21,740	70.00
			(b) *Ferrosilicon Added Late*					
5.	0.36	0.54	0.027	0.038	0.22	30,250	6,800	18.00
6.	0.35	0.57	0.043	0.032	0.24	32,700	3,700	10.00
7.	0.31	0.52	0.057	0.038	0.25	28,600	4,900	14.60
8.	0.40	0.54	0.027	0.040	0.26	36,200	4,100	10.00
9.	0.37	0.58	0.064	0.040	0.25	34,900	3,800	9.80

The author concludes from his investigations that a high temperature favors the separation of the silicate present in the form of a product of deoxidation on the tapping of basic silicized open-hearth heats; and that when the ferrosilicon addition is made at as late a stage as possible, this reduces the percentage of gas in the final product, in the liquid, solid and rolled states.

The American Red Cross is making a drive to get the smaller industrial companies interested in first aid work. To that end classes are being organized by the Pittsburgh chapter for the instruction of those employees of companies which do not feel they can afford the expense of holding classes in their own plants. Any company in Allegheny county which wishes to start its own class, the Red Cross will assist upon application to the Pittsburgh chapter. Classes are to be held in room 1003 Chamber of Commerce building, once a week beginning Sept. 15, at 8 p. m. The fee is $5 per member and the course comprises 10 lessons.

Steel Labor Less than Half Employed

Figures of Labor Bureau Show Extent of Falling Off and Trace Curve of Employment—Curves Show Also Unfilled Orders and Pig Iron Produced

WASHINGTON, Aug. 23.—It is estimated that the number of persons employed in the iron and steel industry in July, 1921, was 283,648 less than at the peak of employment in June, 1918, when 532,798 were engaged. The falling off therefore was 53.2 per cent. The second peak in the number of persons employed in the industry, by which is meant the blast furnace, steel works and rolling mill departments, was in March, 1920, with a total of 502,133, so that the decrease in July of this year was 50.4 per cent. The figures, prepared by the Bureau of Statistics, Department of Labor, are based upon reports showing the number of persons employed by the United States Steel Corporation, and reports of the Bureau of Census.

Reports of the Steel Corporation show that the average number of persons employed by it in the manufacturing properties in 1914 was 131,616. The average number of persons employed in the iron and steel industry in 1914, according to the Bureau of Census, was 307,356. Thus the employees of the corporation constituted 42.82 per cent of all persons in the industry in that year.

Index Figure and Estimated Number of Persons Employed in the Iron and Steel Industry

100 = Base, January, 1916 = 383,308

1915		1917		1920	
Jan.	74 = 283,648	July	130 = 498,300	Jan.	127 = 486,801
Feb.	71 = 272,149	Aug.	134 = 513,633	Feb.	129 = 494,467
Mar.	77 = 295,147	Sept.	133 = 509,800	Mar.	131 = 502,133
Apr.	80 = 306,646	Oct.	135 = 517,466	Apr.	130 = 498,300
May	82 = 314,313	Nov.	136 = 521,299	May	121 = 463,803
June	85 = 325,812	Dec.	136 = 521,299	June	128 = 490,634
July	87 = 333,478			July	126 = 482,968
Aug.	90 = 344,977	1918		Aug.	125 = 479,135
Sept.	93 = 356,476	Jan.	134 = 513,633	Sept.	128 = 490.634
Oct.	97 = 371,809	Feb.	135 = 517,466	Oct.	128 = 490,634
Nov.	97 = 371,809	Mar.	137 = 525,132	Nov.	124 = 475,302
Dec.	97 = 371,809	Apr.	136 = 521,299	Dec.	113 = 433,138
		May	138 = 528.965		
1916		June	139 = 532.798		
Jan.	100 = 383,308	July	137 = 525,132	1921	
Feb.	102 = 390,974	Aug.	138 = 528,965	Jan.	93 = 356,476
Mar.	105 = 402,473	Sept.	137 = 525,132	Feb.	93 = 356.476
Apr.	104 = 398,640	Oct.	138 = 528,965	Mar.	89 = 341.144
May	108 = 413,973	Nov.	135 = 517,466	Apr.	81 = 310.479
June	109 = 417,806	Dec.	138 = 528,965	May	79 = 302,813
July	110 = 421,639			June	75 = 287,481
Aug.	113 = 433,138	1919		July	65 = 249,150
Sept.	115 = 440,804	Jan.	136 = 521,299		
Oct.	115 = 440,804	Feb.	128 = 490,634		
Nov.	117 = 448.470	Mar.	125 = 479,135	*Averages:*	
Dec.	118 = 452,303	Apr.	119 = 456,137	1915	86 = 329,006
		May	114 = 436,971	1916	110 = 420,361
1917		June	114 = 436,971	1917	129 = 496,062
Jan.	122 = 467,636	July	117 = 448,470	1918	137 = 524,493
Feb.	123 = 471,469	Aug.	121 = 463,803	1919	115 = 442,401
Mar.	124 = 475,302	Sept.	122 = 467.636	1920	126 = 482,329
Apr.	124 = 475,302	Oct.	81 = 310,479	1921*	82 = 314,860
May	127 = 486,801	Nov.	95 = 364,143		
June	129 = 494,467	Dec.	113 = 433,138		

*Seven months.

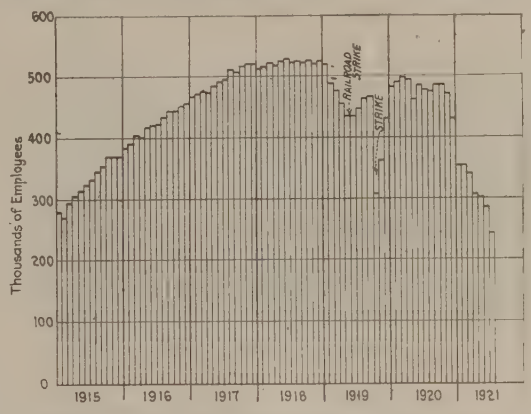
A table prepared by the Bureau gives an index number of persons employed in the industry by months from January, 1915, to July, 1921. The average for the index numbers for 1915 was 85.83, with the base of 100 applying to January, 1916, when 383,308 persons were employed in the industry. This period is used as the base because it marked the first complete and satisfactory reports the Bureau had received regarding employment in all of the industries reporting employment figures.

The Steel Corporation in 1915 had 140,875 persons employed. Using this as 42.82 per cent of all persons employed in the industry in 1915, then the total number employed was 328,993. With this number engaged in 1915, and an average index of the number employed fixed at 85.83, then 1 in the index number would be equivalent to 3,833.08 persons.

Upon this basis of estimate, the computation shows the following number of persons employed at the dates specified as:

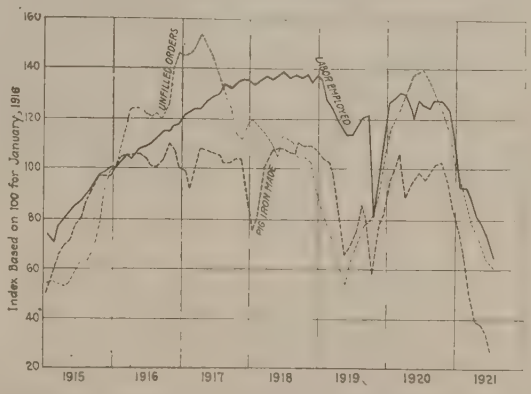
January, 1916	383,308
June, 1918	532,798
March, 1920	502,133
July, 1921	249,150

An accompanying table presents the index numbers referred to, together with the estimated number of persons employed from January, 1915, to July, 1921.



Trend of Steel Mill Employment for Seven Years

According to these figures the peak of employment in June, 1918, was 39 per cent greater than in January, 1916, and no month in 1918 showed an excess lower than 34 per cent. In the next high point, March, 1920, employment was 31 per cent greater than in January, 1916. In July, 1921, only 65 per cent as many were employed as in January, 1916.



Concurrent Fluctuations of Steel Mill Employment, Pig Iron Production and Corporation's Unfilled Orders

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Portland cement production of the United States in July amounted to 9,568,000 bbl., the heaviest month of the year; 52,036,000 bbl. have been produced to date in 1921 and 50,376,000 bbl. shipped. Production in seven months is about 52 per cent of the corresponding figures for 1920.

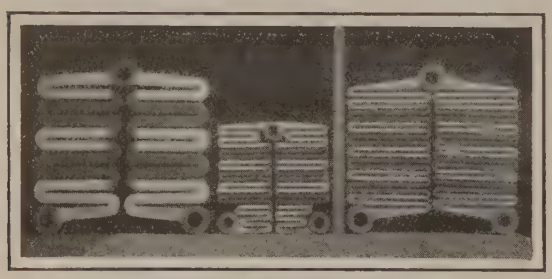
A new rate of $1.12 per ton on limestone from Fairport Harbor on Lake Erie to Youngstown furnaces is announced by the Baltimore & Ohio Railroad.

NICKEL IN IRON CASTINGS*

Alloy Resistance Grids Having Unusual Properties—Effect of the Nickel

One of the special uses to which the electric furnace has been put recently is the melting of an alloy of nickel and cast iron for the production of electrical resistance grids. The metal sections of these grids, as shown by the illustration, are quite uniform for each pattern, but there is, among the various patterns, a variety of thicknesses. The cross sections vary from ½ by 3/16 in. to as small as ⅛ by ⅛ in. The electrical resistance of a perfect casting lies within 10 per cent above or below the fixed listed resistance for each pattern. Good molding is essential to success in the making of these grids, for with absolutely correct metal a variation of 0.01 in. in width and thickness of section on some of the patterns may mean as much as 12 or 14 per cent variation in resistance.

The service for which these castings are intended demands that the metal, even in the smallest castings, be very soft, showing an open, gray, highly graphitic structure in order that they may be resistant to shock,



Electrical Resistance Grids

and stand up well under rough usage. The metal used for this purpose is a gray iron alloyed with 4 to 5 per cent of nickel, which element, when the composition of the alloy is correct, imparts toughness and pliability to the metal and helps to overcome the tendency of metal to run white and become brittle because of the rapid cooling action of the sand mold. When cold, these castings can be twisted into various shapes, taking a permanent set without breaking. The alloy has approximately double the electrical resistance of ordinary cast iron.

Following are the specifications and the analyses of three heats showing a normal resistance:

	Specifications. Per Cent	Analysis of Three Heats Per Cent	Per Cent	Per Cent
Silicon	2.40 to 2.60	2.40	2.48	2.47
Sulphur	Under 0.05	0.010	0.013	0.018
Phosphorus	Under 0.08	0.055	0.055	0.074
Manganese	Under 0.40	0.13	0.08	0.10
Total carbon	3.60 to 4.00	3.92	3.92	3.82
Nickel	4.00 to 5.00	4.47	4.24	4.55
Copper	0.50 to 0.70	0.67	0.67	0.67

On account of the nickel content of the metal, which raises the setting point of the alloy considerably above that for cast iron, causing the alloy to be sluggish at a temperature at which cast iron would have great fluidity, it is necessary to cast at a much higher temperature than would be required for cast iron. The temperature of the metal in the ladle, as determined by a Leeds & Northrup optical pyrometer, runs between 2800 and 2900 deg. Fahr. (1537 to 1592 deg. C.).

The urgency of the situation made necessary the use, largely, of such materials as happened to be in stock in our works, consequently much of the equipment is crude. The furnace is three-phase, combined open-arc resistance type, without bottom electrode; is stationary, and of 1000 lb. capacity. The hearth is built of magnesite brick and grain magnesite while the roof is made of special fireclay brick. Alternating current is delivered by the power company at 22,000 volts. It is stepped down to 220 volts in three 150-kv.-a. single-phase, Westinghouse, lighting transformers, and further reduced to 90 or 110 volts in three autotransformers. These transformers, while not intended for electric-furnace use, have stood up remarkably well, having at times carried an overload of more than 100 per cent for an hour. Four-inch Atcheson graphite electrodes are used, and the regulation is by hand. A switchboard, located in a convenient place for the furnace operator, contains a voltmeter, three ammeters, and the power switch.

The required amounts of pig iron, scrap and nickel ingot, together with some retort carbon, are charged into the furnace, the power turned on, and the melting done as quickly as possible. The melting down is carried on at the higher of the two possible voltages, viz., 110-volt, and the input of current fluctuations from 0 to 3000 amp. per phase; the melting requires about 1 hr. to 1 hr. and 10 min.

As there is not enough time to allow for chemical determinations, the necessary adjustments are made from observations of test pieces so shaped as to indicate the character of the metal as cast in all sections from a feather edge up to ½ in. Several of these test pieces are cast in sand during the adjusting and heating period, and additions of silicon and carbon are made until the fracture of the test piece shows the metal to be normal. As stated before, the temperature, to be high enough to run the smallest grids, should be from 2800 to 2900 deg. Fahr. in the ladle. The adjusting and superheating of the metal requires from 30 to 40 min., thus making the time of the heat from 1½ to 2 hr.

One of the peculiarities of this alloy of cast iron and nickel is a rejection of graphite from the metal when it is just melted, but when the metal is superheated, it again takes up the carbon thrown out at a lower temperature. It is this property of nickel, throwing out graphite on cooling, which helps to make the grids soft and gray in the smaller sections and incidentally keeps the electrical resistance high.

The average power consumption, covering a 9-mo. period of operation, was 1100 kw.-hr. per ton, while the electrode consumption for the same period averaged 28 lb. per ton. These figures are rather high, even for such a small furnace, but considering that the operation was, in a sense, experimental, and the installation more or less a makeshift, it is probably not as bad as the figures would seem to indicate. With an ideal installation, consisting of a tilting furnace, suitable furnace transformers, and automatic regulation, it would be possible to reduce the current consumption by reason of having a smoother operation, greatly lessen electrode consumption by having less breakage, shorten the time of the heat considerably, reduce the amount of labor necessary to operate the furnace, and thereby decrease the cost of metal in the ladle.

The advantages of this method of melting may be stated briefly as follows:

There is no picking up of sulphur in the melting process, therefore all of the scrap alloy, such as gates, sprues, defective grids, and over iron can be charged back into the furnace and nothing wasted. In fact, it is quite possible and just as easy to run a heat of 100 per cent scrap as it is to run one made up of pig iron, scrap, and nickel.

The possibility of adjusting the metal to the proper composition while it is in the furnace.

The attaining of the high temperature necessary to cast the metal into very small section castings so that it will run clean, and remain gray and tough.

*From a paper to be presented at the fall meeting of the American Institute of Mining and Metallurgical Engineers at Wilkes-Barre, Pa., by D. N. Witman, metallurgist, Westinghouse Electric & Mfg. Co., Trafford, Pa.

The Fischer Scrap Iron Co., Stevens Point, Wis., has changed its corporate title to F. & G. Auto Parts Co. It will continue to deal in waste metals and other materials but will specialize in marketing useful parts of passenger vehicles and motor trucks purchased and scrapped in the last two years in the conduct of the business. Hyman D. Fischer and Joseph Goldstein are the proprietors of the business.

Car repair contracts received by the Youngstown Steel Car Co., Niles, Ohio, will keep its plant operating to capacity into the first quarter of 1922 and afford employment to 350 men.

Methods of Preparing Blast Furnace Slag

Divided into Four Classes by Carnegie Steel Co. According to the Specific Use to Which It Is to Be Put

METHODS of preparation of blast furnace slag are described in a comprehensive way in a book compiled by the Carnegie Steel Co., Pittsburgh, to emphasize the properties and commercial uses of the material. From advance pages of the book, the subjoined descriptive matter has been obtained and the accompanying illustrations have been reproduced.

There are four general classes of slag mentioned: air cooled bank slag, fork slag, pancake slag and honeycomb slag. Study of blast furnace slag has been carried on for 16 years, and the forthcoming book of some 38 pages discusses, among other things, the commercial sizes of concrete and the mixtures used for various purposes, and it incorporates tests to prove the reliability of the slag and general physical characteristics necessary in the construction of buildings, roads and other places where the slag may be utilized.

To make air cooled bank slag the white hot molten liquid is run from the slag notch of the furnace into the slag ladles, which hold 200 to 260 cu. ft. or some 7½ to 9½ tons of slag, and which can carry the slag in liquid form as far as eight to ten miles. On the edge of a spoil bank they are dumped and from the slag deposited in this method the greater amount of the principal commercial slag is produced.

The Principal Commercial Slag, Used for Ballast, Road Construction and Mass Concrete Work, Is Obtained from Banks Like That Here Shown at the Lorain Plant of the National Tube Co.

On the bank the slag gives up its heat to the air and to previous deposits with which it coalesces to form a hard stone-like substance. Here it weathers from two weeks to one year or more, dependent upon magnesia content and demand. During this period of seasoning any free lime is removed by natural agencies and thus disintegration of the slag, when in practical use, is eliminated. Meantime, no refuse or waste material is dumped on the bank from which slag is to be taken for sale or use.

The properly seasoned slag is excavated from the bank by blasting or by steam shovel or by both, loaded on cars and hauled to the crusher and the larger pieces broken up. It is then passed over a magnetic separator to extract the iron and from thence is elevated by belt conveyor to revolving screens where it is graded into commercial sizes and is ready for the market.

Fork slag corresponds in size and general characteristics to rough bank slag. It is made at the Columbus steel works of the Carnegie Steel Co., where there is no crusher and where, therefore, earlier methods of disposal are still in use. The slag as it issues molten from the blast furnace is led in long, narrow trenches formed in sand where it is allowed to cool. When sufficiently cool to handle, the long strips or molded pigs of slag are broken up with sledges. The larger pieces are loaded by hand and the smaller by forks into cars to be hauled away to the dump for final disposition after seasoning. Fork slag of necessity carries some sand with it from the trenches and it is offered for mass concrete, road work, etc.

Pancake slag is made at the Isabella furnaces of the Carnegie company. The slag is cast on a machine like a pig casting machine into large flat molds about 20 x 45 in. and 2 in. deep. The pans of slag travel along an endless chain conveyor and, when within a short distance of the dumping point, the cooling of the slag is accelerated by sprinkling with water. This process cracks the thin sheets of slag and the drop into the car breaks them into small pieces. Much of this form of slag has been used as a concrete aggregate in fireproof construction but the production is limited and cost of maintenance of machine high. In consequence this method was for a time discontinued as a mode of preparation of slag for regular uses.

There has beeen a demand recently for a heavy dense blast furnace slag for use as an abrasive, also for the manufacture of ornamental brick. The Isabella furnaces make ferromanganese and the beautiful green slags from them can be manipulated as pancake slag for special uses.

Honeycomb slag, its name derived from its appearance, is the result of numerous experiments to lessen weight without decrease in strength. By the method finally perfected, a slag has been produced that weighs but 30¼ lb. per cu. ft. and will make up into concrete with a weight as low as 105 lb. per cu. ft., compared with the usual 165 lb.

A large rectangular tank, 40 x 120 ft. and 6 ft. deep, built of brick is located near the furnace. The bottom is cooled, cleaned and dried, and then the molten slag is run from the furnace directly into the tank to a depth of about 6 in. When this layer has cooled suf-

Pancake Slag, Cast on a Machine Like a Pig Casting Machine, Has Been Used as an Abrasive and in Making Ornamental Brick

ficiently, it is sprayed with water, cleaned and dried; then another 6 in. layer is poured, and so on until the tank is filled. It is then broken up, excavated by steam shovel, loaded into cars, sent to the crusher and crushed and graded to the various commercial sizes.

Granulated slag is cooled by water immediately on its passage from the blast furnace. It is used in the manufacture of Universal portland cement, and as a substitute for river sand and also as satisfactory filling material. Two methods of granulation are at present in use:—

1. The open tank method.—Common granulated slag is made by running the molten slag directly into a tank or pit partly filled with water by simple contact with which disintegration is accomplished. This product contains many light, fluffy particles in addition to those that are finer and denser. Much of it is as coarse as popped corn which, when the color is light enough, it rather resembles. Owing to its great porosity much of it floats until it becomes cold and saturated with water; only the denser particles settle at once to the bottom of the tank.

2. Improved water jet method.—The molten slag is delivered from the furnace through a trough to a concrete pit at the edge of which the trough takes the form of a large nozzle fitted with an annular tube from which water issues in the form of a spray delivered through a 4 in. pipe under 30 to 40 lb. per sq. in. pressure. This causes disintegration and partial cooling, which operations are completed by contact with the water in the pit. By the force of the impact with the water the slag is driven against the opposite side of the pit. Slag thus granulated resembles that made by the open tank method except that the largest particles are much smaller and the entire product is somewhat more dense.

Granulated slag is removed from the pits and loaded into cars by grab bucket and crane. It will weigh

Slag Tank at the Isabella Furnaces of the Carnegie Steel Co., Where the Jet Method Is Used in Granulating the Slag

The Trough at the Concrete Pit Takes the Form of a Nozzle Fitted with an Annular Tube from Which Water Issues Under Pressure

from 50 to 60 lb. per cu. ft., dependent upon the kind of ores smelted, moisture, condition, etc.

International Resolutions on Emigration Supervision

WASHINGTON, Aug. 22.—The International Emigration Commission, composed of representatives of fifteen nations, which has been in session in Geneva, Switzerland, has adjourned after adopting a number of resolutions, according to a cable received by Ernest Greenwood, American representative of the international labor office.

Among the resolutions adopted were (1) supervision over all kinds of agents interested in promoting emigration and the abolition of all emigration propaganda based on false information; (2) supervision and control, by competent authorities, of the recruiting of workmen in foreign countries, confining such recruiting to agencies authorized by the State; (3) safeguarding the state of the labor market of countries of emigration and immigration; (4) contracts containing clauses for the deduction of traveling expenses from the wages of the immigrant shall be declared null and void by competent authorities of countries of emigration, where such clauses are not in accord with existing legislation.

Tinplate Manufacture in Norway

In 1916, when the difficulty of procuring tin plates (which were not made in Norway) was severely felt by the Norwegian canning industry, a company was formed, with a capital of 3,000,000 kr., to establish rolling mills for the production of steel plates, and a tinning plant for their conversion into tin plates, at Simonsvik, near Bergen. The capacity of the works, which were to be known as the Norsk Valseverk, was to be 18,000 tons a year. It is now announced, says the London *Ironmonger*, that the plant has just completed its first important order, and that another tin mill is about to be erected. In 1914 Norway took 29,000 tons of tin plates from Great Britain.

Germany's Low Bids on Structural Steel for South America

WASHINGTON, Aug. 23.—German steel mills will be unable to make deliveries of a great part of the business they have taken recently in South America in competition with American and British firms, according to importers in that country. A report received by the Bureau of Foreign and Domestic Commerce from Edward F. Feely, commercial attaché at Buenos Aires, says that the view of the importers, who represent American and British manufacturers, was expressed in connection with the award given in June to Pedro Goedhart, representing a German firm, for 750 tons of fabricated bridge steel for the Argentine government. The German bids were much lower than the American and British tenders, one of the latter carrying the highest figure. The bid of Goedhart was 309,570 pesos Argentine paper currency, c.i.f. Buenos Aires, or less than one-half of the lowest American bid, 648,868 pesos, even if the latter currency is figured at the normal rate of exchange. The highest British bid was 670,000 pesos, made by Percy Grant. Another importer of British steel, Cia. Britannica de Construcciones de Acero, bid 496,264 pesos. The two lowest bids were both made by importers representing German mills. In addition to the one mentioned, there was the bid of Staudt y Cia (Krupp), 312,264 pesos.

The State of Pennsylvania suffered a loss of $25,413,305.73 in wages alone from strikes during the first six months of 1921, according to a report submitted to State Commissioner of Labor and Industry Clifford B. Connelley by William J. Tracy, chief of the bureau of mediation and arbitration. A total of 4,186,031 working days were lost in 323 strikes in the six months' period. In the metal industries, alone, the loss is estimated at 669,015 days, with a wage loss of $4,673,736.

Strike benefits amounting to $391,985 have been paid from Oct. 1, 1920, to June 30, 1921, by the International Union of Boilermakers and Iron Shipbuilders, it was announced in St. Louis by Joseph P. Ryan, international vice-president, who is there directing the strike of local No. 27. There are 400 men in St. Louis that are out on strike. Ryan said that boilermakers are on strike in about forty cities in this country.

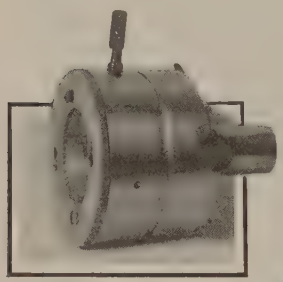
The open hearth department of the National Malleable Castings Co., Sharon, Pa., is working five days a week, starting Aug. 15, instead of three days as before. No additional men will be employed, but those who were retained when the three-day-a-week schedule was started will be given an increase in working hours. The company expects to increase production in other departments within a short time.

Special Diehead for Fine Threads

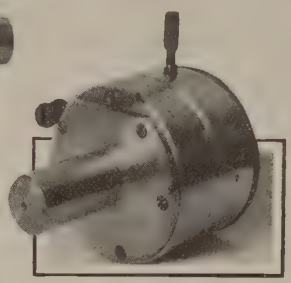
The diehead shown in the accompanying illustrations has been developed recently by Alfred Herbert, Ltd., 50 Church Street, New York, and is being offered as an addition to the line of Coventry diehcads handled by that company.

It is for fine threads of comparatively large diameter but of no great length. The company's standard diehead is of a size and weight in excess of what is required for cutting a fine thread, being made strong enough to cut Whitworth threads of the full nominal diameter of the diehead, which threads are comparatively coarse in pitch. To meet the demand for a smaller and less costly diehead the 2½ in. fine thread diehead under consideration was developed. The range of sizes cut is from 1¾ in. to 2½ in.

The diameter of the body of the diehead is 5⅝ in.; the total length, 7¼ in., and the weight, with one set



The Shank Is Attached to the Diehead by a Large Flange. For threads longer than 2½ in., the shank is removed and an adaptor fitted



The Holder Consists of a Base Bolted to the Capstan Face and a Sliding Portion, Which Carries the Diehead. The slide is elevated by a handle

of dies, is approximately 23 lb. The diameter of the shank is 1¾ in. The weight of a set of dies would be about 8 oz. against 5½ lb. for the dies of a 3 in. diehead. Being smaller and lighter and having a smaller shank than the 3-in. diehead it can be used in the turrets of the smaller lathes which would be used for cutting the fine threads.

The shank is attached to the back of the diehead by a large flange. In cases where threads longer than 2½ in. are required, the shank can be removed and an adaptor fitted to suit the particular turret face on which the diehead is to be used, the adaptor having a hole large enough to accommodate the maximum screw to be cut. The length of the thread is then not limited by the diehead but only by the holes in the turret of the lathe. The shank is 1¾ in. x 3 in. long and, being solid, permits of a reduction in diameter to suit holes less than 1¾ in. The holder consists of a base which is bolted to the capstan face and a sliding portion which carries the diehead. The slide is elevated by a handle with an eccentric at the end of the shaft which engages the slot in a hardened steel bush driven into the base. The reverse movement of the handle lowers the diehead into the cutting position. An external deadstop locates the diehead in line with the spindle. Taper threading and rotating attachments can be supplied. The coarsest pitch which can be cut is 11 per in., or 2.25 min. pitch.

The diehead is said to have met with a ready reception in the brass industry where fine threads are to be met on an extended scale.

The Associated Building Employers of Jackson, Mich., which has declared for the American or open shop plan of employment, has perfected an organization and opened offices at 111 East Main Street, Jackson: A. N. Case, Case Mfg. Co., sheet metal contractors and metal stamping, is president; Clyde Elwood, Watts-Morehouse Co., builders' supplies, is treasurer, and Lewis Atherton is executive secretary. The association is a unit of the Associated Building Employers of Michigan.

Present World Stocks of Zinc

World stocks of virgin zinc, according to the well-informed European correspondent of the American Zinc Institute, are at present about as follows by countries in tons:

United States	80,000
United Kingdom	20,000
Belgium	11,000
Germany	16,000
France	5,500
Scandinavia	4,500
Other countries	8,000
Total	145,000

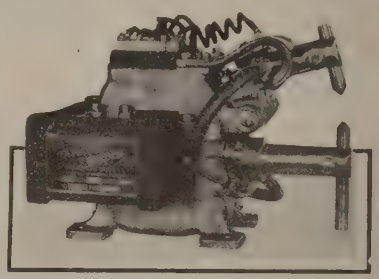
Bearing in mind that the world's consumption was almost 1,000,000 tons per year before the war, these stocks as unsold are low and would be quickly absorbed by a sudden trade revival.

Improved Condition of Standard Parts Co. Affairs

What is mentioned as a sign of recovery for the automotive and allied industries was contained in the decision rendered by Federal Judge D. C. Westenhaver of the Northern Ohio District Court in Cleveland, Aug. 15, answering the petition of Frank A. Scott, receiver for the Standard Parts Co. The court granted permission for a payment of a 10 per cent dividend to creditors and stated that he was satisfied the company was being operated by the receiver in a sound and economical manner. The petition set forth that the company held a cash balance in excess of $1,500,000. A consolidated balance sheet, submitted with the petition, showed the condition of the Standard Parts Co. to be improved.

New Bench Type Spot Welder

A new spot welder of the bench type, designated as the S-4-B, has been placed on the market by the Taylor Welder Co., Warren, Ohio. It is designed for light work such as spot welding light gages of sheet metal; cross-wire welding; contact points of platinum or tungsten to steel; brazing and soldering small parts of electrical instruments, watch cases, optical goods and the welding of gold to German silver or steel; and also



The Cast Copper Frame Acts as a Secondary. The lower horn can be adjusted to three different positions, three sets of holes being drilled in the base of the frame and the horn set to suit the work

small laboratory work. In capacity the range is two pieces of No. 30 to No. 16 gage sheet steel.

The floor space occupied is 10 in. x 17 in., the extreme height from the bench being 12 in. and the distance from bench to the welding dies, 6¾ in. The overhang is 4 in. and greatest movement of the upper electrode, 1 in. the distance between the horns when closed being 3 in. in the upper position and 5 in. in the lower position. The weight is approximately 150 lb.

The machine has a cast copper frame which acts as secondary, tending also to make it more efficient. The horns are of cold drawn copper 1¾ in. in diameter. The lower horn can be adjusted to three different positions, being made adjustable by drilling three sets of holes in the base of the frame and setting the horn to suit the work, a long electrode being furnished below to suit this condition. The electrical features include a 3 kw. transformer with a 4-step regulator for adjusting the current and an automatic single-pole switch. Water circulates in the upper and the lower horn. The machine is foot operated.

The Moline Plow Co., Moline, Ill., announces a new price of $990 on Model D tractors, this being a reduction of $320 under the price of Jan. 1. The new price is the lowest at which the tractor has ever been sold.

Secure Place of the Iron Blast Furnace

Features of Superiority Not Met by Processes Aiming at Producing Steel Direct from Ore — Several Possibilities of Improvements

BY JOSEPH F. SHADGEN*

OF late the reduction process on which the blast furnace is based has been by inference subject to doubt, and various efforts have been made in different countries to discredit, at least indirectly, the functions of this venerable apparatus as well as its commercial usefulness. Direct methods of producing steel immediately from the ore are invented every year. They stir up a froth of opinions and controversies that generate sometimes extensive trial installations, but they have, up to the present time, upset very little of the universally recognized strong position of the blast furnace in its yielding an intermediate product termed pig iron, so impure that another operation is required to transform it into steel, the most useful commercial form of iron. That the blast furnace offers only a roundabout solution of the ore reducing problem is obvious and the following study purposes to present in a concise way the whys and hows of the process involved. It is neither an attack nor a refutation, but is merely intended as an objective exposition of the writer's personal point of view, the result of theoretical studies and practical observations.

In reviewing the problems involved, it must not be forgotten that the direct process of reducing iron ore to steel existed before the blast furnace, because the Catalan ovens and fires producing steel from ore antedate even historic records. The blast furnace is the result of a slow evolution and was born over a century ago through the efforts of the artisan to increase the production. After a century of a haphazard slow development, it came into prominence about 75 years ago through the invention and application of the steam blowing engine to replace the old style bellows or hydraulic devices. Refinements of the process never ceased. Hot blast was adopted after 1860 and Cowper stoves in their numerous forms have been standard fixtures since 1880. After 1900 the utilization of the waste gases set in vigorously and to-day is in the last stages of its development. Hence it appears that the blast furnace is not an invention but the growing child of the practical operator, who never ceased to have faith in its superior commercial value.

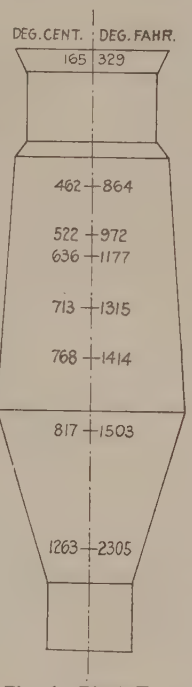


Fig. 1—Blast Furnace Temperature Records as Published by N. Metz

Very little of theoretical consideration was responsible for its conception. Bessemer and Thomas, as well as Siemens and the Martin brothers, accepted the correct principle and efficiency of the blast furnace process philosophically and concentrated their minds on the methods of refining economically the pig iron into the final steel by means of either the converter or the open-hearth furnace. Theoretical investigations of the very complex process were undertaken only after the universal adoption of the process by industry, as the classical work of Professor Gruner of Paris attests, and only since 1900 have scientific tests been made on a large scale to secure real data for heat-balance sheets and to study the detail factors.

Early records show that the small blast furnaces used charcoal, and this fuel has survived in this country and also in Sweden, where its price is reasonably low. Economic reasons, cost and supply considerations, forced a switch to the mineral fuels available in larger quantities and anthracite proved to be the best suited natural coal giving good results in the blast furnaces. High volatile coals proved unsatisfactory on account of the complication of the coking phenomena introduced within the shaft of the furnace. The scarcity of anthracite coal led to previous carbonization of the ordinary bituminous coals to transform them into coke by distilling the gases that had proved objectionable in the blast furnace. Coke became the standard fuel not only because practically all its carbon is uncombined and its sulphur content is less than that of the original coal, but because its qualities could easily be controllable beforehand. Coke furthermore is hard and of a very porous texture, properties that are of the greatest value in the process of the blast furnace. Free carbon proved to be the best reducing agent in the blast furnace for reasons unknown for quite some time, but the results of the practical experience more than convinced the operator of this vital condition.

Features of the process are: The so-called impure carbon-iron alloy called pig iron melts at a relatively low temperature, and melts without getting pasty or without any intermediate transformations. The melting points of the various grades of pig iron lie between 1100 and 1300 deg. C. (2000-2350 deg. Fahr.), which permit operating with bosh and hearth temperatures of 1200 to 1400 deg. C. (2200-2550 deg. Fahr.), as slightly superheated conditions have to prevail to guarantee permanent fluidity and continuity of running. The relative ease of producing slags (aluminosilicates of calcium and magnesium) melting at those temperatures, the possibility of shading the composition of those slags to conform with the analysis of the various qualities of pig iron wanted by the trade are outstanding reasons for the success of the blast furnace process. As all temperatures below 1400 deg. C. (2550 deg. Fahr.) assure a reasonably long life of the refractories, it will be clear why the blast furnace is the accepted medium for reducing iron ores. The last but not least advantage of the blast furnace is that "all" the iron content of the ores is reduced to metallic iron and that the loss of metal through incomplete reduction (in other words, the iron content of the slag) is very low. In spite of the large volumes of the slags produced, four to ten times greater than the volume of pig iron, this loss seldom exceeds 3 per cent of the iron produced and should never be greater than 5 per cent. The iron loss through the dust contained in the blast furnace gases can be recovered practically in its totality in a modern plant.

All direct methods reducing ores immediately to steel must not only create slags fluid at temperatures

*Consulting engineer, New York.

around 1500 to 1600 deg. C. (2700 to 2900 deg. Fahr.), and consequently provide refractories to withstand those temperatures and the mechanical actions and chemical reactions at those extreme heats, but they must also avoid that the iron oxides enter the slag, unreduced, because this loss is unrecoverable, and hence may compromise the economic results of the whole operation. All operators of open-hearth furnaces are well aware of the difficulties of keeping the iron content of their high temperature slags very low. In spite of the small volume of slag in comparison with the volume of the metal inherent to the refining process, all means are used to cut down this loss to a minimum.

Another factor not to be lost sight of is the enormous capacities made possible by the blast furnace within a very limited space without handicapping the natural balance of its reactions or reducing the economical run of operations. The recognition of these facts led to enormous daily production (500 tons, sometimes more), unknown in any other industrial process involving chemical changes. This concentration of operations in large units helped considerably the economic developments, because it permitted the reduction of conversion costs through large well equipped mechanical installations that are the earmarks of the modern blast furnace plant.

Influence of Solid Carbon of Fuel as Reducing Agent

The blast furnace mixes fuel and flux intimately and creates by the counterflow of the rising gases an equilibrium of reactions as well as temperatures at each level that is difficult to excel by any other apparatus. The movement of the materials downward is vertical, producing least friction and a minimum of abrasion on the walls of the furnace and thus assuring long life of the brick linings. The vertical upward movement of the gases tends to make use of the whole section offered and does not favor any part against another part. This counterflow utilizes the heat to a remarkable degree and stratifies the various reactions that require different temperature levels, such as dehydration, calcination of limestone, reduction of oxides, melting of flux. The remarkable way the temperatures vary is reflected by the results of tests of N. Metz, made in 1910 in Dudelange (Luxemburg) on a minette furnace. See Fig. 1.

The latest research seems to attribute the surprising reduction qualities of the blast furnace process to the action of the solid carbon. The theory confirmed what had been recognized by practical experience as reflected by the constant endeavors to provide a fuel with a maximum amount of free, uncombined carbon. Without going into lengthy theoretical calculations, this point can be made clear by pointing out that the reducing influence of the gases (CO in particular) is practically negligible. First, because their time of contact in the high temperature zone is very small—a fraction of a second—as the gases pass through any blast furnace from tuyere to top in less than 3 to 5 sec. Second, because this high velocity does not permit intimacy of mixture and contact necessary for the reducing action. And, third, because the reaction velocities of CO acting as the reducing agent are relatively small.

Most of the reduction of iron oxide or the ores to the uncombined metal of the pig iron is the work of the downgoing carbon of the coke. The porous texture permits intimate mixtures and offers large contact surfaces. The periods of contact are very long, several hours at least. The coexistence of these conditions explains the superiority of the blast furnace process. Part of this solid carbon that pervades the whole pasty mass in the lower bosh is absorbed by the freshly reduced iron particles to form the alloy called pig iron that absorbs additional impurities of the flux (Si, P, S and Mn).

This analysis and these considerations bear out, first, that all new processes based on the reducing activities of gases have to be taken with a grain of salt and, second, that laboratory tests are in no way conclusive, as the time factor is completely ignored in small installations producing several tons a day, whereas in large plants with hundreds of tons of daily capacity the time of contact is much shorter, a detail feature that has to be discounted correctly. The fact of the paramount influence and value of the solid carbon as a reducing agent is also borne out by the evolution of the electric blast furnaces, wherein electricity generates only the heat required to attain the temperatures necessary for the reactions and the melting phenomena, while mixtures of coke with charcoal, or charcoal alone, provide the reducing agents for the iron oxides of the flux.

Heat Balance of Blast Furnace

Fig. 2 represents the rough diagram of the heat balance of a blast furnace. The calculations and assumptions conform to a practical case, and for general discussion, the data of Table 1 may be accepted. It must be said in parenthesis that real balance sheets are much more complicated and require very elaborate preliminary explanations and real information data, but for the purpose of this study the tabulated approximations will prove sufficient.

The hot blast contributes more than heat and the savings are proportionately greater than the immediate addition of a number of British thermal units. The increase in temperatures around the hearth level caused by the hot air creates more appreciable results than merely adding heat. This plus the flywheel effect and easy control explains why stove efficiency and blast temperatures are or should be in the foreground of the attention of the practical furnace man to-day.

The heat loss through the slag varies with the flux, which is a function of the ore. The heat lost by the molten slag is proportionate to the amount of slag and is practically unrecoverable. No practical means of reclaiming that waste exists to-day in spite of efforts toward a solution in England.

The melting of the pig iron accounts for about 4 per cent of the heat supplied by the coke. In steel plants adjoining blast furnaces this sensible heat is utilized to a large extent, as the pig iron is refined into steel immediately.

Table I—Items Entering into the Heat Balance of a Blast Furnace

Providing B.t.u.		Absorbing B.t.u.	
(*a*) Heat content of coke, %	100	(*a*) Liquid iron, %	3.5 to 5
(*b*) Heat added by hot blast, %	8 to 15	(*b*) Liquid slags, %	4 to 10
		(*c*) Radiation and cooling	8 to 12
		(*d*) Reactions, %	25 to 32
		(*e*) Blast furnace gas, %	55 to 65

Radiation and cooling losses are mainly dependent on the rate of operation; their value is considerably less in large furnaces blowing large tonnages than with the small units pushed to less degree.

The heat required for the complex reactions is made up of the heat required for evaporating the water of the flux and the coke, the calcining of the limestone and the reduction of the ores and varies considerably. Numerous detail data have to be guessed at or, to put it politely, have to be carefully estimated.

The most remarkable characteristic of the blast furnace process is the fact that, speaking roughly, 55 to 65 per cent of the theoretical heat content of the coke escapes from the top of the apparatus in gaseous form. In the early days of the art, with the open top, these gases were considered a great nuisance, but soon their value as a by-product was recognized, especially for

heating the brick work of the stoves that raise the temperature of the blast. Crude attempts were made to separate the dust that soiled them. The advent of the gas engine and the continuous upward movement of coke prices changed the old point of view, and to-day the gases are no longer a by-product but one of the main products.

The correct utilization of their energy permits of reducing the conversion cost of ore to pig iron to a remarkable extent. Speaking generally, for each ton of pig iron the blast furnace yields an average of 155,000 cu. ft. of gas, representing at 130 B.t.u. per cu. ft. some 20,000,000 B.t.u., equivalent to the heat value of 1400 lb. of real coal of about 14,000 B.t.u. per lb. This simple calculation visualizes the asset those furnace gases represent and makes all further comment of their value superfluous.

To make an efficient use of the calorific value of the blast furnace gases a thorough cleaning is necessary. The last twenty years of furnace experience are a proof of that statement and yet not all operators accept its obvious logic. It is not only cheaper to clean all the gases, but it is cheaper to cleanse them thoroughly before releasing their heat energy. The costs of purification will be more than regained by subsequent advantages. Efficient solutions of the cleaning problem are on the market, based either on the dry filter principle or on water injection with centrifugal separation or scrubbers, or the electrical precipitation phenomena.

That no gas should escape and all joints be tight to prevent every wanton loss is a precaution so evident that it hardly needs any repetition. A loss of over 3 to 5 per cent during work days may be accepted as inevitable, but figures in excess of that are to be considered as representing wasteful operation.

The first use of the gas is the heating of the Cowper stoves. With clean gas and modern burners, 25 per cent of the total gases, or some 5,000,000 B.t.u. per ton of pig iron, should suffice for this purpose, although 30 to 33 per cent (7,000,000 B.t.u.) are more common in every day experience to-day. Here is room for considerable saving, and it is astonishing to note the absence of interest in this problem and to record the indifference toward improvements in this detail by the majority of operators.

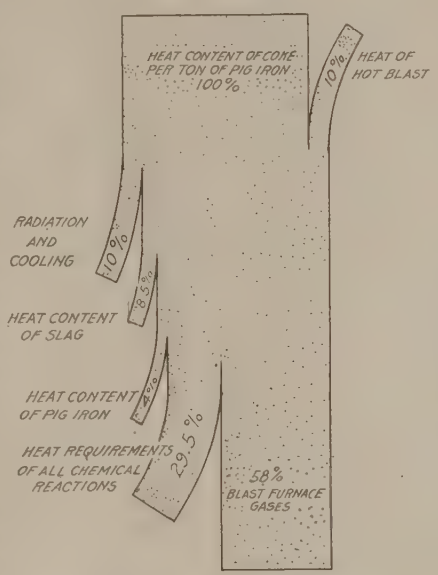


Fig. 2—Approximate Diagram of Heat Balance of Blast Furnace

The second immediate utilization of the blast furnace gases is the generation of power to operate the furnace itself. The principal auxiliaries are the blowing engines, the hoist, the pumps and the gas cleaning plant, all of which operate practically continuously; of secondary importance is current for intermittent uses, such as lighting and shop work. The total power requirements per ton of pig iron will probably average some 130 to 150 kw., of which the blowing station takes the lion's part of 90 to 110 kw. The generation of this power leads broadcast into the controversy of gas versus steam prime movers, a question which cannot be dealt with squarely in a summary like this one. The surprising popularity of the gas engine in Europe is nevertheless worth mentioning, and for general information it may be added that 15,500 to 16,500 B.t.u. are generally figured as necessary to generate a kilowatt on the bus-bars of the powerhouse, an average confirmed by practical experience, over years of operation, with due allowance for the low load factor of the central power plant in the iron and steel industry in not operating on Sundays. For gas blowing engines here in America a minimum of 100,000 B.t.u. per 1000 cu. ft. of blast air may be accepted (although lower figures have been reached with lower pressures in Europe) and used as a comparison to check up the actual efficiency of an existing equipment.

About 40 to 55 per cent of the blast furnace gases are surplus available for other purposes and represent a value that no practical operator should miss taking advantage of. The statement, heard so often: "We have no use for the surplus," cannot be taken seriously, as no industry can afford to disregard an asset and to throw dollars away.

This essay will have proved that there is nothing basically wrong with the process of the blast furnace. The historical evolution has found a theoretical confirmation that explains the superiority of the method of reducing iron ores into pig iron over any other method. The efficient utilization of the blast furnace gases is emphasized and several possibilities of improvement are hinted at; these will not fail to be drawn into the limelight in the coming years of competition and low margin profits.

Coal and Coke Labor Reductions

UNIONTOWN, PA., Aug. 20.—Preceding by 24 hours the announcement of the United States Steel Corporation of a further reduction in wages, W. J. Rainey, Inc., published reductions of 3 to 15 per cent in mine and coke plant labor, carrying the Rainey scale back to the old Frick scale of May 1, 1917. Employees of the Mt. Braddock and Allison plants of the Rainey company declined to accept the reduction and quit work, closing down two of the largest plants of the company in the region. No disorder marked the suspension of operations. Men say they will not accept the new scale; officials say the plants cannot be operated at a higher scale.

The Rainey reduction, effective on Aug. 19, is the fourth this year and cuts total approximately 50 per cent. Other reductions were put into effect without question and were followed by all other independents in the region. So far as can be learned to-day, no other independent operations contemplate further reductions. The present scale of the independents is 10 per cent lower than the present Frick scale. No information is available as to the new scale of the Frick company which is to become effective on Aug. 29, in line with the Steel Corporation's announcement on Aug. 19 in New York.

Rainey operations, until the Mt. Braddock and Allison were suspended, was approximately 85 per cent coal and 30 per cent coke. All Frick ovens continue out of blast. Coal production of the company in the region is now approximately 35 per cent. Most observers believe that the new wage scale will be the signal for resumption on a large scale, many predicting that the region will be operating generally at 60 per cent by the middle of September and at near normal by early spring, "near normal" being approximately 90 per cent of regional production. It is wise to emphasize, however, that coke production probably never will reach the "war basis" of operations, due to the growth of the by-product ovens in place of the beehive type.

Steel Industry Heard on Tariff Schedules

Ferroalloy Paragraph Chiefly the Issue —Magnesite and Graphite Duties Opposed and Defended in Late Hearings

WASHINGTON, Aug. 23.—The interest of the iron and steel and allied industries in the metal schedule of the permanent tariff bill is evident from the number of important witnesses who are scheduled to appear this week before the Senate Committee on Finance. The hearings on this schedule were begun to-day with discussion relating to aluminum, anvils, files, cutlery, surgical instruments and other products but it is a question how far the committee can carry out its program, because it has been delayed in closing hearings on the chemical and earthenware schedules.

The committee plans to complete the metal schedule this week, after which it expects temporarily to discontinue hearings in order to take up the tax bill. On Thursday the major items in the metal schedule are to be taken up, according to the present program, and some of the leaders in the industry are listed to appear. They include Chairman John A. Topping, Republic Iron & Steel Co., who will speak on the ferroalloy section, an object of much discussion, also on tin; E. G. Grace, president Bethlehem Steel Co., ferroalloys; A. C. Dinkey, president Midvale Steel & Ordnance Co., ferroalloys; J. A. Campbell, president Youngstown Sheet & Tube Co., welded pipe and barbed wire; Willis L. King, vice-president Jones & Laughlin Steel Co., ingots, slabs and billets and structural steel; Severn P. Ker, president Sharon Steel Hoop Co., hoops, bands and cotton ties; I. M. Scott, Wheeling Steel Corporation, sheets and tin plate; Alan Wood Iron & Steel Co., pig iron and scrap; W. M. Slater, Washington, American Rutile Co., ferroalloys; Henry L. Smith, Indianapolis, manganese ore; De Courey Brown, New York, ferroalloys; Dan Sutherland, Washington, American Brass & Copper Statistical Exchange, chrome ore; Clifton Taylor, Pittsburgh, Molybdenum Corporation of America, ferroalloys; Radcliffe Romeyn, Philadelphia, ferroalloys; W. H. Abbott, Wheeling Steel Corporation, metal schedule; Thomas E. Monks, Cleveland, ferrosilicon.

Hearings last week on the chemical and earthenware schedule included testimony regarding magnesite, graphite and fluorspar. On the first two witnesses appeared both to oppose and support duties, while on fluorspar one witness appeared and asked that the duty of $5 proposed in the Fordney bill be increased to $10 net ton. The steel industry itself did not have any representative before the committee, but its position is that fluorspar should be continued on the free list.

Treasury experts have begun the work of studying the American valuation plan, which the Senate Finance Committee, in joint conference with the House Committee on Ways and Means, has concluded to adopt. The experts will endeavor to learn as nearly as possible how the new plan of assessing ad valorem duties will operate as applied to American products and report to the Senate committee. The latter will use the information in determining rates in the permanent bill and it has been indicated strongly that this will result in a general lowering of the duties carried in the measure as it passed the House.

Argument Against Proposed Duty on Magnesite

Claiming that the four Pennsylvania plants engaged in the manufacture of magnesite brick and the plant of the American Refractories Co. at Baltimore, representing an investment of approximately $2,500,000, would have to be abandoned within one year after the levying of the proposed duty of ¾c. per lb. on dead burned magnesite carried in the Fordney tariff bill, P. B. Mossman of the American Refractories Co., Pittsburgh, urged the committee to continue crude and dead burned magnesite on the free list. Mr. Mossman, after approving the present duty of 10 per cent ad valorem on manufactured magnesite brick, made a vigorous attack on the Fordney rates on magnesite. He recited the growth of production in the United States, saying that domestic output was less than 10,000 tons prior to 1914; that large quantities were imported into the United States from Austria and Greece, 90 per cent coming from the former country because of the superior character of the material.

Domestic Production and Prices

Stimulation of domestic production following the outbreak of the European war, when importations from Austria were cut off, was noticeable, references being made to operations in California and Washington. It was contended by Mr. Mossman that there is not one magnesite deposit in California that has sufficient tonnage of quality to justify the erection of a plant at the deposits for the production of synthetic and dead burned magnesite. It was also asserted that at the rate of production for the year 1920, magnesite deposits in Stevens County, Washington, would be exhausted within 10 years and that meanwhile users of magnesite in this country would be carrying a heavy tax burden, and millions of dollars invested by rivals of the Northwest company would be in idle plants.

Before the war dead burned magnesite sold at $15.75 per ton at American Atlantic seaboard and consequently the tax proposed, equivalent to $15 per ton, is practically 100 per cent. Asserting that the United States Tariff Commission estimates the total consumption of magnesite in this country at about 300,000 tons crude, which would equal about 150,000 tons of calcined or dead burned, Mr. Mossman said that the total annual tax upon the producers of steel, copper and other materials in the production of which magnesite is used would amount to $2,250,000, a sum to be annually increased with the normal increase of production in the United States.

He combatted what he said was the assumption of domestic producers that the chief point of destination of magnesite grain was the Atlantic seaboard, freight rates being figured accordingly. It was explained that about 50 per cent of the magnesite grain is shipped to the brick plants to be manufactured into magnesite brick and the remaining 50 per cent is shipped in grain form directly to the steel or copper plants, where it is used in making bottoms for the furnaces in which the metals are treated. The brick plants are at present located, he said, in Pennsylvania and Baltimore.

The Center of Magnesite Consumption

With the development of the industry in Washington, under free and competitive conditions, it was maintained by Mr. Mossman that it is inevitable that similar plants will be erected either by the producing company or by others, in such close proximity to the deposits of raw material as to have the benefit of the resulting low freight rates. He maintained that it is a well-known fact that the center of steel production in the United States is in the neighborhood of the Indiana and Ohio State line and that in view of the fact that there is very large consumption of magnesite used in the copper smelting industry in the Rocky Mountain States, it is fair to assume that the center of consumption of magnesite grain is west of the center of steel production.

It was asserted that 30½ per cent of the total ship-

ments of the American Refractories Co., during the years 1916-17-18, went to destinations north, west and south of the Mississippi River, 26 per cent going to points in the United States west of the Mississippi. It was argued, therefore, in determining the comparative cost of the foreign and domestic material, that the Atlantic seaboard cannot be taken, in estimating freight tariffs, as the average point of destination. He gave figures to show that the actual cost of all the magnesite marketed by the American Refractories Co. from its Austrian plant during the year 1920, amounting to 17,217 metric tons, delivered at Baltimore, was $33.05, while the total cost per net ton of 2000 lb. on vessel at United States Atlantic seaboard ports was given as $30.05. He also submitted a statement making a comparison between domestic and imported magnesite delivered at various destinations. It emphasized again the fact that the average destination is not the Atlantic seaboard but some point west of the Indiana-Ohio State line, it being claimed that the Austrian cost did not include any profit to the Austrian operation.

Competitive Prices East and West

The cost of magnesite produced at Chewelah, delivered in the Pittsburgh-Cleveland district, was given as $40.04, while the import cost was given as $36.05, the latter having the advantage of $3.99. The cost of the Chewelah product delivered in the Chicago-St. Louis district was given as $38.29, while the import cost was estimated at $40.05, the domestic advantage in this instance being $1.76. In the Montana copper district the domestic advantage was put at $20.17.

Mr. Mossman opposed the idea that domestic deposits should be developed as a matter of national preparedness, contending that the best thing that could happen to further the cause of preparedness would be to close down the domestic magnesite industry completely in order to conserve the supply for emergency needs.

"The American Refractories Co.," it was stated, "has a far greater investment of capital than exists in the entire magnesite producing industry in the United States. This investment was made at a time when the copper and steel producers of the United States were wholly dependent for their supplies of magnesite upon European sources.

"The property of the American Refractories Co. acquired in Austria now represents a cash investment of over $2,000,000, and it has produced and sold to American manufacturers magnesite which is recognized to be of the highest known quality."

Request was made by Attorney Reeves T. Strickland, Washington, representing the Magnesite Mining & Mfg. Co., that magnesite be placed on the free list. The company he represents has mines on the coast of Venezuela and it was stated that importations would be seriously interfered with by the duties proposed in the Fordney bill. It was asserted that imports at the Atlantic seaboard would not interfere with the magnesite industry on the western coast of the United States.

For and Against the Graphite Tariff

In his argument before the committee for the continuation of graphite on the free list, H. M. Riddle of the Asbury Graphite Mills, Asbury, N. J., stated that a serious condition confronts not only the manufacturer and refiner of foreign crystalline graphite, but all users of this material, including nearly 4000 foundries in the United States and large crucible interests. There never has been a duty on crystalline graphite because it is impossible to get along without this product. It was explained that there is something about the texture of Ceylon graphite that the American graphite does not contain. Aside from that, it was pointed out that there is only about 2 per cent of graphite in the American rock, while the Ceylon product is from 60 to 98 per cent pure. Mr. Riddle told of the difficulty of using American and Canadian graphite during the war, when shipments from Ceylon were cut off. Their use was made possible by mixing these grades with the Ceylon product which was on hand. Not only did Mr. Riddle complain of the high prices of the domestic product, but he claimed that there is nothing that will satisfactorily take the place of Ceylon graphite.

Restoration to Free List Urged

Speaking for graphite dealers and manufacturers, Attorney Charles E. Kern of Washington urged the committee to restore this product to the free list. He said that no matter how high the tariff may be it cannot force crucible makers to use an unfit raw material. He added: "Increased cost of crucibles will work to the disadvantage of manufacturers who have small capital. The electric furnace and the crucible have been going nip and tuck in matters of cost efficiency but if expense is added to the crucible by a tariff tax which does not apply to electric furnaces there will be a positive advantage for manufacturers of large capital because they can change to the electric furnace. Men operating on a small scale will continue of necessity to use the crucible if they remain in the business.

"Our graphite trade with Ceylon is now giving return cargoes to American ships that carry our products to the Orient. It has been suggested that we should develop our graphite deposits as a preparation for war, but until someone can make a satisfactory crucible of this graphite it cannot serve in war time. Necessity caused the most thorough tests of this material in crucible making during the recent war and proved that it was unfit for that purpose, beyond a small mixture along with the binding clay.

"We trust the crucible industry will be permitted to continue with the conditions under which it was built up."

George H. Pettinos of Philadelphia manufacturer of crude graphite, using domestic and foreign material, and owner of deposits in Chester County, Pennsylvania, asked that graphite be kept on the free list. He said there is no substitute for Ceylon graphite, except up to 10 per cent, and that the crucible industry, now on a par with the electric furnace as to cost and quality, will be wiped out if it is handicapped by the proposed duty on graphite. He gave it as his opinion that eventually the electric furnace will entirely replace the crucible industry but protested against hastening such a condition. Replying to a question by Senator Simmons, the witness said he did not seek or desire protection on his manufactured products.

Lower Melting Cost with American Crucibles

The other side of the story on graphite was told by George A. Sharpe of Birmingham, Ala., representing the Alabama graphite producers, who asked for protection ranging from 1c. per lb. on crude graphite to 6c. per lb. on the finished product. He asserted that domestic graphite will make a good crucible of itself and even a better crucible than that made from Ceylon graphite and pointed out that the Electro Refractories Corporation of Buffalo is getting 85 heats from domestic flake graphite. He argued that a duty of 6c. per lb. on American flake graphite would reduce instead of increase the cost to consumers by more than one-half. With this in mind he said that a No. 70 crucible contains approximately 17 lb. of graphite, which at a duty of 6c. would be $1.02. Made of Ceylon graphite, it was stated, this crucible will take not more than 30 heats. The crucibles from American flake (each charge weighing about 90 lb.), it was stated, will melt 7650 lb. of metal. Melted in a Ceylon crucible, the total would be 2700 lb.

"A No. 70 crucible, we will say," added Mr. Sharpe, "sells for 7c. a number, and this means a No. 70 crucible would be sold for $4.90. Add to this the full 6c. per lb. which we are asking on flake, or $1.02, and you have a cost of $5.92 for the American crucible. The Ceylon crucible, melting 2700 lb. of metal, at a cost of $4.90, means a cost of 0.18c. per lb. of metal melted. The American flake crucible, melting 7650 lb. of metal at a cost of $5.92, represents a cost of 0.08c.

per lb. of metal melted, or less than one-half the cost of melting in the Ceylon crucible."

Asks $10 Per Ton on Fluorspar

A duty of $10 a ton on fluorspar was asked by A. A. Northern, Hopkinsville, Ky., representing the Potters' Union. The duty carried in the Fordney bill is $5 a net ton, with a provision that after the expiration of one year beginning on the day following the passage of the act, the duty shall be $4 a net ton. Mr. Northern contended that production costs in England are much lower than they are in the United States and said this open-hearth flux was coming in from England and selling at $10 a ton, while the average domestic price is $20 a net ton f.o.b. mines. It was brought out, however, that imports have been extremely small during the past few years when compared with domestic production and consumption.

Transfer of zinc oxide from the metal to the chemical schedule was suggested by Stephen S. Tuthill of the American Zinc Institute. He also asked that products of lead and zinc ores be placed at higher duties than the ores themselves, pointing out that zinc oxide and white lead are competitive.

Fall Meeting of Mining Engineers

Plans are rapidly maturing for the fall meeting of the American Institute of Mining and Metallurgical Engineers at Wilkes-Barre, Pa., Sept. 12 to 16. Besides the usual sessions on coal and general mining problems, there will be a meeting of the metal section at 8 p. m. on Monday, Sept. 12, for which the following papers are scheduled:

"Application in Rolling of Effects of Carbon, Phosphorus and Manganese on Mechanical Properties of Steel," by W. R. Webster.

"Thacher Process for Molding and Casting Propeller Blades and Wheels," by E. Touceda.

"Making a 5 Per Cent Nickel Cast Iron Alloy in an Electric Furnace," by D. N. Witman.

A paper on the "Application of Pulverized Coal to Boilers" will be presented Tuesday evening, Sept. 13, by J. M. Fuller.

Fall Meeting of Electrochemists

Present indications point to a high-grade program for the technical sessions of the fall meeting of the American Electrochemical Society at Lake Placid, N. Y., Sept. 29, 30 and Oct. 1. The features are to be symposiums on non-ferrous metallurgy and on electrodeposition. On Thursday evening, Sept. 29, Prof. Harlow Shapley of Harvard University will lecture on "Chemistry and the Stars." An elaborate program of sports is being arranged.

For the spring meeting in 1922 three symposiums are announced: Electric furnace cast iron, gases of the electrochemical industries and electromotive chemistry.

The Gibson, Ind., repair shops of the Indiana Harbor Belt R. R. have been leased by the United Boiler Heating & Foundry Co., Hammond, Ind., which opened the shops on Aug. 15, with a force of 150 men. Charles Nau, president of the company, was formerly general foreman of the Gibson shops and hopes to be able to handle the repair work not only of the Indiana Harbor Belt but of other roads.

A merger has been effected between the Stowell Co., South Milwaukee, and the Pelton Steel Co., Milwaukee, whereby the Stowell Co. secures the business of the Pelton company. It is the intention to continue operating the Pelton plant under the old name and to maintain the same organization. The Stowell Co. has had steel casting facilities for some time, but now counts on added capacity and scope of quality.

Industrial Plant Activities

The tinners tool department, Peck, Stow & Wilcox Co., Southington, Conn., is on a 5½-day schedule, as against a 5-day heretofore.

The Remington-Arms Union Metallic Cartridge Co., Bridgeport, Conn., employing 2700, last week began operations under a new wage scale involving a reduction of 10 per cent.

The Warren Steam Pump Co., Warren, Mass., heretofore operating its plant with reduced help on a 40-hr. week schedule, has closed.

The Sessions Clock Co., Forestville, Conn., last week somewhat reduced working forces and lowered wages 10 per cent. The automatic machine and casting departments closed for two weeks.

The screw products department, New Britain Machine Co., New Britain, Conn., is working a small number of men on a night shift. Other departments are busier than they have been in months.

The Gilbert & Barker Mfg. Co., West Springfield, Mass., maker of tanks, is employing 800, contrasted with approximately 2000, the normal working force. The company in the past week laid off an additional 100 men.

The employees of the Stanley Rule & Level Co., a subsidiary of the Stanley Works, New Britain, Conn., have returned to work under a wage reduction of about 12½ per cent. The plant was closed for a 10-day period, reopening Aug. 22.

The New York, New Haven & Hartford Railroad Co. is steadily increasing the working force at its East Hartford, Conn., car shops and this week expects to have 400 on the payroll. Most of the men are working for 72c. per hour or about $3.92 per week less than they formerly received.

Effective Aug. 26, the plant of the Collins Co., Collinsville, Conn., maker of agricultural tools, etc., will be closed Mondays and Saturdays.

Following a shutdown of some time, the Aetna Nut Co., Southington, Conn., will resume operations within the immediate future. The full number of 100 employees will be engaged.

The plant of the Royal Typewriter Co., Hartford, Conn., was closed Aug. 17 until Sept. 6, throwing approximately 1200 out of employment. Between 300 and 400 have been retained on the payroll. The plant was operating two days a week, following a two weeks' shutdown.

Business of the Cadillac Motor Car Co. is so favorable, says a statement issued by the general office of the corporation, that the new Clark Avenue plant has been opened. The company, says the statement, has reached 70 per cent of normal production and is employing 70 per cent of the normal working force. More than 1000 men have been added in the last few days, bringing the number up to more than 4000. Almost every department is operating full time.

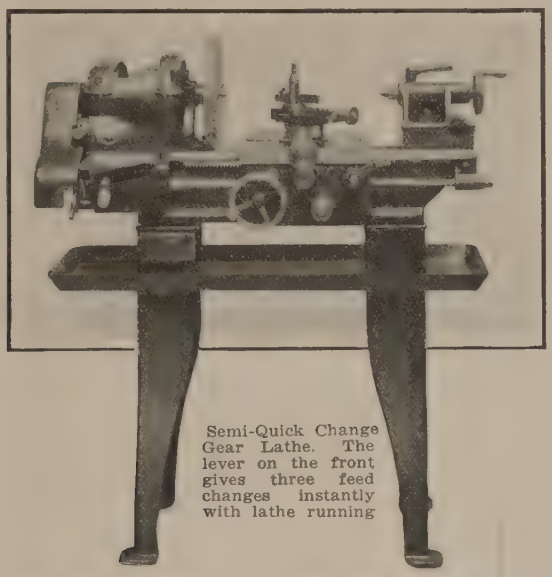
The Nash Motors Co., Kenosha, Wis., in a public statement, says that although it attained a production of 2470 passenger cars at the Kenosha and Milwaukee works for July, orders exceeded production by more than 50 per cent following the price cut effective July 1. It is also stated that a similar condition confronts the company for the monthly period ending Aug. 31, and will carry over well into September.

As part of a program of expansion, the Warren Iron & Steel Co., Warren, Ohio, producer of steels used chiefly in ploughs and tools, has purchased coal lands in Kentucky. Hitherto, the company has purchased its coal requirements on the market. Stockholders are asked, in a letter by President C. B. Loveless, to sanction a $400,000 bond issue, proceeds to be applied to purchase of the coal properties.

Adds to Line of Engine Lathes

The Monarch Machine Tool Co., Sidney, Ohio, has added two new machines to its present line of engine lathes. The sizes are 9 in., and 11 in., respectively and are being offered under the name of Monarch Junior.

Among the features of construction may be mentioned the quick change gear box which is of simple design, one tumbler lever operating on a cone of nine gears, compounded on the end with a 32- and 64-tooth gear and with three other gears on the end gearing, giving 54 changes of threads and feeds. The back gears are locked in and out of position by a ball and spring plunger. The tailstock base is graduated for accurate set-over for taper turning and can be considerably over-hung on the bed. The feed reverse and lead screw reverse are instantly secured and with the lathe



Semi-Quick Change Gear Lathe. The lever on the front gives three feed changes instantly with lathe running

running by a reverse lever on the headstock. The compound rest is gibbed throughout and has large bearing surfaces. Cross feed dial, swivel and compound rest dial are graduated and numbered. The tool post is steel, milled from the bar and tool post screw is the Mac-It non-breakable screw. The steel rack is in one section.

The lead screw is from special screw stock, is chased on a special lathe and tested on a Hartness screw thread comparator, recording 0.0001 in. for accuracy of lead and form of thread. The carriage is 11¾ in. long and is drilled and tapped to receive taper attachment, chasing dial and chasing stop. The apron is said to be foolproof and exceptionally rigid and strong. The upper knurled hand wheel has three distinct marked positions of engagement. When thrown to the left, the longitudinal feed is engaged; to the right the cross feed is engaged; and when in neutral, and only in this position, the half-nut is engaged. The lower knurled hand wheel controls the large friction, which is used to operate both power cross feed and longitudinal feed. It is impossible to engage either feed and the half-nut at the same time and thereby eliminates breakage from that source. Ample oiling facilities are provided.

The countershaft consists of Edgemont friction clutches and cast iron hangers having ring oiling bearings. The lathe can be furnished with floor or bench legs; with oil pan, pump and tank; and in bed lengths of 2½, 3, 4 and 5 ft. For motor drive the countershaft and control clutches are mounted above the headstock on a special bracket. Full quick or semi-quick change gear box can be supplied as desired. Other attachments include: draw-in, taper, turret, chasing dial, chasing stop and metric thread transposing gears. A ½ to ¾ hp. motor is required.

The Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of leather belting, has abolished the titles of general manager and sales manager. Production will be supervised by the administrative board.

German Export Success Exaggerated

Ever since the reparations question was settled between the allied nations and Germany in May there has been a great deal of superficial discussion to the effect that German workmen are working long hours at very low pay; and that all the people of Germany—60,000,000 souls with a single thought—are buckling down to capture the markets of the world, crush foreign competition, and pay off their indemnities with manufactured products, enjoying all the while the advantage of greatly depreciated currency, low cost of living, and low cost of materials as compared with other manufacturing nations.

But L. R. Morris, in an article in this week's *American Exporter Bulletin*, states that: "Germany, instead of being in a better position to compete with the United States than before the war, is in a much worse position. That this is the case is recognized even in Germany; it is a subject of comment in the trade press, and is emphasized in official documents relating to German export trade and reports of prominent banking houses.

Germany an Exporter of Cheap Goods

"It is a fundamental of world trade that each manufacturing country will excel in certain lines of products and certain industries. Germany may be expected to show special qualification in her specialties now, as she did before the war, just as this country excels in certain lines, Great Britain in others, and France in still others. But this is not to say that Germany will be able to compete in any and all lines. Germany will have much the same place now as before the war, in that she will be known chiefly as an exporter of cheap goods.

"American goods have never competed on a price basis except in staple lines—grains, steels, etc. Manufactured goods, which in the fiscal year 1913 formed 48.80 per cent of our total exports, and in June, 1921, formed 52.15 per cent, have never been sold so much on a price basis as on quality and service. In hardware, shoes, machine tools, and many other lines, the United States has always sold large quantities of its goods, even in Germany, although German products in the same lines were sold at cheaper prices.

Labor Costs in Germany

"The most important factor in the cost of production is labor. Now any impression that German labor is working on a less self-centered basis than labor in other countries, or is working at a less rate of increase per hour over pre-war years, in proportion to the increased cost of living, is not true to facts.

"The efficiency of the German workman has deteriorated in the last few years, just as it will always deteriorate in a period of inflation. The Manufacturers' Union of South Germany recently reported workmen turning out only 60 per cent per capita of their pre-war production. During the first four months of this year the coal mines of all Germany, excluding lost territories, employed 92,000 more men than before the war, and produced 22 per cent less coal.

"Belief abroad that German workmen are to-day working long hours is likewise not supported by facts. The normal work day in Germany is 8 hr.; in coal mines, only 7 hr.; a bill has been submitted in the Reichstag to make the day in all mines 7 hr. Last year in the Ruhr mines a general strike was at one time threatened, to enforce the demand for a 6-hr. day.

German Wages Compared with American

"The belief that German workmen are working for extremely low wages, as compared with pre-war conditions, is also a misconception. German real wages are actually 30 per cent higher than before the war, for since 1914 the cost of living has increased 770 per cent, and wages have gone up 1032 per cent.

"In the same period the cost of living in the United States rose 66 per cent, and wages rose 107 per cent, making the rise in United States real wages 25 per cent, or less than that of Germany.

"Between February, 1920, and May, 1921, the cost of living in Germany rose 41 per cent, whereas wages rose 120 per cent, or three times as fast. Between

February, 1920, and May, 1921, the cost of living in the United States declined 15 per cent, and wages declined 3 per cent."

Data presented show how Germany is slipping in her erstwhile control of markets once largely dominated from Berlin. As a single example:

"During the first three months of 1921 imports from the United States into Japan constituted 35 per cent of the total imports, as compared with 18 per cent in the corresponding period of 1914. During the same period, imports from Germany constituted 1.3 per cent of the total as compared with 7 per cent in 1914. Whereas the value of imports from the United States was 254 per cent greater than in 1914, the imports from Germany showed a decrease of 65 per cent from the 1914 figure."

Melting Steel in a Non-Ferrous Electric Furnace

Successful Production of Crucible Quality Steel in Small Baily Resistance Units

NOT all tool steel, whether carbon or high-speed, is made in electric furnaces. There is still a considerable quantity made by the crucible process. One reason why crucibles are still used is because of the convenience of such small pots for special mixtures and the ability to pour without sculling, thus doing without a ladle.

In the belief that the small type of electric resistance furnace might be used in place of the crucible, the Electric Furnace Co., Alliance, Ohio, recently carried out experiments at its laboratory at Salem, Ohio, in melting steel in such a furnace. Attempts were made to adapt it to producing the portion of crucible quality steel now handled in pots.

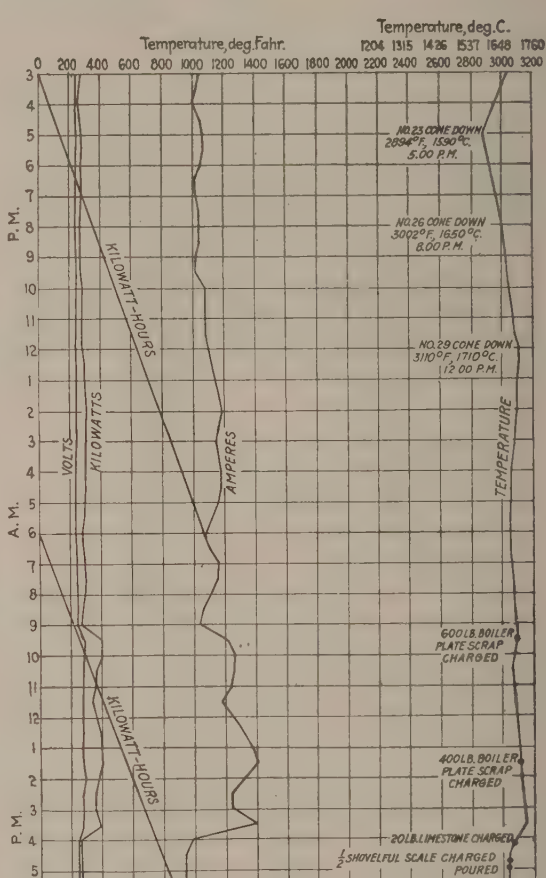
These furnaces have been developed into smaller sizes, holding 200 lb., 750 lb. and 2000 lb., respectively, the largest size also being built in the nose tilting type in connection with a casting table on which molds are mounted; so that the metal can be poured directly to the molds without any ladle at all, as in brass melting practice. This gives uniform temperature throughout the pour, eliminates the ladle entirely and makes the pouring condition analogous to that of crucible practice. The following is taken from the report of the company's results and claims.

This test was also used as a means of determining the maximum temperature that could be obtained and maintained in a furnace of the resistance type, and it was found that there was no difficulty in keeping steel of as low carbon content as 0.05 per cent at a good pouring temperature. The maximum temperature obtained on the hearth in this test was 1850 deg. C., at which the magnesite lining commenced to volatilize.

The furnace used for this steel test was a standard 7-ft. diameter brass melting furnace, having a hearth capacity of 2000 lb.; and, in addition to the 4½-in. brick lining used in brass melting, a 9-in. magnesite brick lining was placed directly inside the ordinary fire brick lining. The roof was made of 9-in. silica soap shapes, and was not insulated. The accompanying test sheet shows not only the temperatures obtained, but the melting rate as well.

These tests, and subsequent tests, indicated that crucible quality steel can be made and poured in small furnaces of this type with a current consumption of not to exceed 1200 kw.hr. per ton which, while much higher than the figures obtained in arc practice, nevertheless will produce steel much more economically than by crucible practice.

There seems every reason to believe that furnaces of this type can be advantageously used to replace a large part of the crucible steel making capacity that is still handled in pots. A particularly advantageous feature of the resistance type of furnaces for this work is that the furnace atmosphere is under better control than in a furnace of any other type, whether of the electric arc type or in a crucible pit furnace. This particular feature has been one of the advantages in handling non-ferrous metals, particularly of rolling mill quality, since the furnace can be kept much more tightly closed than other types and, therefore, the amount of oxides and blow holes in the metal reduced; the bath of metal in this type furnace, not being agitated as in the case of the arc furnace, almost directly duplicates conditions in crucible practice, in allowing not only the gases to rise to the top of the bath but also any slag inclusions or other foreign substances.


Temperature, deg. Fahr.
Temperature, deg. C.
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200 2400 2600 2800 3000 3200
1204 1315 1426 1537 1648 1760
P.M.
A.M.
P.M.
KILOWATT-HOURS
VOLTS
KILOWATTS
AMPERES
KILOWATT-HOURS
TEMPERATURE
NO. 25 CONE DOWN 2894°F, 1590°C. 5.00 P.M.
NO. 26 CONE DOWN 3002°F, 1650°C. 8.00 P.M.
NO. 29 CONE DOWN 3110°F, 1710°C. 12.00 P.M.
600 LB. BOILER PLATE SCRAP CHARGED
400 LB. BOILER PLATE SCRAP CHARGED
20 LB. LIMESTONE CHARGED
½ SHOVELFUL SCALE CHARGED POURED

Steel Melting Test in a Baily Electric Resistance Furnace at the Salem Laboratory of the Electric Furnace Co.

Time	Amperes	Kw.	Voltage	Bath Temp., Deg. Fahr.	Meter Reading, Kw. Hr.	Remarks
8:00 P.M.	1040	68	60	3002	200,454	[1]
9:00	1020	67	60	3030	.....	
10:00	1080	70	60	3050	.....	
11:00	1080	70	60	3080	.....	
12:00	1100	70	60	3110	.....	[2]
1:00 A.M.	1140	74	60	3100	.....	
2:00	1180	76	60	3100	.....	
3:00	1140	75	60	3090	.....	
4:00	1180	75	60	3070	.....	
5:00	1160	75	60	3060	.....	
6:00	1080	71	60	3050	201,185	
7:00	1160	75	61	3060	.....	
8:00	1120	73	61	3080	201,333	
9:00	1040	67	60	3090	201,391	
9:30	1000	65	61	3100	201,421	[3]
10:00	1260	100	75	3080	201,462	
11:00	1240	90	70	3070	201,553	
12:00	1240	92	69	3090	201,647	
1:00 P.M.	1380	98	70	3110	201,733	
1:30	1400	100	69	3120	201 792	[4]
2:00	1320	95	74	3120	201,840	
3:00	1240	90	70	3140	201,924	
4:00	980	65	64	3090	202,009	[5]

Remarks:
[1] No. 26 cone down at 3002 deg. Fahr.
[2] No. 29 cone down.
[3] 600 lb. boiler plate scrap charged.
[4] 400 lb. boiler plate scrap charged.
[5] 20 lb. limestone charged, 4:10 p.m.; 5 lb. roll scale charged, 4:40 p.m.; poured at 4:52 p.m.

WHEELING DISTRICT

The Strike Against Wheeling Steel Corporation —Sheet Market Conditions

WHEELING, W. Va., Aug. 24.—The answer of the Wheeling Steel Corporation to the strike called against it a week ago to-day by the Amalgamated Association of Iron, Steel and Tin Workers is point to the fact that it has in operation the Belmont mill of the Wheeling Steel & Iron Co., the Benwood plant, where it is running at a 50 per cent gait in the skelp mills and pipe furnaces and has its steel works there going after a shutdown of a week, and that the LaBelle Iron Works is running 40 per cent of capacity both in Wheeling and Steubenville. The company is making no attempt at present to start up the Wheeling Steel & Iron Co. tin mills at Yorkville, Ohio, nor any of the Whitaker-Glessner Co. plants, but since the company is carrying good sized stocks of sheets and tin plate, built up earlier in the year, and current orders largely can be supplied from stocks, the necessity of starting up idle capacity is not pressing. On sheets the company can supply sizes and gages not in stock from the Steubenville, Ohio, plant of LaBelle Iron Works, which is in operation. If orders continue to grow in number as they have in the past few weeks, it is possible that the Portsmouth, Ohio, works of the Whitaker-Glessner Co. will be started up.

There is little or no outward sign that a strike exists and none is likely to appear until the company attempts to start up some of the sheet and tin plate mills hitherto operated under an agreement with the Amalgamated association. The Wheeling Steel Corporation officials view the situation calmly. They believe firmly in the principle of the open shop and having decided that the interests of the workmen and the stockholders are better served by such a policy, they are not disposed to go back to dealing with the unions. There has been no lockout, as claimed by union leaders, company officials declare; there has been simply the substitution of direct dealing with the men for indirect dealing with them through union officials. Men can work in the plants whether they are members of the union or not. In announcing the change it was stated that the same wages as are paid in the union mills would be paid in the plants of the company, and as indicating the wage ideas of the company, one official, who is active and conspicuous in its affairs, declares that 30c. an hour, the ruling rate for common labor, is low enough with rents and the necessaries of life as high as they are to-day. The belief exists among Wheeling Steel Corporation officials that the company has been singled out for special attack by the Amalgamated association, pointing out that in no other steel-making center is the latter organization as active as it is in the Wheeling district.

Business Volume and Prices

In common with other districts steel manufacturers here are enjoying a somewhat better business. No big orders are being received, but the number is greater and they are so well distributed among the various products of local plants that manufacturers are encouraged to believe that consumers' and jobbers' stocks are pretty low and that buying will be constant during the remainder of the year. The feeling prevails here, as elsewhere, that prices have gone about as low as they can unless there is a reduction in railroad freight rates, which would permit some lowering of producing costs, and some will not admit that this development will bring material recessions from present prices, claiming that such rate reduction as is likely to be made would no more than absorb the present difference between present costs and selling prices.

On the basis of recent business done by mills in this district, black sheets are quotable at 2.75c. to 3c. base, Pittsburgh; galvanized at 3.75c. to 4c. and blue annealed at 2.25c. to 2.40c. Sheet bars have been sold in this district at $30 f.o.b. makers' mill and 4-in. rerolling billets at $29 to $30, mostly at $29.50. So little demand is developing in slabs that the price is indefinite, but they probably could be placed at $30. Both LaBelle Iron Works and Weirton Steel Co. have supplies of basic pig iron that are available for market. The latter company is quoting $20 furnace, but $21 is as low as LaBelle Iron Works would consider. The latter is not actually seeking pig iron business and prefers to carry the iron rather than sell at less than $21, which it claims is below replacing costs, and these, it is asserted, have been figured upon a basis of the lowest probable fuel, ore and labor costs that can be reasonably expected over the next six months and also make allowance for a possible freight rate reduction.

Operation in Wheeling District

Operations in the district, aside from those of the Wheeling Steel Corporation plants, still are low. National Tube Co. has its plant at Benwood down. Laughlin Works, American Sheet & Tin Plate Co., Martins Ferry, Ohio, last week started up about half of the tin mills there, but this is only for a brief run and the resumption is merely part of the plan of the company to give some work to the men of all plants so long as orders are not sufficient to keep all plants running. Carnegie Steel Co. plants at Bellaire, Steubenville and Mingo are all idle. Weirton Steel Co., Weirton, W. Va., is running rather well. In addition to its blast furnace, it has five of its seven open hearth furnaces running and by concentrating its tin plate business at Weirton it is able to keep the 26 mills there running 16 turns a week. Operation of its strip mills are averaging about 35 per cent full.

After several postponements due to labor conditions, which delayed alterations in the old Schmulback building, now the Wheeling Steel Corporation building, Market Street, Wheeling, all of the executive offices of the Wheeling Steel Corporation are located in that building. It is expected in the near future to have the offices of all of the subsidiaries quartered in this building. This means the eventual abandonment of all offices elsewhere, leaving only plant operating offices outside of Wheeling. The company expects to sell the old Wheeling Steel & Iron Co. building, Main and South Streets, Wheeling.

Employment in New York State Factories

Figures for June from the State Department of Labor show a falling off during the month, both in the number of employees at work and in the total wages received. The former loss is 1.9 per cent; the latter, 2.4 per cent. Under the headings of Metals, Machinery and Conveyances, which heading included 30.1 per cent of all employees reported in June, the falling off during the month was much more marked, having been 7.2 per cent in number of employees and 8.5 per cent in total wages. The heaviest decreases in this group were under the headings of Pig Iron and Rolling Mill products, Structural and Architectural Iron Works, and Cars, Locomotives and Railroad Repair Shops. Under these headings the number of employees, compared with June, 1914, is now 52, 42, and 64 per cent, respectively, showing a falling off of approximately half.

A statement recently made on behalf of union molders, concerning labor conditions in Indianapolis foundries, is contradicted by the employing companies. The situation at Indianapolis is that only two out of 33 foundries reporting have any agreement with the molders' union for a definite time and these two are stove foundries. The six other union shops have no present agreement with the union. Since the reduction in wages from 90 cents per hour to 75 cents, made in April, their molders have been working from day to day, without an agreement, at the reduced rate. There are 19 open-shop and five non-union foundries. The one other foundry of the 33 has not begun operations, its machinery having just been installed.

The Sharon Pressed Steel Co., Sharon, Pa., manufacturer of automobile frames, has increased the operating rate of its plant at Wheatland, Pa., to 40 per cent. Officials state the outlook for business continues bright. A number of substantial orders have been placed.

BRITISH PROTECTIVE BILL

Protective Duties for Certain Key Industries and a Five-Year Anti-Dumping Provision

WASHINGTON, Aug. 23.—The bureau of foreign and domestic commerce has received a cablegram from Commercial Attache Alfred P. Dennis, London, stating that the House of Commons has passed the British Safeguarding-of-Industries bill carrying protective duties on certain special lines in key industries and also an anti-dumping clause, which is to remain in force for five years. The measure is certified as a money bill and is therefore incapable of amendment by the House of Lords and becomes statutory in the present form on receiving Royal assent.

Among products embraced within the measure, which imposes a duty of one-third of the value of the goods, are metallic tungsten, ferrotungsten and manufactured products of metallic tungsten, crucibles, gages and measuring instruments of precision of the types used in metal working shops, various chemicals, optical glass, etc.

The anti-dumping feature is applicable under conditions of collapsed exchanges or in the ordinary acceptance of the term. Dumping is defined as the sale or offer of goods in the United Kingdom below the cost of production in the country of origin.

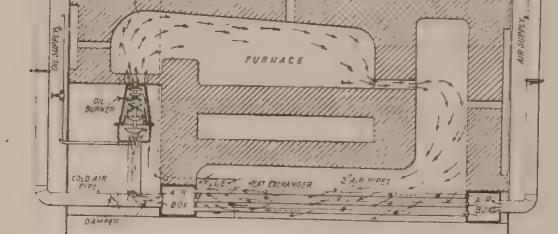
Controversial points have to do, first, with the confusion between the cost of production and selling prices abroad, cost of production being defined in the bill itself as the current sterling equivalent of 95 per cent of either the wholesale price at the works less internal duties leviable in the country of origin, or, if the wholesale price cannot be established through actual sales, a reasonable price computed on wholesale prices charged for similar goods; and, secondly, with conflicts between the bill and existing treaties with other nations. The part having to do with depreciated exchanges appears to contravene commercial treaties with 26 foreign powers, it is stated. The government gives assurance that it does not intend to denounce any existing commercial treaties and, as a consequence, the only countries of commercial and competitive importance to which the exchange provisions could be made to apply are France, Germany and whatever remains of the old Austrian-Hungarian Empire.

The original bill clothed the Board of Trade with final competence as to the issue of anti-dumping orders. This was regarded as an assumption of taking authority and was amended so that all Board of Trade orders against dumped goods are subject to confirmation by the House of Commons.

The amended measure also provides that trades demanding protection against dumped goods must show that the British manufacture of similar goods is being carried on with reasonable efficiency and economy.

Oil Burner Uses Preheated Air

It is a universal practice in Pittsburgh, Cleveland, Buffalo, Wheeling, Cincinnati and Columbus to cut off industrial consumers of natural gas so that domestic consumers may have sufficient gas for cooking and heating purposes, when the supply is short. Two causes have contributed to the shortage of natural gas supplies: wide-spread use of the fuel, and gradual depletion of the Appalachian field after thirty years' constant drain. The natural gas companies have, for several years past, advised industrial users to provide other appliances and fuel for emergency purposes.



Setting of Burner and Furnace, Showing Path of Heated Air from Burner Through Furnace, Back Around Air Inlet Pipes and Up Flue

To meet this condition, the Anderson-Garner-Shaner oil-burning apparatus has been designed and patented, and is being marketed by the Pittsburgh Saw & Manufacturing Co. During the development stages of this apparatus tests were made of its efficiency and utility in commercial ovens, refineries, glass plants and forge furnaces. The cost of operation with oil at 8c. per gal. is about equal to that of natural gas at 45c. per 1000 cu. ft.

This oil-burning apparatus is of the gasification variety. Air, under a pressure of from ½ to 2 oz., delivered by a small fan or blower, is adequate for the heat requirements of metal, heat-treating, forging or glass plants.

The forging furnace shown is 4 ft. wide, 8 ft. long and 5 ft. high. Arrangement is made for the exchange of heat between outgoing, hot flue gases and the fresh incoming air. All of the heat imparted to the incoming air contributes materially to efficiency of use of the fuel, and makes it possible to attain high temperatures in the heating chamber. This forging furnace has been in practically continuous operation for some weeks, and it is said that at no time has the temperature of the flue gases at a point 6 in. above the furnace exceeded 650 deg. Fahr.

Temperatures of 2600 to 2800 deg. Fahr. are obtained and maintained in the heating chamber. It is possible by means of thermostatic connections to maintain and control temperature between 500 and 2800 deg. Fahr. The consumption of oil in heating up the forging furnace is placed at 5 to 6 gal. per hr. The time required, depending upon the oil consumption, is 1 to 1½ hr. When once the furnace has been raised to the desired temperature of 2000 to 2800 deg. Fahr. the oil consumption, to maintain this temperature, is said to average 2½ to 3 gal. per hr.

Cost of Living Stationary

Figures of the Bureau of Labor Statistics show no change in the index number of the cost of living in July as compared with June. Wholesale prices in both months were 48 per cent above the average of 1913. Metals and metal products continue to hold the lowest price position, with the exception of farm products, being now only 25 per cent above the 1913 figure, or well below the average run of prices. House furnishing goods and building materials still maintain their positions at the top of the list, being respectively 135 and 100 per cent above 1913 figures.

In the following table all the figures given represent wholesale prices, except the last line—retail prices of food. The figures are based on 1913 at 100.

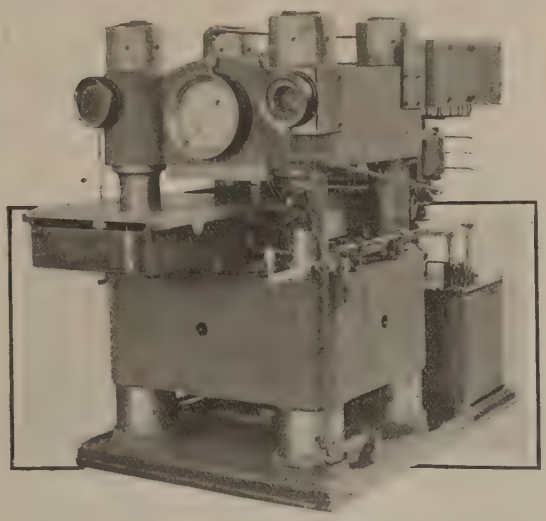
	1920	1921		Percentage Reduction	
	July	June	July	A*	B†
Farm products	236	113	115	51.3	89.6
Food, etc.	268	132	134	50.0	81.8
Cloths and clothing	317	180	179	43.5	68.0
Fuel and lighting	252	187	184	27.0	37.8
Metals and metal prod.	191	132	125	34.6	73.1
Building materials	333	202	200	39.9	58.5
Chemicals and drugs	217	166	163	24.9	45.2
House-furnishing goods	362	250	235	35.1	43.5
Miscellaneous	243	150	149	38.7	66.4
All commodities	262	148	148	43.5	72.1
RETAIL COST OF FOOD	219	144	148	32.4	58.3

*Reduction in one year. †Percentage cut from the excess of May, 1920 (the "peak" month) over the average for 1913.

Lead Molding Hydraulic Press

The hydraulic press shown in the accompanying illustration is a recent product of the Hydraulic Press Mfg. Co., Mount Gilead, Ohio. It was designed and built for the Menasha Machinery Co., Menasha, Wis., and although intended primarily for use in the Claybourn process of solidifying electroplates, it is regarded as equally serviceable as a lead molding press.

The press, motor, pump, reservoir, valve and motor controls are contained in a steel cabinet 5 ft. 4 in. x 5 ft. 2 in. x 3 ft. 7⅛ in. The machine complete weighs



The Platen Travels In and Out, Stopping Automatically When Reaching the Extreme Position

about 6 tons and is capable of exerting 1000 tons pressure. Lightness is secured without sacrificing strength and rigidity by using heat-treated nickel steel castings for the cylinder and press heads and forged nickel steel strain rods. Among the special features may be mentioned the cylinder which is of the differential type having one small cylinder of 3¾ in. bore set inside and at the bottom of the 18-in. cylinder. A single pressure pump is furnished. Pressure is applied first in the small cylinder which raises the main ram until the daylight space is closed, the large cylinder at the same time filling through a surge check valve by suction. When the pressure builds up in the small cylinder, which occurs as soon as the daylight is closed, a valve automatically opens and admits pressure into the large cylinder. In this manner a pump having a relatively small discharge may be used and rapid operation secured. To prevent air from sucking into the large cylinder while it is being filled by suction, two U leather packings are used with the open sides of the U adjacent to each other. A small pipe connection in the side of the cylinder admits the same pressure between the two packings as is applied to the small ram. The packings are thus expanded before the main ram starts to ascend and remain expanded during the operation.

A special operating valve and pump are placed inside the reservoir and operate under oil, the pump being belt driven by a motor on the back of the press head. The valve is operated by two levers, one of which is worked by hand, applying and releasing pressure; the other being operated by the foot pedal and used to raise the stem of a safety valve in order to release the pressure from the pump. A check valve is placed between the safety and the operating valves, so that pressure may be held on the press at any point and for as long as may be desired. The press is also equipped with a pressure gage, electrical control gage and travel indicator.

A price reduction of 10 per cent is announced by the Link-Belt Co., from its Chicago office, on malleable iron and steel chains, sprockets, buckets and other products, to take effect Aug. 22.

Fewer Steel Men at Lower Wages

Unemployment is still increasing in iron and steel works, according to the Bureau of Labor Statistics report for July, which shows a loss of 14,633 men from June, representing 12.7 per cent. The loss from July, 1920, is 89,000 men, or 46.9 per cent. Payrolls showed an even greater decrease, the drop from June to July being 24.4 per cent, while that for the year was 71.4 per cent. As a result, the individual pay envelope has fallen from $72.11 in July, 1920, to $38.17 last month—a cut of 47.1 per cent. This decrease in earnings is greater than the 43.5 per cent drop in the cost of living, from July, 1920, to July, 1921.

Comparative figures for June and July, 1921, and July, 1920, in iron and steel mills, automobile factories and car building and repairing shops follow:

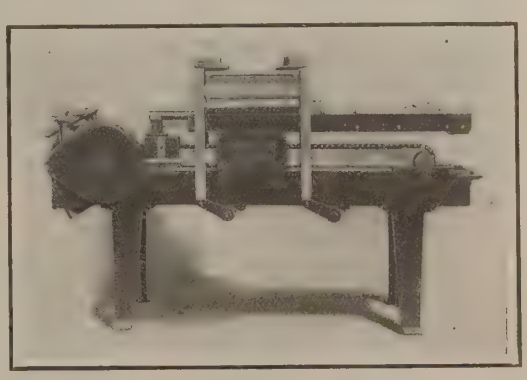
Month	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
June, 1921.....	118	115,411	$5,088,831	$44.10
July, 1921.....	118	100,778	3,846,541	38.17
July, 1920.....	118	189,770	13,683,927	72.11
Automobiles				
June, 1921.....	45	76,734	2,620,084*	34.15
July, 1921.....	45	79,064	2,622,596*	33.17
July, 1920.....	49	126,997	4,335,639*	34.14
Car Building and Repairing				
June, 1921.....	59	39,335	2,670,021	67.88
July, 1921.....	59	38,378	2,272,954	59.23
July, 1920.....	62	65,386	4,082,301	62.43

*Weekly.

Automatic Lockseaming Machine

An automatic machine which produces a lock-seamed article direct from the blank without an extra operation is being marketed by the Stolp Co., Inc., Geneva, N. Y. The machine is also equipped with a self-feeding attachment by which lock-seamed tubes can be produced directly from a coil of metal. It is said to handle taper tubes within certain limits and lockseam tubes of any thickness of metal.

The machine is shown in the accompanying illustration. The blank on being inserted is pressed into a U



A Mandrel Pushes the Blank Endwise Through the Lockseaming Dies

shape after which the round mandrel enters the blank and pushes it through the lockseaming dies endwise. The mandrel is fastened to a crosshead which straddles a chain. The chain carries the cross head back and forth the whole length of the frame. As the mandrel reaches the back position a U-shaped punch descends, pressing the blank into a position in line with the mandrel. The punch then leaves the blank and the mandrel enters, carrying it forward through the lockseaming dies which are shaped to close the blank and put the lockseam in it. The dies have no moving parts. The finished product comes out at the end of the machine, the mandrel withdrawing to its starting position to repeat the operation.

Sales representation of the Farber Fire Brick Co., St. Louis, in the Pittsburgh district has been taken over by the Dover Fire Clay Brick Co. of Cleveland.

New Crawling Tractor Crane

To meet the need for a full revolving tractor crane which can be operated independently of rails, the Industrial Works, Bay City, Mich., have developed the crane shown in the accompanying illustration. It is built in two types, the type BC having a capacity of 20,000 lb. at 12 ft. radius and equipped with continuous crawling tractor belts; and the type BT with a capacity of 18,000 lb. at 10 ft. radius, equipped with four broad-gage tractor wheels.

Operation is by means of an internal combustion engine. The boom is 30 ft. long and made up of two channels strongly latticed with angles and tie plates. The steering, while propelling, is controlled by the operator from his position in the revolving upperworks, by manipulation of the friction clutches and brakes controlling the motion of each tractor belt. Through these clutches and brakes either tractor belt may be readily and instantly disconnected from the motor while the other belt continues traveling at the normal rate of speed. The disconnected belt can be held stationary by applying the brake, can be allowed to coast with the brake and clutch both disengaged or the clutch can be allowed to slip, thus allowing the operator to turn as sharp or as wide a corner as he may select. For simplicity and accessibility the clutches, brakes and lever mechanism for steering are located in the revolving upper works.

The Capacity Is 20,000 Lb. at a 12-Ft. Radius. Steering is by means of friction clutches and brakes controlling the motion of each tractor belt

The makers emphasize the propelling and steering arrangement as a new and exclusive feature, stating that it enables the operator to propel and steer the crane independently of all other motions and as easily as a wheel or "caterpillar" tractor. The capacity and speed of these cranes make them adaptable to the needs of road contractors, coal dealers, gravel, sand and stone producers, foundries, and moderate-size manufacturing plants. They can be equipped to handle hook and block; grab bucket; drag scraper bucket; wood grapple; electric lifting magnet; shovel dipper and pile driver loads with drop hammer.

Luria Bros. & Co., iron and steel scrap, has in operation its new yard located on South Avenue and Baltimore & Ohio Railroad tracks, on the north side, Pittsburgh. The yard covers an area of about six acres, has three tracks and a capacity for handling 68 carloads of material at one time, and is equipped with three shears and a 25-ton locomotive.

July Fabricated Steel Business

The amount of fabricated steel business that was contracted for in July, according to the records of the Bridge Builders and Structural Society, George E. Gifford, secretary, 50 Church Street, New York, was 60,200 tons. This corresponds to 33½ per cent of the capacity of the bridge and structural shops of the country and compares with 66,900 tons, or 37 per cent, for June. The amount of business taken in the first half of 1921 averaged about 47,250 tons per month.

Efforts to Relieve Unemployment

WASHINGTON, Aug. 23.—The report of the Bureau of Labor Statistics sent to the Senate by Secretary of Labor Davis, reporting 5,735,000 persons out of employment in the United States, has stirred the administration and Congress to increased efforts designed to relieve the situation. Speedier action for the purpose of bringing about economic readjustment is being urged, and is one reason why it has been desired to enact quickly the railroad funding bill, and other measures that would mean more employment. Unemployment is the result of poor national economic management, according to Eugene Meyer, Jr., director of the War Finance Corporation, who stated that unless the Government acts there will be a most serious situation for it to confront next winter.

Of the total reported unemployed by the Bureau of Labor Statistics, 3,900,000 (more than two-thirds) are classified under manufacturing and mechanical industries.

British Steel and Iron Output and the Coal Strike

The serious effect of the coal strike on the pig iron and steel output of Great Britain is reflected by the following table in gross tons:

1921	Pig Iron	Steel Ingots and Castings
January	642,100	493,400
February	463,600	483,500
March	386,000	359,100
April	60,300	70,600
May	13,600	5,600
June	800	1,900
Aver. per month, 1920	667,320	754,730

Only two blast furnaces were operated in June and the 1900 tons of steel, credited in that month, was steel castings.

July Exports Under One-Sixth of January

Falling Off General—Lowest Figure in Nearly Seven Years—Many Items Less Than 10 Per Cent of July, 1920—Imports Also Low, but Slightly Better Than June

WASHINGTON, Aug. 23.—Exports of iron and steel in July totaled only 86,523 tons, and were but 925 tons above the low point in August, 1914, when the outbreak of the European war temporarily demoralized the industry and reduced exports to 85,598 tons. The value of July exports was $27,639,787. For the seven months ending with July exports totaled 1,676,348 tons, valued at $465,374,692. The July exports showed a drop of 32,558 tons under those of June, 119,081 tons. The striking reversal of the export movement is shown when comparison is made with that of one year ago, the total for July, 1920, having been 489,223 tons and for the seven months ending then it was 2,701,400 tons.

Exports, January, 1919, to July, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Calendar year 1919.	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920...	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920.	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162 592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921...	4,168,619	129,541	82,549
July	86,523	2,744	363
Seven months	1,676,348	15,493	4,326

Exports for January, 1921, were reported at 547,394 tons.

Machinery exports for July amounted to $14,758,741, as compared with $37,303,748 in July, 1920, and for the seven months of the present year they aggregated $214,832,576, as against $258,813,489 for the same period of last year. In June, 1921, machinery exports amounted to $22,044,833.

Imports of iron and steel in July totaled 10,286 tons, valued at $2,253,110, exclusive of those relating to sheets and plates, which are omitted in view of an error made by the Bureau in its compilation on these products. The incoming tonnage for this month was greater than in June, when importations totaled 8929 tons. For the seven months ending with July imports amounted to 62,438 tons, valued at $18,279,024. Those of July, 1920, totaled 31,863 tons and for the seven months ending with that month they were 257,782 tons.

Steel rails were exported in greater volume than any other product in July, shipments amounted to 20,074 tons. Next in importance came welded pipe, with an outward movement of 14,485 tons. Structural steel took third rank, with 11,320 tons exported. Other lines generally showed a drop and some of them almost reached the vanishing point, among these being ferromanganese, ferrosilicon, horseshoes and railroad spikes.

Steel rails also were imported in July in greater quantity than any other product, the amount being

Exports of Iron and Steel

	Gross Tons			
	July		Seven Months Ended July 31	
	1920	1921	1920	1921
Ferromanganese	417	15	934	413
Ferrosilicon	97	64	306	218
Pig iron	29,133	2,744	128,995	15,493
Scrap	24,906	1,524	84,021	24,198
Bar iron	33,729	149	22,388	11,290
Wire rods	12,258	854	77,588	10,964
Steel bars	55,933	5,385	363,288	152,700
Billets, ingots, blooms.	17,243	363	155,530	4,326
Bolts and nuts	2,639	1,028	22,290	19,449
Hoops and bands	4,733	1,263	31,906	13,393
Horseshoes	198	12	1,141	364
Cut nails	354	42	1,296	588
Wire nails	8,184	992	43,959	17,296
All other nails, including tacks	878	445	6,534	3,243
Cast pipe and fittings	3,851	2,634	30,942	37,814
Welded pipe and fittings	28,075	14,485	147,675	288,678
Radiators and cast house boilers	486	238	4,285	1,644
Railroad spikes	1,270	16	9,794	6,558
Steel rails	51,869	20,074	333,834	256,938
Galvanized sheets and plates	10,642	2,634	63,834	40,578
All other sheets and plates	1,802	652	17,659	9,756
Steel plates	58,360	6,205	494,505	282,414
Steel sheets	15,220	6,819	92,261	70,459
Ship plates, punched and shaped	5,522	294	25,369	9,401
Structural steel	36,054	11,320	236,695	244,810
Tin and terne plates	17,553	3,024	139,995	77,302
Barb wire	10,439	1,432	72,151	20,372
All other wire	17,358	1,860	92,256	55,689
Total	489,223	86,523	2,701,400	1,676,348

2597 tons. Pig iron came next, with 2567 tons; while billets, without alloys, were third, with 2469 tons. These three items represented much more than one-half of the entire importations of blast furnace, semi-

Imports of Iron and Steel

	Gross Tons			
	July		Seven Mos. Ended July 31	
	1920	1921	1920	1921
Ferromanganese	2,448	275	23,711	5,481
Ferrosilicon	1,265	309	9,436	1,922
Pig iron	7,335	2,567	85,387	15,595
Scrap	7,953	1,650	85,672	21,381
Bar iron	564	274	2,468	1,006
Structural steel	192	46	841	405
Billets, without alloys	1,313	2,469	17,416	2,916
All other billets	481	22	2,803	1,020
Steel rails	9,550	2,597	26,952	11,898
Sheets and Plates	79	....	903	....
Tin and terne plates	17	....	222	308
Wire rods	666	77	1,971	506
Total	31,863	*10,286	257,782	*62,438
Manganese ore and oxide.	18,447	5,028	234,989	297,403

*Omitting tonnage of sheets and plates, which the Bureau is having rechecked.

finished and finished lines. Imports of manganese ore in July totaled 5028 tons, compared with 18,447 tons last year.

A 12-story building to serve as the New York warehouse of the Dodge Sales & Engineering Co., Mishawaka, Ind., is being erected on West Broadway, from Murray Street to Park Place. The structure has been provisionally named "Power and Transmission Building," for it is hoped to make of it a new center for factory and mill supplies of this character. The eight upper stories are to be leased, in whole or in part, to concerns in the power field.

NEW SCRAP CLASSIFICATION

Schedule Prepared by Division of Purchases and Supplies of American Railway Association

The American Railway Association, division 4, purchases and supplies, has prepared a new scrap iron and steel classification which will come up for adoption at that body's next meeting, which will take place in the spring of 1922. The classification is of especial interest to old material dealers because, if adopted, it will be used by all of the railroads and will eliminate the special classifications now in use. Although most railroads are now following the classification adopted by the United States Railroad Administration, which superseded the old Railway Storekeepers' Association classification, there are still some roads using the latter and others which use private classifications. The adoption of a uniform classification will do away with much of the confusion resulting from the present system.

The proposed classification follows the old storekeepers' classification more closely than any of the other various classifications. Thus far the only criticism of it reported by the dealers is that it does not stipulate that No. 1 steel rails is intended to cover rails used for rerolling purposes. There has always been controversy between the railroads and the rerolling mills as to what is and what is not a rerolling rail; and without a definite stipulation in the classification, further disagreement of this kind is bound to occur. This situation was recognized when the Railroad Administration classification was prepared and it is urged that a like stipulation should be added to the proposed classification.

American Railway Association Classification of Scrap Iron and Steel

Item No. Description

1 Arch bars and transoms, iron.
2 Arch bars and transoms, steel.
3 Axles, steel—Car and locomotive, 6 in. diameter and over at center.
4 Axles, steel—Car and locomotive, under 6 in. diameter at center.
5 Axles, steel, hollow bored.
6 Axles, iron—Car and locomotive, all sizes.
7 Angle and splice bars—Steel angle bars and splice bars.
8 Angle and splice bars—Patented joints only.
9 Angle bars, splices and fish plates, iron.
10 Boilers, fireboxes and tanks, uncut—All kinds, attached or separate. Specify whether with or without flues.
11 Boilers, fireboxes and tanks, cut up—Iron or steel boiler or tank plate, cut into sheets and rings (with or without stay bolts).
12 Brake beams, uncut.
13 Built up bolsters.
14 No. 1 busheling—Iron and soft steel pipes and flues (free from scales); tank and bands No. 12 and heavier, boiler plate punchings and clippings, and soft steel and iron drop forgings and trimmings, nothing to be over 8 in. long or wide, free from galvanized or tinned stock.
15 Cast, Railroad No. 1—Pieces weighing 150 lb. or less, includes new grates, new stove plate and clean cast-iron culvert, soil and water pipe, to be free from brake shoes and burnt grates, burnt grate frames, burnt stove plate and all other burnt castings.
16 Cast, Railroad No. 2—Pieces weighing over 150 lb. but not more than 500 lb.; otherwise same specifications as Class No. 15.
17 Cast, Railroad No. 3—Pieces weighing over 500 lb.; includes cylinders and driving wheel centers and all other castings; otherwise same specification as classification No. 15.
18 Cast, Railroad No. 4—All kinds of burnt castings, including grate bars, grate frames and stove plate.
19 Cast-iron brake shoes—All shoes with steel back or with steel or wrought iron inserts, both driving and car. Excludes composition filled shoes.
20 Cast-iron borings—Clean and free from other metals, dirt and lumps.
21 Cast steel No. 1—Charging box size, 5 ft. and under, under 18 in. wide; no piece weighing less than 10 lb. to be included.
22 Cast steel No. 2—Steel castings over 18 in. wide and over 5 ft. long; may include cast steel truck or body bolsters and cast steel locomotive frames.
23 Cast steel truck and body bolsters.
24 Couplers and knuckles, steel and steel knuckle locks.
25 Tools and tool steel—Worn out steel tools, tool steel, files, including old claw bars, pinch bars, spike mauls, track wrenches, picks, axes, adzes, chisels, drills, hammers, knuckle pins, punches, finger pins, bits, draft keys, bar steel weighing under 10 lb. per piece.
26 Frogs and switches, uncut—Steel and iron frogs and switches that have not been cut apart, exclusive of manganese material.
27 Flues, tubes and pipes, wrought iron and steel No. 1—1 in. diameter and over, 2 ft. long and over, free from fittings, paint, galvanized or enameled, coiled or bent material.
28 Flues, tubes and pipes, wrought iron and steel No. 2—Ungraded wrought iron and steel flues, tubes and pipe, including fittings attached.
29 Limed iron and steel—All kinds of material from interior of boilers (except flues which are incrusted with lime or corroded by the action of water) such as crown bars, crown bar bolts, stay bolts, etc.
30 Malleable—All malleable castings.
31 Melting steel, heavy, No. 1—Charging box size, ¼ in. thick and over and not over 18 in. wide, or over 5 ft. long, free from all attachments, may include chain, carbon tool steel, files, punchings and all other steel scrap that will come within the above dimensions, unless otherwise specified.
32 Melting steel, heavy, No. 2—All steel over 5 ft. long or over 18 in. wide.
33 Rail, iron, No. 1—Iron tee rail, 3 ft. long and over, toe section 40 lb. per yard and over, free from frog, switch, guard or crooked rail.
34 Rail, iron, miscellaneous—All iron rail, not otherwise specified, including guard rails, switch points and frogs, when cut apart. Does not include frog fillers or plates.
35 Rail, steel, No. 1—Standard section steel tee rails, 50 lb. per yard and over, 5 ft. long and over, free from badly bent and twisted rails, frog, switch and guard rails and rails with split heads and broken flanges. Note: All rail suitable for relaying must be classified as relaying rail separate from all scrap rail.
36 Rail, steel, No. 2—Cropped rail ends under 3 ft. long, 50 lb. and over, standard section.
37 Rail, steel, No. 3—3 ft. long and over, 50 lb. and over, standard section having split heads or ball of rail worn with wheel flanges, curved and bent rails, free from frog, switch and guard rails.
38 Rail, steel, No. 4—All sections of rail not coming under specifications of No. 1, 2 or 3 rail, including frogs cut apart, guard rails and switch points. Does not include frog fillers or plates.
39 Structural wrought iron, cut apart—Wrought iron structural shapes from bridges, buildings and equipment, cut apart and free from riveted material.
40 Structural wrought iron uncut—Wrought iron from bridges, structures and equipment which has not been cut apart.
41 Structural steel, uncut—All steel or steel mixed with iron from bridges, structures and equipment that has not been cut apart; may include uncut bolsters, brake beams, steel trucks, under frames, channel bars, steel bridge plates, frog and crossing plates and other steel of similar character not included in No. 2 heavy melting steel, Class 32.
42 Sheet scrap No. 1—Under ¼ in. thick, consisting of cut stacks and stack netting, hoops, band iron and steel, pressed steel hand car wheels, scoops and shovels (free of wood) and wire rope; must be free from galvanized iron or tin, cushion and other similar springs and lime encrusted pipe and flues from boilers.
43 Sheet scrap No. 2 and miscellaneous—Includes netting, other than stack wire, all galvanized or tinned material, composition brake shoes and gas retorts, and any other iron or steel material not otherwise classified.
44 Spring steel No. 1—Flat spring steel, including elliptic springs from which bands have been removed.
45 Spring steel No. 2—All coil springs, made from steel 3/16 in. and over.
46 Manganese steel—To include all kinds of manganese rail, frogs and switch points, cut or uncut.
47 Steel, high speed—High speed steel turnings (butts and ends report separately).
48 Tires No. 1—All locomotive or car tires 36 in. and over inside diameter, smooth inside, not grooved for retaining rings or lipped.
49 Tires No. 2—All tires not included in tires No. 1.
50 Turnings and drillings No. 1—Wrought iron and soft steel, clean, free from cast borings, brass, hard steel or other foreign metals, dirt and lumps.
51 Turnings and drillings No. 2—From tires and other similar steel, including hard steel; clean, free from other metals, dirt and lumps.
52 Turnings and drillings, mixed, No. 1—Wrought, cast and steel mixed, free from other metals, dirt and lumps.
53 Turnings and drillings, mixed, No. 2—Wrought, cast and steel, mixed with brass and other metals, free from dirt and lumps.
54 Wheels, No. 1—Includes all solid cast iron car and locomotive wheels; no allowance for grease and dirt.
55 Wheels, No. 2—Includes all kinds of built-up or steel-tired wheels (specify kind in offering).
56 Wheels, No. 3—Includes all solid rolled, forged or cast steel car and locomotive wheels (specify kind in offering).
57 Wrought, railroad No. 1—Clean wrought, pieces 6 in. long and over, flats to be ¼ in. thick and over; rounds or squares ⅜ in. thick and over; to include bars, rods, chain; all to be free from riveted material.
58 Wrought, railroad No. 2—All wrought under 6 in. long, not specified under No. 1 railroad wrought; to include track spikes, bolts, nuts, rivets and lag screws.
59 Wrought iron locomotive frames or mud rings—Includes all other large wrought iron forgings.
60 Destroyed steel cars and locomotive tenders—Includes underframes and bodies of steel cars cut apart sufficiently to load—excluded trucks and cast steel underframes.

Miscellaneous

61 Aluminum.
62 White metal No. 1—Including various mixtures of clean bearing or lining metals, such as babbitt, metallic packing, etc.
63 White metal No. 2—All non-bearing white metals, exclusive of aluminum.
66 No. 1 brass—Locomotive bearing metal, such as driving, crown and rod brass, free from white metals, excluding car and tender bearings.
67 No. 2 brass—Steam metal brass, including valves and fittings, injector and lubricating bodies and parts and check valves.
68 No. 3 brass—Journal bearings free from babbitt.
69 No. 4 brass—Brass or bronze borings, drillings and turnings.
70 No. 5 brass—Yellow brass castings, to include coach trimmings, light brass, hose couplings, pipe, tubes, etc.
71 Copper cable, insulated—Specify kind.
72 Copper, No. 1—Wire free from insulation, flue ferrules, pipe and tubes.
73 Copper, No. 2—Sheet copper, sheathing and roofing, free from paint and nails.
74 Copper, No. 3—Sheathing and roofing copper, with paint and nails.
75 Copper, No. 4—Battery copper.
76 Copper, No. 5—Dross and oxide (report separately).
79 Lead—Sheet, pipe, etc.
80 Lead—Battery.
81 Lead—Battery mud or sediment (specify wet or dry).
91 Zinc—Battery or sheet (specify kind).

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ESTABLISHED 1855

THE IRON AGE

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Kicking Against the Goads

Mr. Gompers, in his favorite impersonation of Ajax defying the lightning, spoke with some violence this week on present industrial conditions, at the Atlantic City meeting of the American Federation of Labor. "We are going to fight to our utmost the reduction of wages," he said. He denied that the cost of living had come down, though official statistics have shown a substantial reduction in the past year. "Instead, it is going up, especially rents." It is true that in many cases rents are being advanced even now. It must be said, however, that the main cause of higher rents is that the supply of houses, generally speaking, falls short of meeting the demand, and that condition in turn is due largely to the fact that some scores of thousands of union workers in the building trades prefer idleness to accepting such a reduction in wages as would encourage the building of more houses. Attention has been called repeatedly to this phase of the unemployment situation which is brought home daily to millions of workers, either in the high rents they pay or in the entire cutting off of income because the union has decided that no pay envelope at all is preferable to a pay envelope of less than war-time proportions.

"In all this talk about readjustment and reconstruction," says Mr. Gompers, "why is it that the pressure is always brought to bear upon those whose standards of life and everyday existence would be demoralized by a reduction in wages, and why this drive to reduce wages first? Would it not be more humane to start with 'them as have' and whose profits or incomes derived from their surplus savings would be the only factor affected? The question is between profits in dollars and the demoralization and deterioration of the American wage earners' standards."

The record of dividends reduced or passed by industrial companies in the past nine months has suggested that the order has been just what Mr. Gompers would have it—the cutting down of profits and then reductions in wages. That has been the order throughout the steel industry. Profits have disappeared and scores of important producers are writing a loss on every day's operations. And if the list of sufferers from the suspension or cutting down of dividends were analyzed it would be found that in ninety cases out of a hundred the losses are falling upon investors with small or moderate incomes, whose hardship in kind, and in many cases also in degree, is like that of the worker whose wage has been reduced.

It may be recalled that in November, 1918, when the country faced the maze of problems resulting from the armistice, Mr. Gompers announced in an address at Laredo, Tex., that "the advantages which the workers of America and the allied countries have gained are not going to be taken away from us, and we will resist the attempt to the uttermost." He referred to the eight-hour unit in figuring overtime, also to the high rates of wages that were the gift of the war. At that time it was said in these columns that war commodity prices and war wages must be deflated and that Mr. Gompers could no more successfully resist the forces that would bring about these changes than he could control the rise and fall of the tides or the precession of the equinoxes. The record of his success has been written in the months that have elapsed. He has been no more able in the past year to hold wages at the war level than he could hold wheat at $2.30, or ship plates at $95.20 per gross ton.

The forces at work have been economic forces and not decrees of any labor union or manufacturer or government. Moreover, forces beyond any such control are still at work. They are world-wide in their operation. "The economic crime," as Mr. Gompers calls the "forcing into idleness" of several million workers, is not the conspiracy he conceives it to be. Rather the economic crime was the forcing of the labor cost of production, which was also the cost of living, beyond the power of consumers to endure it. To the reparation every member of the community is contributing.

One of the surprises of the abnormal course of steel production the world over this year is the performance of the electric furnace in Canada. Out of a total output of steel castings of 12,639 gross tons for the first half, 75.8 per cent or 9585 tons was made in electric furnaces. On Jan. 1 Canada had only 43 electric steel furnaces as compared with 356 in the United States. The best

record ever made by American electric furnaces producing steel castings was in 1920 when almost 12.5 per cent of the total was electric. The best previous Canadian record was in 1919, when about 18 per cent of the total steel casting output was from electric furnaces. Of interest also is the fact that in June the Canadian electric steel ingot production of 1353 tons was over twice that of the United States in July—575 tons. Even the American output for June, 1476 tons, was but slightly in excess of the same month's output in Canada. Seeing that Canada has only about one-eighth as many electric furnaces as the United States, this performance is noteworthy.

The Traffic Problem

While there is a great deal of talk about what the public needs in freight service and what the railroad companies need in earnings, it does not appear that the full extent of the traffic problem is appreciated. A little analysis on the quantitative basis may be illuminating. Demand for various commodities rises and falls quite irregularly, though the general trend in nearly all commodities is upward. Representing in a sense the sum total of all demand for commodities, the demand for transportation service moves with relative smoothness. Almost any comparison that can be selected shows that from almost the earliest time in American railroading the freight ton-mileage on the railroads has tended to double every 12 years. Not going into details, it is sufficient here to point out that the revenue ton-mileage in the fiscal year ended June 30, 1913, was 301,398,752,-108, also that the movement in 1901 had been a trifle less than one-half and the movement in 1902 a trifle more than one-half of this amount, so that there was a doubling in a shade less than 12 years.

The rate represents an annual increment of 5.95 per cent. Such an increase, from 1913, would involve in the twelvemonth to end June 30, 1922, on which period we have already entered, a movement of 507 billion ton-miles, or 68.2 per cent more than that of 1913. The railroads cannot closely approach such a rate now or in the near future, and they cannot come at all near it with any degree of comfort or convenience to shippers. In 1918, under forced conditions, and with some long movements to use certain lines, thus piling up ton-miles, they did about 400 billion, while in 1920, with consignees very greatly incommoded, they did only a shade better.

Last May the quality of service rendered by the railroads was comparatively good, and the rate of movement was just equal to the movement in 1913. Two conclusions can readily be drawn: (1) That with anything like normal business conditions the demand upon the railroads would be much greater, perhaps closely approaching the 507 billion ton-miles computed according to the old rule; (2) That the railroads could not possibly perform anything like the quantity of service demanded by active industrial conditions, even by moving the freight irrespective of the convenience of shippers and consignees.

To a great many the conclusion to be reached from the facts here referred to is that by this means or that means sufficient improvement in railroad capacity must be forced to meet the indicated conditions. That dictum, however, cannot be granted in full. As a people we cannot accept the burden of doubling every 12 years the quantity of freight movement on our railroads, for obviously we should eventually break under the strain. After liberal allowance for improvements and economies that may be introduced the supply of capital and man power would not increase rapidly enough to carry the pace.

As a part of the transportation problem, whether we accept it intelligently or have it forced upon us, is the necessity of curtailing our requirements or diverting some of the demands from the railroads. Of course this will have to come about through the force of self-interest, but there are some means available for influencing self-interest. When water transportation is available as an alternative, there can be some recession from the principle so often preached that the railroads must make rates that will compete. We have reached a point where much more is requisite than a mere increase in railroad facilities. Should we depend alone on that our trouble would be endless.

Steel Makers as Coke Sellers

Not only are the steel companies making the market in pig iron, but they threaten to become the dominating influence in the coke market, at least temporarily. This possibility is suggested by the fact that a Youngstown district steel company, which recently blew in a blast furnace, contracted for its fuel requirements from a nearby steel company having by-product ovens. This company formerly bought beehive coke for its furnaces, as it probably would be doing now if business were normal and the steel companies having by-product plants were using all the coke they produce. The lowest price quoted by the Connellsville operators against the inquiry, which was for about 12,000 tons a month over the remainder of the year, was $3 per net ton at ovens. The buyer was able to get by-product coke at $2.50 per net ton, Connellsville base, a saving of 50 cents per ton, or $6000 per month. It is necessary to keep by-product plants in partial operation at all times to prevent heavy repair charges, and there are also in some cases gas contracts, and the steel companies in the Youngstown district, and probably in all other districts, which have by-product plants, are producing more coke than they need, since they have only one blast furnace in five on an average making iron.

It was the marketing of surplus pig iron by the steel companies that established market prices in steel-making grades of iron, and now that the steel companies have surplus by-product coke for sale and the capacity for commercial production, the beehive coke producers have a condition to meet that may have to be reckoned with for a considerable time. The fact that many merchant blast furnaces stopped making iron did not prevent prices from slipping, and likewise the curtailment of beehive coke making has its limitations as a price corrective, seeing that the steel

companies must keep their by-product plants going and will take low prices for coke to prevent burdensome accumulations.

Adding Silicon to Basic Steel

Deterioration of steel due to mistaken judgment as to the proper time and method of adding silicon has been the subject of experiments by a German investigator, as summarized elsewhere in this issue. His work was on basic open-hearth steel. He concludes that by adding the ferrosilicon at as late a stage as possible, not only are the silicon losses and silica inclusions less, but also the carbon monoxide in the steel is greatly reduced, as well as the hydrogen content. Still more important is his conclusion that the amount of discard in rolling the steel, due to the presence of occluded gases, is reduced over 50 per cent by late additions of the silicon alloy. The results show a discard as high as 70 per cent when silicon is added at the usual time, whereas by a late introduction of the silicon discards ranged from 9.80 per cent to 18 per cent.

It is true that the steel under consideration contained from 0.20 to 0.22 per cent final silicon, which is not usual in American practice; but if the author's conclusions are true regarding such steel, they must have some weight in the production of steel containing less silicon. At any rate the points the author raises merit close consideration from producers of basic open-hearth steel castings, where the final silicon content is usually at a minimum of 0.25 per cent and where gas content and consequent blow holes are some of the chief defects to be avoided. And the matter is equally vital if rolling discard losses can be cut in two by proper additions.

These experiments emphasized the growing necessity of giving more attention to the time and method of making additions of all alloys. In many plants ferrosilicon is not added to the steel under the conditions laid down by the German investigator. There is also a wide divergence of opinion as to when and how ferromanganese should be added. Time of addition, temperature and other considerations in adding all alloys deserve careful research, which will no doubt reveal some facts not now known.

CORRESPONDENCE

New Car Wheel Specifications and Southern Charcoal Pig Iron

To the Editor: The tentative specifications for cast iron car wheels adopted by the American Society for Testing Materials at its 24th annual meeting, as reviewed by THE IRON AGE of June 30, work a severe hardship to the Southern pig iron manufacturer, in that they eliminate Southern pig iron almost entirely by lowering the phosphorus maximum. Time was, when the large as well as the small producer of wheels, was content with a maximum phosphorus specification of 0.55 per cent, sulphur, 0.035 per cent and under, with silicon all the way from 0.75 to 2.75 per cent, depending on the other ingredients of the individual mixture.

Dr. Moldenke saw the injustice these new specifications would work to the Southern product, when he raised the point that Southern melters could not meet these figures, since their product contains phosphorus around 0.50 per cent.

Let us go back to 1913, the year in which Mr. Force states that the total loss sustained by the railroads, due to accidents of all kinds, amounted to approximately $39,000,000, as compared with $106,000,000 for the year 1919, which increase, it is admitted, is due in a large measure to defective wheels. In 1913 one Southern charcoal iron manufacturer shipped 53 per cent of his output to the railroads and car wheel manufacturers, while in 1919 only 16 per cent went to this same trade.

Recent investigation developed that some of the wheel manufacturers, in order to meet the views of the railroads as to price, were resorting to the use of higher phosphorus iron of the ordinary No. 4 foundry grade, increasing the percentage of steel scrap and adding ferromanganese. It is small wonder that the scrap wheel of to-day, which constitutes a goodly percentage of the manufacturer's mixture, has accumulated phosphorus, sulphur and combined carbon in such quantities as to lower materially the former high standard of efficiency of the wheel.

A close inspection of the tables submitted by Mr. Force reveals the fact that in practically every case where failure appears to be attributable to high phosphorus content, either the combined carbon or sulphur content or both were excessive. Then why should the Southern pig iron manufacturer, the Southern and Pacific Coast wheel maker be eliminated until it can be established that phosphorus is responsible for wheel failures?

If wheels could be made in 1913, that would give the maximum service without the aid of the electric furnace or the addition of nickel and chromium, they can be made in 1921 without these agencies. Meanwhile railroads have been hammering the shipper to load freight equipment heavier, insisting that cars be loaded 10 per cent over their marked capacity in order to make the supply take care of the demand during a prosperous period, thus increasing the strain on the most vital part of the equipment, the wheel. They have resorted to the cheaper wheel; and thus it is we have a condition that cuts both ways—reduced wheel efficiency combined with increased maximum loads.

Let's agree with the author of "Some Failures of Chilled Cast Iron Wheels" in the statement, "By no means are the car wheels as a whole satisfactory," and get at the root of the trouble before we reach a conclusion that operates against the best interests of any special section of the United States.

J. G. HENDRICK,
Shelby, Ala., Aug. 19, 1921. Shelby Iron Co.

Training in Economics as Preparation for a Business Career

To the Editor: THE IRON AGE for Aug. 11 contains a letter by Sterling H. Bunnell commenting upon an article by Alvan T. Simonds, president of the Simonds Saw Mfg. Co., Fitchburg, Mass., in which he raises the question "Should Business Men Be Licensed?"

Mr. Simonds prepared his article because he recognized a condition among American business men that I have seen nowhere better stated than in Mr. Bunnell's letter as follows:

> Since the close of the war in 1918 it was perfectly evident to the very few men who were willing to think in international terms and study world conditions, that a huge financial crisis was impending. However, a search of the printed records of the past three years shows only two names, Richard Martens and Frank A. Vanderlip, who were conspicuous for their bold telling of the truth about the economic situation. The vast majority of recognized successful leaders of trade and industry in the United States are, on the contrary, on record repeatedly up to within twelve months of this writing, as predicting unlimited prosperity, continuance of industrial activity, vast profits, and higher and higher prices for American commodities demanded by all the world; and this in spite of the fact that all of the nations engaged in the late World War were financially exhausted, and operating their governments at enormous deficits.

Mr. Simonds believed from his own experience and study that what was "perfectly evident to very few" might be made evident to the many by proper educa-

tion; or at least that the many might be taught to respect and follow the opinions of the few who had taken the time and trouble to get the proper education. Most men respect and take the advice of skilled physicians because they believe that there is a science of medicine back of them. Most business men neglect or ridicule the advice of skilled economists (and I mean by this skilled both by study and experience) because they have failed to recognize that there is such a thing as a science of economics. Mr. Simonds believed that with such education many business failures, with the consequent loss of money and the bringing of great hardship upon many families of employees, might be avoided to a much greater extent than it is to-day.

During the first six months of 1921 there were over 9000 business failures in the United States, involving an indebtedness of over $300,000,000. In the light of these facts the failures for February, 1921, do not stand out as so unusual. It should be remembered in this connection that the failures show only a small part of the losses occasioned by ignorance of the fundamental laws of economics—and the word is used here to mean the study of material means to satisfy human desires. Greater losses than those represented by the failures occurred in connection with businesses that did not fail because of their financial condition or because of being bolstered up by friends or banks.

Mr. Simonds is not a believer in Government regulation. He is an individualist and few business men would go further than he does in giving freedom for individual initiative. Realizing, however, how far the Government has interfered to protect property, he raised the question that if this principle is good, why should not business men be licensed, who direct the use of other people's money and who determine by their success or failure the happiness or misery of many families of laborers, before such men are allowed to undertake such a trust. He did not mean the small man running a fruit stand, but only those who work with large capital and direct large numbers of employees.

Mr. Simonds did not want "to start something." He wanted to create public sentiment in favor of education in economics, so that the condition described above by Mr. Bunnell would gradually cease to exist.

He believes "world wide depressions" and "stock panics" are caused by the ignorance, weakness and foolishness of human beings and are not "acts of God" save as every act of human beings may be called an act of God. Depressions and stock panics differ from earthquakes and the floods that usually follow them, because human beings can prevent the former by proper education and experience rightly understood. Education here does not mean only book education; scarcely anyone so understands education to-day. Mr. Simonds believes that most of the business men (as Mr. Bunnell says, "this includes the vast majority of recognized successful leaders of trade and industry in the United States,") who did not foresee the condition that followed the armistice would foresee such a condition twenty years from now, if they were living and in business and we had just passed through another world war. A study of the years following our Civil War and the Napoleonic wars should have made American business men understand these conditions in 1919 and 1920. A very few did "see perfectly," as Mr. Bunnell says. Mr. Simonds was one of these. In the house organ of the Simonds Saw Mfg. Co. in March, 1920, he called the attention of the employees of the company to his belief that October of 1920 would see many of them out of employment and that a similar condition would exist in most businesses in the United States.

Mr. Simonds says: "Let us have such education in our schools and colleges that the many may be better able to see as the very few saw in the last two or three years."

JOHN G. THOMPSON,
Assistant to the President
Simonds Mfg. Co.

Fitchburg, Mass., Aug. 15, 1921.

[In a note accompanying the above, Mr. Thompson says that he is writing in Mr. Simonds's absence on his vacation.—EDITOR.]

Proposal to License Business Men

To the Editor: The proposal of Alvan T. Simonds in your issue of July 14 is very interesting, particularly as I myself have raised that very question among our own members in my discussion of business conditions at our regional meetings. There is no doubt in my mind but that society as a whole cannot afford the waste of capital caused by incompetent management of business.

I myself have used the same illustration as Mr. Simonds, that inasmuch as navigation insists on licensing its ships' officers, so business should insist on licensing its managers. Just as ships' officers must demonstrate their ability in service, and must have a certain education as well before they can secure their license, so business captains using other people's money in their ventures, or managing business ventures for other people, should be licensed.

The competitive capitalistic system is greatly criticised for its deficiencies. Those of us who believe that there is no other system possible would do well to make every necessary improvement in the present system. Unless the deficiencies of the system are removed, we may find enough sentiment aroused among the unthinking and ill-informed to try something entirely different. I believe it would be a calamity, but if it should come about it will be due to the inertia of men who ought to be improving the present system.

Profound ignorance of fundamental economic laws and their operations has recently put a number of large concerns on the rocks. Some of them have not yet reached the bankruptcy court, but some of them surely will; and perhaps more are headed the same way than the public may suspect. The loss to stockholders is the same whether it is caused by ignorance or by criminal looting. The ordinary stockholder cannot know that the management of his property is in incompetent hands until the final crash demonstrates that fact, and perhaps his property is picked up by financial beach combers.

The corporation is a creature of the law. Those using the corporate form of organization use a power conferred upon them by the State. Is it too much to ask of all those operating as corporations created by law first to demonstrate their qualifications, and their character, before they are allowed to use this public power? Under the corporate form they secure many advantages, not the least of which is the size that a venture can grow to. This being possible only by special action, that permits the managers to gather large sums together from the public, certainly the public could well demand that the management of public money gathered into corporations shall be in the hands of men who presumably are able to guard properly the funds intrusted in their care.

Many a man will rise up and say that this is unwarranted interference, but let him just look around and see the wreckage that even now is strewing financial shores. Let him look back over the days of the Rock Island, the New Haven, C. H. & D. deals, and see whether something more than honesty is not necessary. A well-intentioned fool should not be allowed to control business craft any more than he should be allowed to navigate a ship on the high seas.

E. F. DUBRUL,
General Manager, National Machine Tool Builders' Association.
Cincinnati.

Improved Industrial Outlook in Milwaukee

MILWAUKEE, Aug. 22.—Reviewing the important local industries manufacturing motor vehicles and parts, the current review of the First Wisconsin National Bank says: "Most firms in automobiles and allied lines, except trucks, report improvement both in current sales and forward business. Capacity of operations averages around 60 per cent, with one firm making automobile specialties (drop forgings) operating at full capacity, 24 hr. a day. Automobile bodies are in fair demand. Prospects for motorcycle business in August and September are good. Prices in automobile lines are believed to be close to the bottom.

Iron and Steel Markets

USING UP STEEL STOCKS

Consumers in the Market in Larger Numbers

Improvement in Pig Iron Maintained—Increase in Output Expected

The hope of the steel trade that the fall will bring a noticeable increase in buying amounts to something less than confidence as yet, but there are indications of slowly expanding demand for some forms of finished steel. The best basis for better expectations is an increase in the number of orders coupled with a more urgent call for early delivery.

Producers of steel see more signs of the using up of stocks that have long stood between them and anything more than a hand-to-mouth operation, and are encouraged to look for a gradual decrease in the scale of their losses.

That the Steel Corporation followed more promptly the last wage reduction of the independent companies than those coming earlier in the year is an indication of the effect of recent competition. It will take a considerable increase in operations to give any approach to economical production.

The rate of steel ingot production is slightly larger this week at several important plants. In the Chicago district the Wisconsin Steel Co. shows the most marked improvement, running at 40 per cent of capacity.

Central Western mills find more activity in automobile steel than in any other direction. Several Detroit plants will operate at the present rate through September. The Ford Motor Co. placed 2500 tons of light plates at Youngstown and a like amount went to another mill.

There are signs of increased activity at some implement works, but one farm tractor company has reduced production.

The sheet market is more active, some buyers making their first purchases in months. Base prices on blue annealed range from 2.25c. to 2.40c. and on black sheets from 2.75c. to 3c. Offerings of stock tin plate have been made at $4.50 per box, or 75c. below the price for production plate.

The week has been an outstanding one in fabricated steel. Upward of 12,000 tons was placed and nearly 20,000 has been added to active pending projects, not including 14,000 tons for the Federal Reserve Bank in New York. Railroad bridge and building work is conspicuous for its absence.

Railroads continue to place car repair work. An Illinois Central contract is for the repair of 1400 box and gondola cars. Western roads are in the market for locomotive forgings and car axles. For repair work in its own shops the Burlington will buy 2200 tons of plates and shapes.

Bar iron is about $1 per ton lower in the Eastern market, being now quoted at 1.65c., Pittsburgh.

Light rails, 25 to 45 lb., have declined about $2 per ton under recent competition.

The pig iron market has held the improvement of last week, considerable sales being reported at 50c. or more above recent low prices in some districts, while in other cases business was closed at prices quoted a fortnight ago. In the Central West foundry iron shipments in August have been from a third to 50 per cent larger than in July.

The appearance of an inquiry at Chicago for 40,000 tons of pig iron for India naturally caused comment, but there is no expectation that any part of it will be bought in this country.

Further Chicago sales of 50 per cent ferrosilicon have been made at concessions, the low prices having been made by Canadian producers in view of their advantage in the exchange situation.

Tentative inquiries for coke have been made by several blast furnace companies in the Central West which have considered blowing in. The Carnegie Steel Co. will start another furnace at Youngstown, but will blow out one in the Pittsburgh district. A Cleveland furnace and one at Columbus are to go in early in September and there are other indications of slightly increased pig iron production in the fall.

Prices of old material grow firmer on any appearance of consuming demand; but the market is still largely in the hands of dealers.

Recent concessions by one producer of Lake Superior iron ore have not changed the prices of other sellers. A Canadian steel company that thus far has received no 1921 ore on its contracts will now begin to ship and may take a total of 250,000 tons.

Pittsburgh

PITTSBURGH, Aug. 23.

Demand for steel continues to reflect a lack of confidence on the part of consumers that prices now current will hold any considerable length of time. While orders in a general way still are gaining in number they do not increase in size, and in all cases prompt shipment is demanded. Buyers merely are taking on such supplies as will meet their immediate requirements, and about the only encouraging feature to the demand is the fact that it comes from widely scattered sources and also that there is insistence on early deliveries. This indicates plainly that the consumers' stocks are pretty low, but only here and there are plant operations discernibly greater than they have been and if anything the question of prices is more prominent now than it was last week and the week before.

The action of the Steel Corporation in receding to the independent company wage scales encourages the hand-to-mouth purchasing policies of buyers because they feel that further reductions on the part of the independent steel companies are likely. Such an idea does not find much support among steel manufacturers in general because it is held that 30c. an hour carries common labor to a point that cannot fail to put it into debt on current living costs and a great many workmen on present operations are not getting in more than three or four days a week. It is estimated that unemployment in the Pittsburgh district now is a matter of 60,000 workmen. Buyers, however, seem interested only in getting prices down and are not greatly concerned as to how such a condition is brought about. Present prices are badly out of alignment with costs and it is declared that even with common labor at 25c. an hour, as it is in some mill towns where living costs

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 23, 1921	Aug. 16, 1921	July 26, 1921	Aug. 24, 1920
No. 2X, Philadelphia‡	**$20.84**	$20.34	$21.35	$53.35
No. 2, Valley furnace†	**20.00**	19.50	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	24.50	45.60
No. 2, Birmingham, Ala.†	19.00	19.00	20.00	42.00
No. 2, foundry, Chicago*‡	20.00	20.00	18.50	46.00
Basic, del'd, eastern Pa	19.00	19.00	21.25	48.30
Basic, Valley furnace	18.00	18.00	19.00	48.50
Bessemer, Pittsburgh	21.96	21.96	22.46	49.90
Malleable, Chicago*	20.00	20.00	18.50	46.50
Malleable, Valley	20.00	20.00	20.50	50.00
Gray forge, Pittsburgh	21.46	21.46	21.46	50.40
L. S. charcoal, Chicago	33.50	33.50	36.00	57.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	*29.00*	30.00	30.00	60.00
O.-h. billets, Pittsburgh	*29.00*	30.00	30.00	60.00
O.-h. sheet bars, P'gh	*30.00*	32.00	32.00	68.00
Forging billets, base, P'gh	*34.00*	35.00	35.00	80.00
O.-h. billets, Phila.	35.74	35.74	35.74	64.10
Wire rods, Pittsburgh	42.00	42.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	1.75	1.75	1.90	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*2.00*	2.05	2.10	4.75
Iron bars, Chicago	1.75	1.75	1.85	3.75
Steel bars, Pittsburgh	1.75	1.75	1.75	3.25
Steel bars, New York	2.13	2.13	2.13	4.02
Tank plates, Pittsburgh	1.80	1.80	1.80	3.25
Tank plates, New York	2.18	2.18	2.18	3.52
Beams, etc., Pittsburgh	*1.80*	1.85	1.85	3.10
Beams, etc., New York	*2.18*	2.23	2.23	3.37
Steel hoops, Pittsburgh	2.25	2.25	2.50	5.50

Sheets, Nails and Wire,	Aug. 23, 1921	Aug. 16, 1921	July 26, 1921	Aug. 24, 1920
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	*2.75*	3.00	3.00	7.50
Sheets, galv., No. 28, P'gh.	*3.75*	4.00	4.00	9.00
Sheets, blue an'l'd, 9 & 10	2.25	2.25	2.40	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh	$5.25	$5.25	$5.50	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.00	$13.00	$12.50	$39.00
Carwheels, Philadelphia	**17.00**	16.00	16.00	41.00
Heavy steel scrap, P'gh	13.00	13.00	12.00	29.00
Heavy steel scrap, Phila.	11.50	11.50	11.00	26.00
Heavy steel scrap, Ch'go	**11.00**	10.75	10.00	25.50
No. 1 cast, Pittsburgh	**16.50**	16.00	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.00	13.00	11.50	36.00
No. 1 RR. wrot, Phila.	14.00	14.00	13.50	33.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	9.00	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$2.75	$2.75	$2.75	$17.50
Foundry coke, prompt	3.75	3.75	4.00	19.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.50	19.00
Electrolytic copper, N. Y.	11.75	11.75	12.25	19.00
Zinc, St. Louis	*4.17½*	4.20	4.25	8.10
Zinc, New York	*4.67½*	4.70	4.75	8.45
Lead, St. Louis	4.25	4.25	4.35	8.75
Lead, New York	4.40	4.40	4.40	9.00
Tin, New York	26.12½	26.12½	26.00	45.50
Antimony (Asiatic), N. Y.	4.50	4.50	4.65	7.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 23, 1921, Finished Steel, 2.321c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Aug. 16, 1921,	2.364c.
July 26, 1921,	2.364c.
Aug. 24, 1920,	3.974c.
10-year pre-war average,	1.684c.

are low and freight rates substantially lower, not much excuse exists for lower prices than now prevail.

However, all manufacturers are not giving close attention to costs, or at least are not letting them influence their price ideas, and the past week has seen recessions in a number of finished products, notably in sheets. The week also has developed lower prices in semi-finished material, while the effect of the recent advances in asking prices of pig iron has been to halt new buying. Releases against unshipped tonnages of foundry iron are more numerous, but some difficulty is experienced in getting buyers to advance their bids to the ideas of producers.

Pig Iron.—A Pittsburgh district steel maker has just closed for 2000 tons of basic iron on a basis of $19, Valley furnace. This iron is to be shipped from a furnace outside the Valley district and the sale cannot be considered as having established the Valley furnace price. Last business done from any of the Valley furnaces was at $18 and while all makers in that district now are asking $20 for this grade, this price has not yet been established by a clear-cut sale. There are no important inquiries for basic now before makers. The market on Valley Bessemer iron still is quotable at $20, at which price a few moderate sized lots have changed hands. New business in foundry iron has been altogether in small lots, but there no longer is much iron of this grade available and $20, Valley furnace, is as low as any can be bought for, while one maker is unwilling to consider less than $20.50 for No. 2 grade. It is reported that the matter of blowing in several furnaces, now idle, is under consideration. Among the furnaces mentioned as likely to be put on the active list before long are those of the A. M. Byers Co., Girard, Ohio; the Trumbull-Cliff furnace, a new stack jointly owned by the Cleveland-Cliff Co. and the Trumbull Steel Co., Warren, Ohio; one of the Shenango Furnace Co. stacks and the Cherry Valley furnace, Leetonia, Ohio. While coke inquiries have been put out against the probable relighting of some of these furnaces, the matter at present is merely in the tentative stage in all the cases. The only change in the line-up of active furnaces is that the Carnegie Steel Co. has put on one furnace at its Ohio works, Youngstown, and has withdrawn the blast from one of its Carrie furnaces, Rankin, Pa. It seems that more iron was being melted than made at the Ohio works and since the extra iron was coming from Pittsburgh, a considerable saving in freight was affected by turning the blast on in one of the idle Ohio furnaces.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$18.00 to $20.00
Bessemer	20.00
Gray forge	19.00 to 19.50
No. 2 foundry	20.00 to 20.50
No. 3 foundry	19.50 to 20.00
Malleable	20.00

Ferroalloys.—A rather determined effort is being made by domestic producers of ferromanganese to boost the price of 78 to 82 per cent material to $75, delivered, but such business as has been done has been at $70, at which price we note one sale of 100 tons. Some makers are asking $73 delivered for 76 to 80 per cent alloy but consumers claim to have been offered this grade as low as $65. The Valley steel maker who recently asked for 200 to 300 tons of 80 per cent material for September and October shipment has not yet covered. British ferromanganese is quoted at $60 to $65 c.i.f. Atlantic seaboard, but is not being pressed for sale. British makers evidently are waiting definite action on the

tariff before aggressively going after business. Little interest is apparent on the part of consumers in spiegeleisen, which is quoted by an Eastern maker at $26 furnace, for 19 to 21 per cent material, and by another with furnaces in western Pennsylvania at $29 for 18 to 22 per cent manganese content. Despite efforts by some makers of 50 per cent ferrosilicon to get at least $65 furnace, freight allowed, the market is not quotable above $60 on sales. Demand is limited and competition for passing orders is sharp.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent $68; 76 to 80 per cent British ferromanganese, $60 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $26 furnace; 16 to 19 per cent, $25; 50 per cent ferrosilicon, domestic, $60, furnace, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—There is some inquiry for sheet bars but actual sales are of rather moderate tonnages, and buyers seldom find it necessary to go as high as $32 Pittsburgh. The common basis is $30, f.o.b. makers' mill. Four-inch re-rolling billets are reported at $29 and on sales cannot be quoted above $29.50, though $30 still is asked. Hardly enough demand is coming out for slabs to establish prices. The quotation is $31, but it is doubtful if more than $30 could be obtained except for retail lots.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30 to $31; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand still is extremely limited but apparently production is being gaged by consumption and there are no surplus tonnages to weigh down prices. Occasionally small lots are sold from makers' yards at around $40 for common soft steel, but on new rollings nobody is disposed to go below $42 Pittsburgh. However, an inquiry of a size that would provide a real test of the price is lacking. Prices are given on page 498.

Structural Material.—Actual orders in fabricated steel are still of small proportions, both individually and in the aggregate. Some projects, the original inquiries against which went out as far back as a year ago, are coming to life, but these are merely providing work for the estimating departments rather than the shops of the fabricators. The McClintic-Marshall Co. recently entered 250 tons for the municipal electric light plant in Ashtabula, Ohio, and 800 tons for school No. 54, Brooklyn, N. Y. On the small lots of plain material that are being placed there is not much cutting from 1.75c. for bars and 1.80c. on plates and shapes, but it is reported that protection has been given against round tonnages on pending projects, down to 1.65c., and quotations of 1.70c. to 1.75c. have been fairly common on prospective business. Prices are given on page 498.

Iron and Steel Pipe.—Orders for standard pipe in both steel and wrought iron still are gaining but there is no perceptible increase in the demand for oil country goods, nor in line pipe, and in a general way there is so much room for improvement that few are inclined to believe that business is definitely on the upgrade. August is proving a better month than July, but the improvement is found in shipments rather than in plant operations. Prices are pretty well maintained on standard pipe but there is not quite so good observance of quotations on oil country and line pipe. Discounts are given on page 498.

Iron and Steel Bars.—Considerable talk continues that less than 1.75c. is being done on soft steel bars and it is indeed possible that if a sizable inquiry were before makers, less than this price could be done, but there is a dearth of other than small lot inquiries and on such tonnages as are wanted there is no important deviation from the regular market base. Orders for iron bars are more numerous but they run entirely to small lots.

We quote steel bars rolled from billets at 1.75c.; reinforcing bars, rolled from billets 1.70c. to 1.75c. base; reinforcing bars rolled from old rails, 1.60c. to 1.75c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Nuts, Bolts and Rivets.—The market still is dull and settled, with no very definite basis of prices. Quotations made by makers in Cleveland and Chicago are not being followed by makers here, except occasionally, where the account of a regular customer is involved. On machine bolts, rolled thread, makers here are not inclined to quote more than 70 per cent off list and on cut threads and on the larger and longer sizes are holding fairly well to 65 and 10 per cent off list. Pittsburgh district makers are trying to hold at $4.60 off list for blank nuts either in hot-pressed or c.p.c. and t. and $4.25 off list for tapped. Prices and discounts are given on page 498.

Steel Rails.—As a selling price, 1.85c., Pittsburgh, for 25- to 45-lb. rails has disappeared. Larger makers are quoting and glad to get orders at 1.75c., base, and even at this price are finding competition from rerolling mills rather stiff.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—Very little demand is developing in this district except for small tonnages for early shipment. A number of makers still are observing the quotation of 1.85c., but on actual sales 1.80c. about measures the top, and there is an inquiry from one of the railroad equipment manufacturers for about 600 tons carrying a price of 1.70c. As far as can be learned, the latter inquiry has not been placed.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.80c. to 1.85c. f.o.b. Pittsburgh.

Wire Products.—While orders, especially in nails, continue to increase in number, they do not gain much in size and the general character of the demand is such as to suggest a lack of confidence on the part of buyers in the maintenance of present prices. Neither jobbers nor manufacturers are buying more than a few weeks ahead, apparently because they do not want to be too heavily stocked in the event of a price cut. There are rumors that less than $2.75 base, per keg, Pittsburgh, has been done but verification is lacking and one maker here reports a customer who claimed he had a price of $2.65 and subsequently placed the order at $2.75. If there is any shading of prices, it is in wire rather than in nails, but the concessions are neither numerous nor large.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Spikes.—On standard railroad spikes, the recent purchase by the New York Central Railroad of 21,500 kegs at $2.50 per 100 lb. appears to have fixed that figure as the minimum and the old base of $2.75 has disappeared. Makers now are quoting $2.75 base on the smaller sizes and also on boat and barge spikes. The railroads are not buying or specifying at all freely and demand from the jobbers though fairly numerous, are only for small lots for prompt shipment. Prices are given on page 498.

Hot Rolled and Cold Rolled Strips.—Orders show a fair increase in number but do not gain much in size. There are more sellers than buyers and prices consequently favor the former. Some makers who are not aggressively seeking business are trying to maintain the old basis of 2.50c. to 2.60c. for hot rolled strips and 4.25c. for cold rolled strips. On competitive business, however, as low as 2.25c. has been done on the former and 4c. on the latter.

Boiler Tubes.—Small orders for early shipment are more numerous than they were recently, but capacity is far from being taxed and buyers are experiencing no difficulty in covering their requirements and usually at favorable terms. Discounts are given on page 498.

Cold-Finished Steel Bars.—Efforts to stabilize the market at 2.60c. base, Pittsburgh, have been unsuccessful due to the fact that some makers in their anxiety to secure orders have not observed this quotation and a recent reduction in the base to 2.50c. by a large maker has been quite generally followed by others. Even this price, however, does not rule very often on new business, which has been taken as low as 2.40c. base, the higher figure referring chiefly to shipments against old orders.

Hoops and Bands.—The base of 2.40c. has practically disappeared. Large cooperage interests have had no difficulty in developing a base of 2.25c. on hoops and even less has been quoted by companies which ordi-

narily are not regular factors in the hoop and band business. On small lot inquiries, however, the common quotations are 2.30c. to 2.35c. It is claimed that a price of $1.30 per bundle of 45 lb. for cotton ties is much more remunerative than 2.25c. for hoops and some mills which have done well with ties this year are not inclined to shade 2.25c. on hoops.

Sheets.—The past two weeks have been exceptionally good ones for the American Sheet & Tin Plate Co., its orders and shipments having averaged about 50 per cent of normal production. Sheet mills of this company are not running in excess of 40 per cent, but it is able to meet larger demands because of the existence of fair sized stocks. Independents are getting a fair amount of business but it is not quite as heavy as it was recently. Fresh irregularity and weakness is observed in prices, some four or five mills having lately taken business in black sheets at 2.75c. and galvanized sheets at 3.75c. base. Mills adhering to the regular bases of 3c. and 4c. frequently find it necessary to meet the low prices named by others to hold regular customers. The quotable market now is 2.75c. to 3c. base for black, 3.75c. to 4c. base for galvanized and 2.25c. to 2.40c. base on blue annealed sheets. It is said that some newcomers in the field of full-finished sheets are offering to take business at $5 to $7 per ton below the base of 4.70c. for No. 22 gage, as quoted by makers who have been in this business for some time. Prices are given on page 498.

Coke and Coal.—Outside of some inquiries made chiefly for the purpose of finding out probable prices by some furnace interests considering blowing in idle stacks, the market for beehive oven coke has been dull and featureless. Several Valley furnaces are mentioned as likely to go into blast before long, but definite action in this direction still is to be taken. The more common price idea of Connellsville operators on furnace coke for the remainder of the year is $3 per net ton, oven. This is considerably above what iron makers feel they can afford to pay on the present selling price of iron, and it is more than probable that some of the producers, who are figuring on starting up, will buy by-product coke, as did the Sharon Steel Hoop Co., a few weeks ago. It is impossible to make any change in prices on spot coke, standard 48-hr. fuel taking a range of $2.75 to $3 per net ton at oven, and foundry coke $3.75 to $4.50. The coal market does not show much life nor strength. Activity in slack to-day has dwindled and recent quotations of $1.70 for steam and $1.85 for gas slack have lately been shaded as much as 10c. to 15c. per ton. Mine run steam coal is quotable at $1.50 for Sewickley seam up to $2 for higher quality, while by-product coal ranges from $1.50 to $2 (generally at $1.60 to $1.85), and gas coal from $2 to $2.25.

Tin Plate.—Makers whose plants are in operation report a generous volume of rush shipment orders and in some instances have been obliged to put on additional capacity to accommodate these demands. As stock items have been pretty thoroughly liquidated, consumers are obliged to take new production and the market consequently is slightly firmer than it was recently. Stock items which recently sold down as low as $4.50 per base box now are not available at less than $4.75 and there is much closer adherence to the base of $5.25 for production plate than was true a short time ago. Considerable tin plate capacity still is idle in this and nearby disricts. All of the 24 mills of the Wheeling Steel Corporation are down, while neither the Standard Tin Plate Co., Canonsburg, Pa., nor the Washington Tin Plate Co., Washington, Pa., which have been down for several months, has yet resumed. On the other hand, the Weirton Steel Co. has all of its 26 mills at Weirton, W. Va., running 16 turns a week, the McKeesport Tin Plate Co., McKeesport, Pa., is running about 80 per cent full and the Jones & Laughlin Co., 62½ per cent.

Old Material.—The market maintains a strong tone, though demand is lighter than it was recently. Actual increase in open-hearth furnace operations is slight but in anticipation of improvement in this direction almost all of the independent steel companies would take on tonnages. They are not buying heavily, however, because asking prices generally are above what they consider they can afford to pay. On heavy melting steel $13.50 per gross ton, delivered, is about the maximum bid that can be secured, and material thrown down on the storage yards at that price, it is claimed, would mean about $15 in the charging box because of handling charges. A few companies have a real need of supplies, but generally the condition is that the companies which are buying are in the market chiefly because they regard old material as cheap at current quotations. It takes only moderate buying to send prices up at present, because offerings are so meager. Producers are not forcing supplies on the market at current levels and dealers' stocks are off the market until prices are much higher. Foundry grades are in better demand than they were a short time ago, partly because of the scarcity and strength of pig iron. Rerolling rails are not plentiful and not available at less than $16 delivered, consuming points. We note one good sized sale at that price. The Westinghouse Electric & Mfg. Co. scrap list for September offers 3 to 5 cars of hydraulic compressed steel a week, 1 to 2 cars a week of turnings, and 1 to 2 cars for the month each of cast iron borings and shoveling steel.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va.; Franklin, Pa., and Pittsburgh	16.00 to 16.50
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron wheels	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.50 to 9.00
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	10.00 to 10.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	12.00 to 13.00

Revised Federal Tax Bill

WASHINGTON, Aug. 23.—The revised tax bill passed by the House last Saturday, which is estimated to cut $818,000,000 from the tax levies of the nation by 1923, will be taken up by the Senate at the end of the recess, Sept. 21. Meanwhile, the Senate Committee on finance will hold additional public hearings on the measure and it is assumed will make a number of revisions as to details, if not as to fundamentals. The bill as passed by the House is supposed to produce a total of $3,347,000,000 revenue during the present fiscal year, or $221,000,000 less than the estimate under the existing law. The repeal of the excess profits tax and higher income tax rates will not become effective until Jan. 1, 1922, a disappointment to business interests of the country, which had hoped that this provision would be made retroactive as of Jan. 1, 1921.

Representative Fordney, chairman of the House committee on ways and means, stated that the bill is predicated on a policy of strictest economy, and added that the effect of the repeal of the transportation act cannot be other than beneficial. He pointed out that the objectionable taxes from the business standpoint, the standpoint of the cost of living, and the standpoint of the revival of the railroads is the existing tax on transportation, which produces a yearly revenue approximating $262,000,000.

"With a view to simplifying tax forms the bill provides for the creation of a tax board on which the taxpayers will be represented," he said. "Several changes have been made in the law to clear up administrative difficulties, and to simplify the tax forms, a conspicuous one being the amendment regarding Liberty Bond exemptions.

"In administering the existing law many loopholes have been discovered by the Treasury Department, and corrective recommendations by the department are incorporated in the bill passed by the House."

Chicago

CHICAGO, Aug. 23.

An unusual feature in the current demand for finished steel is the fact that immediate delivery is invariably asked on all orders placed with the mills. This indicates that many consumers have allowed their stocks to run very low. While it is apparent that most purchases are for replacement purposes, it is notable that orders are steadily increasing in number, and aggregate bookings of mills are growing larger. One important local producer reports that specifications received thus far this month are twice those of July. As July was an exceedingly poor month, the comparison is not so impressive as it might otherwise be, but it can nevertheless be truthfully said that business is slowly expanding.

Prices are no more clearly defined than heretofore, nor are they any weaker. In an effort to keep their plants running, producers continue to take business at a loss, evidently on the theory that if operations could be sufficiently increased the red figures on their books would be wiped out. If a slow cumulative increase in business in the next month or two should bring their operations to a 45 or 50 per cent basis, they will be able to gage more accurately what can be done with costs and will no doubt find that there is an inflexible limit under which high transportation and raw material costs will not permit them to go. Some observers in fact believe that present going prices will be found to be under that level and that a reaction upward, such as has taken place in pig iron prices, may also occur in steel.

The Chicago, Burlington & Quincy took public bids to-day on a small tonnage of steel. The low bid on 123 tons of structural steel and 49 tons of plates was 2c., Chicago, this price having been named by two local interests. The low figure on a small lot of sheets was equivalent to 3.90c., Pittsburgh, for No. 28 gage, galvanized.

Considerable interest has been aroused in the pig iron market by the appearance of an inquiry from India for 40,000 tons. The railroads continue to place repair work. The Illinois Central has awarded contracts for the repair of 1400 box and gondola cars.

Mill operations are approximately the same as heretofore, the only changes being for the better. The most marked improvement is by the Wisconsin Steel Co., which is now operating on a 40 per cent basis.

Pig Iron.—Local sellers have received an inquiry from India for 40,000 tons of 2½ to 3 per cent silicon foundry iron, for delivery over the rest of the year. It is not regarded likely, however, that the business will be placed here. There continues to be a fair rate of buying in this territory and the new prices are holding. A local melter has purchased 2000 tons of malleable, and a large radiator manufacturer has bought 1500 tons of foundry iron for delivery at Litchfield, Ill., and Kansas City. Other sales made recently range from several hundred tons to carload lots. Even at the advanced quotations, some business is still being placed for local producers in outside territories, such as southern Ohio, southern Indiana and the St. Louis district. The St. Louis Coke & Chemical Co. expects to bank its furnace at Granite City the latter part of this week. It has about 9000 tons of iron on yards, of which the larger part is less than 2¼ per cent in silicon. The Tennessee producer of silvery has sold most of its stocks with the result that Jackson County prices now rule in this market. A current inquiry calls for about 500 tons of silvery. A Milwaukee melter has purchased 1000 tons of low phosphorus at $40, delivered, part of the tonnage being resale and the remainder copper bearing material from furnace. A number of carload sales of copper free material have been made recently at $35.50, Valley furnace. Inquiries for charcoal iron include one for 120 tons for delivery over the remainder of the year and two others for a single carload each. Thus far one inquiry for first half delivery has been received by the local trade. It covers 1000 tons of foundry and one producer has submitted a quotation on the basis of present prices. Most of the other current inquiries range from carloads to several hundred tons. A Michigan printing press manufacturer wants 400 tons of foundry grade. A feature of the past week's business was the sale of 1000 tons of gravel fluorspar to a local user at $15, at mine.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	20.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	20.00
Northern high phos.	20.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	20.00
Basic	20.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—Several hundred tons of approximately 15 per cent ferrosilicon has been bought by a local melter at $33 delivered, and a number of inquiries for carload lots have brought out quotations of $34, Chicago. Further sales of 50 per cent ferrosilicon have been made at $62.50, freight allowed. It is reported that the low prices on ferrosilicon are being named by Canadian producers, who are favored by the exchange situation. Ferromanganese has stiffened evidently because producers are discounting the passage of the tariff bill.

We quote 78 to 82 per cent ferromanganese, $72 to $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Rails and Track Supplies.—New business in track supplies is light and the price situation is substantially unchanged. Specifications against rail contracts are disappointingly small.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.85c. f.o.b. makers' mills. Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Railroad Equipment.—The Illinois Central has divided the repairs on 1400 box and gondola cars between the American Car & Foundry Co., the Haskell & Barker Car Co., the Pullman Co. and the Ryan Car Co. The Rock Island is in the market for 10 Mikado type engines and the Seaboard Air Line is inquiring for 5 mountain-type, 13 Mikado type and 10 six-wheel switch engines. Western roads are in the market for locomotive forgings and car axles. The Northern Pacific and the Great Northern have each purchased 100 tons of locomotive forgings, including locomotive axles, and a number of 100-ton inquiries for car axles are current.

Plates.—The Chicago, Burlington & Quincy Railroad takes open bids to-day on 200 tons of plates and shapes and on Sept. 2 will receive tenders on 2000 tons, to be used for car repair work in its own shops. There has been no material change in the plate market, aggregate demand being light and prices being indefinite. The attitude of sellers appears to be to quote what is necessary to get the business, with the result that varying concessions under the official price of 1.85c., Pittsburgh, are reported. So far as can be determined, the market is neither weaker nor stronger than heretofore.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, the freight to Chicago being 38c. per 100 lb. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—Structural inquiries and lettings are falling off, and competition among mills for plain material business is keen. There is no definite market level for plain material in this district. Mills are considering each inquiry individually and are naming quotations according to the desirability of the business. As a result variations in going prices are wide. Recent fabricating awards include:

Fifth Street Department Store, Los Angeles, Cal., 3271 tons, to American Bridge Co.

Northern Pacific Terminal Co. of Oregon, trainshed and umbrella shed, Union Depot, Portland, Ore., 136 tons, to an Oakland, Cal., fabricator.

Group of buildings, Saint Elizabeth's Hospital, Lafayette, Ind., 210 tons, to Indiana Bridge Co.

Vault, Lake Shore Trust & Savings Bank, Chicago, 80 tons, to Union Foundry Co.

Meat market building, Louisville, Ky., 150 tons, to Louisville Bridge & Iron Co.

Pending business includes:

San Jacinto Life Insurance Building, Beaumont, Tex., 950 tons.

Bryn Mawr School, Chicago, 230 tons, Gage Structural Steel Co. low bidder.

Frost National Bank Building, San Antonio, Tex., 382 tons, general contract awarded to J. P. Haynes, San Antonio.

New shop for F. Rosenberg Elevator Co., Milwaukee, 100 tons.

The mill quotation is 1.60c. to 1.85c., Pittsburgh, which takes a freight rate of 38c. per 100 lb. for Chicago delivery. Jobbers quote 2.88c. for materials out of warehouse.

Bolts and Nuts.—Purchases by railroads and jobbers are small and for immediate needs only. The same thing may be said of the automobile manufacturers with the possible exception of the leading maker of low priced cars, whose monthly purchases are fairly large. While prices are still weak, some bolt makers are turning away orders rather than take more business at a loss. As a result, the market is somewhat steadier and the appended quotations appear to be representative.

Small machine bolts, rolled threads, 70, 10 and 10 to 70 and 7½ per cent off list
Small machine bolts, cut threads. 70 and 10 to 70 per cent off list
Large machine bolts..... 70 and 10 to 70 per cent off list
Small carriage bolts, rolled threads, 65, 10 and 10 to 65 and 5 per cent off list
Small carriage bolts, cut threads, 65 and 10 to 65 and 5 per cent off list
Large carriage bolts..... 65 and 10 to 65 and 5 per cent off list
Lag bolts ..... 70, 10 and 7½ to 70 and 5 per cent off list
Stove bolts, in packages..... 80, 10 and 10 per cent off list
Stove bolts, in bulk..... 80, 10, 10 and 2½ per cent off list

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅝ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—The demand for this commodity is appreciably better than for plates, structural shapes or bars. Both mills and warehouses report that users have little material in stock and invariably ask for the immediate shipment when they buy. Individual orders are generally small, indicating that buyers are still timid. While keen competition is bringing out some shading in mill prices, the ruling market is substantially the same as a week ago. Blue annealed is weaker than either black or galvanized, owing to the fact that there is less demand for that product. The local independent continues to operate 14 out of 18 hot mills.

Mill quotations are 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.53c.; No. 28 black, 4.65c.; No. 28 galvanized, 5.65c. Hoops and bands, 3.48c.

Bars.—Orders for mild steel bars are still small but gradually increasing in number. There is an increasing insistence on the part of the purchaser for immediate delivery, indicating that stocks have been depleted. In fact, sellers declare that it is surprising how many consumers have little or no remaining material in stock. As yet, however, buyers are cautious and are placing orders for replacement purposes only. There continues to be a fair run of small reinforcing jobs. Among the largest is a factory addition for the Cuneo-Hennebery Co., Chicago, requiring 450 tons, which is reported to have been let. Considerable road building is also under way, resulting in the purchase of a moderate quantity of reinforcing steel. The amount of concrete work being done may be judged by the fact that the leading cement producer is unable to keep up with its orders. Prices of both merchant and reinforcing bars are neither weaker nor stronger than a week ago. Jobbers, however, appear to be asking a full warehouse differential on reinforcing bars, bringing the quotation up to 2.53c., f.o.b., local store. The demand for bar iron is light and the ruling price for this commodity remains 1.75c., mill. There has been no material change either in the demand or price of rail carbon steel bars. Hard steel bar mill operations are somewhat steadier than they were a month or two ago.

Mill prices are: Mild steel bars, 1.55c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Wire Products.—Mills have received at least two offers of 500-ton orders of soft wire rods at $35, Pittsburgh, but the business has gone begging. While as low as $35 might have been done a few weeks ago, $40, Pittsburgh, is now the bottom, and most makers are insisting on the official price of $42. Railroad inquiries for nails are increasing. Several lots of 500 to 1000 kegs are in the market and a number have already been closed. The Rock Island is inquiring for 1100 kegs Railroad inquiries and orders for wire are principally in carload lots. Fall trade in barb wire is commencing to come in, and bookings of wire products in general are on an improved scale. Nevertheless it is to be noted that jobbers are buying cautiously and run the risk of being unable to supply their customers if a healthy autumn demand materializes. In such a case they would ask for immediate shipment and the mills, having no accumulated stocks to draw from, would be unable to meet the situation. For mill prices, see finished iron and steel f.o.b., Pittsburgh, page 498.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.;; cement coated nails, $2.90 per keg.

Cast Iron Pipe.—Bay City, Mich., which took bids on 3000 tons, has awarded the business to W. J. Magher, a general contractor of that city, who will sublet. For the 36-in. pipe to be bought, steel has been specified, but cast iron has been decided upon for the remaining sizes, which will call for about 2000 tons. The Detroit Water Board awarded 1500 tons to the Lynchburg Foundry Co., as announced last week, but the letting was later cancelled by the City Purchasing Board, and new bids were ordered taken on Aug. 23. Other pending business includes:

Youngstown, Ohio, 1500 tons, bids to be received Aug. 31.
Bloomington, Ind., two carloads, Aug. 22.
Sidney, Ohio, 400 tons, Sept. 2.
Table Rock, Neb., 125 tons, Sept. 9.
St. Paul, Minn., 200 tons, Sept. 5.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; ;6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—The market has grown quieter, even the buying by dealers having abated. Consumers still refuse to pay the advanced quotations, the only noticeable exception being a local melter who bought 1000 tons of brake shoes at $11.25, delivered. With the market largely in the hands of the dealers, prices are about the same as a week ago. The only important railroad offerings are 3000 tons advertised by the Burlington and a blind list circulated by the New York Central.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	13.00 to 13.50
Steel rails, rerolling	12.50 to 13.50
Steel rails, less than 3 ft.	12.00 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.25 to 10.75
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	9.50 to 10.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.00 to 11.50
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Low phos. punchings	13.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	11.50 to 12.00
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	12.00 to 12.50
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

New York

NEW YORK, Aug. 23.

Pig Iron.—The stronger prices on foundry iron reported last week are still in evidence and some business running into fairly large figures has been closed at the higher levels. Nevertheless some prices close at $18 are reported by consumers, though it is difficult to trace these quotations to any furnace. The inference of the trade is that some more re-sale iron is being thrown on the market. Furnace quotations range from $19 to $20 for No. 2 plain and from $19.50 to $20.50 for No. 2 X. Most, if not all, of the Buffalo furnaces are quoting on the basis of $20, furnace, for No. 2 plain, but some eastern Pennsylvania iron figures back to $19, base, at the furnace. A heating furnace company has placed 1500 tons of foundry iron, the order having gone, it is reported, to an eastern Pennsylvania furnace at $19.50, furnace, for No. 2 X. Another furnace company, which came into the market last week for 2000 tons for delivery over the remainder of the year, closed on Monday for at least 1000 tons and paid $20, furnace, for No. 2 X. Judged by these transactions, the market has strengthened from $1 to $1.50 a ton within two weeks. A significant feature of present demand is the willingness of consumers to cover for the last quarter of the year, indicating a confidence in prices which has not existed before this year. It is also to be noted that the furnaces are willing to accept business for forward delivery, whereas a month ago or so they would take nothing but prompt-shipment orders. Pending inquiries do not total very large, perhaps a few thousand tons. A car builder has not closed, so far as reported, on 1000 to 1500 tons for a Western plant and a machinery manufacturer is believed to be still interested in 500 tons of foundry iron, on which quotations were made a week or so ago.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	28.16 to 29.16

Ferroalloys.—The report is current that a Central Western consumer has been offered 200 to 300 tons of British ferromanganese at $57 to $60, seaboard, as against a prevailing quotation of $65. However, the $65 price is the general minimum so far as British producers themselves are willing to sell. It is reported that some dealers in Great Britain have been offering ferromanganese to merchandising representatives in this country at somewhat below the regular market price. With these possible exceptions, there are no offerings of ferromanganese below $65, seaboard, for the British product and $70, delivered, for the American. Imports from Great Britain have dwindled, having been only 275 tons in July, bringing the total for the first seven months to 5481 tons as against 23,711 tons for the first seven months last year. The spiegeleisen market is exceedingly quiet, with quotations unchanged. There is no activity in high grade manganese ore for which the quotations are nominally the same as a week ago. Imports of ore are also declining, having been only 5028 tons in July as against a rate of nearly 60,000 tons per month early in the year. Sales of carload lots of 50 per cent ferrosilicon are reported at $65 per ton, delivered, though $60 has been named as the basis of one transaction. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$65.00
Spiegeleisen, 20 per cent, furnace, per ton	$26.00
Ferrosilicon, 50 per cent, delivered, per ton	$65.00
Ferrotungsten, per lb. of contained metal	50c. to 55c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast Iron Pipe.—A further reduction of $5 a ton in cast iron pipe has been made by leading producers, who believe that this will be the last. On 230 tons of 12-in. pipe for Yonkers, N. Y., the United States Cast Iron Pipe & Foundry Co. was low bidder, its price being $41.90 per ton, delivered. The general contract for waterworks extensions at Scarsdale, N. Y., requiring 800 tons of pipe has been let.. We quote per gross ton f.o.b. New York, carload lots, as follows: 6-in. and larger, $42.30; 4-in. and 5-in., $47.30; 3-in., $57.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—A noteworthy increase in fabricated steel projects is the outstanding feature of the local finished steel market. The largest letting covers 3700 tons for the Bowery Savings Bank building, awarded to the Hedden Iron Construction Co. Other awards include the following taken by the American Bridge Co.: A high school at Jeannette, Pa., 250 tons; an office building at Trenton, N. J., 200 tons; a bridge over the Mystic River at Mystic, Conn., 450 tons, and a factory building for the Onondaga Pottery Co., Syracuse, N. Y., 300 tons; and Eidlitz & Ross have been awarded 500 for the Bushwick telephone exchange in Brooklyn. Among the new steel structures, railroad work is conspicuous by its absence. Included in the new work are the following:

National Surety Co., Washington Street between Albany and Carlisle, 1000 tons.

An apartment house, Thirty-eighth Street and Park Avenue, 500 tons.

Five schoolhouses, three in New York totaling 2500 tons, and the others, totaling 350 tons, one at Syracuse, N. Y., and the other at Meadville, Pa.

A high school, Mercer County, Trenton, 500 tons, letting postponed to Sept. 6.

Wharf, Chestnut Street, Philadelphia, 1000 tons, bids to be taken Sept. 9.

Theater and office building, Philadelphia, 1500 tons.

Highway bridge for New York State at Aqueduct, 300 tons, bids Aug. 25.

Federal Reserve Bank, New York, 14,000 tons, including vault work, bids Sept. 3.

Boiler house, Cherry River Paper Co., West Virginia, 200 tons.

Representatives of some mills report a slight improvement here and there in demand, but in the main the situation continues unchanged. The improvement is chiefly in small orders. Without large projects, with the exception of a few pending structural jobs, present steel prices are not being thoroughly tested. On the ordinary small business prices are not being cut much except on plates, which are now quotable at 1.70c. to 1.75c., Pittsburgh, though some mills still adhere to the "regular" quotation of 1.85c. No new domestic car work has come out, but American car builders, who quoted on 1000 tank cars for the Russian Soviet Government, have learned that this order was placed in England, credits in gold having been arranged through a Stockholm bank. It now appears that the 1000 all-wood box car repairs for the Lehigh Valley will be obtained in a Hamilton, Ont., car plant. The Long Island Railroad Co. will receive bids, Aug. 29, for 550 kegs of spikes and bolts besides frog and switch work, covering estimated shop requirements from September to December.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.13c.; plates, 2.18c. to 2.23c.; structural shapes, 2.18c. to 2.23c.; bar iron, 2.08c.

Coke.—A copper company which inquired for 1000 tons of furnace coke is reported to have received several quotations below $3 per net ton, Connellsville basis. Foundry coke is slightly firmer, sales having been made within the week at $4.25 to $4.50.

Warehouse Business.—The market continues to move along sluggishly with no changes in prices reported. Present quotations are in most cases nominal, a good sized order bringing out some shading. Buying is sporadic, one week bringing in a fairly large number of small orders, and the following week reverting to the dull condition. Some warehouses expect that there may be a slight price change in September, but this assumption is evidently based on the belief that the leading mill interest may make a downward revision at this time. The brass and copper market is unchanged. Wrought iron and steel pipe warehouses report no change. We quote prices on page 510.

High Speed Steel.—Although orders are still ex-

ceedingly small, most producers report them more numerous. Quotations continue nominally at about 90c. per lb. for 18 per cent tungsten high speed steel, with sales reported at slightly lower prices.

Old Material.—The trade continues hopeful, although transactions show little or no change for the better. There is a slight tendency of some dealers to hold stocks in yards in anticipation of a recovery early in the fall. There is some activity in cast iron pipe. The American Bridge Co. is considering offers for Pencoyd of No. 1 heavy melting steel and cast iron borings, both of extremely high grade, the former not over 4 ft. long. Prices show practically no change, although there is evidently a rather wide range in quotations on heavy melting steel which spreads from $7.50 per ton with some dealers to as high as $9 per ton with others. The latter quotation is for extremely high quality.

Buying prices per gross ton, New York, follow:

Heavy melting steel	$7.50 to $8.75
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	5.00 to 5.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	9.00 to 9.50
Locomotive grate bars	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Boston

BOSTON, Aug. 23.

Pig Iron.—Business the past week was confined to 3000 tons eastern Pennsylvania iron, silicon 2.00 to 2.50 per cent, nearby shipment, to the Whitin Machine Works, Whitingsville, Mass., at an indicated price of less than $19.50 furnace; 200 tons No. 2X to a Massachusetts foundry at $20 furnace; 100 tons No. 2X to a Holyoke, Mass., melter at $19.50 furnace and about a dozen car lots of No. 2 plain, No. 2X and No. 1X on a basis of $19.50 to $20.50 furnace for No. 2 plain, the aggregate business falling short of 3700 tons. No Buffalo, Southern or Virginia sales are reported. Prospective business has dwindled to small proportions. Furnaces quoting show a strong tendency to maintain silicon differentials. One eastern Pennsylvania furnace, for instance, is now quoting $19.50 for No. 2 plain, $20 for No. 2X and $21 for No. 1X. Another quotes $19 for No. 2 plain, $19.50 for No. 2X and $20.50 for No. 1X. Other interests, however, quote No. 2 plain and No. 2X at $20. Buffalo usually is quoted at $20 furnace base. The average large New England foundry appears better off for business than the small one. The Sessions Foundry Co., Bristol, Conn., has reduced wages 10 per cent. Other melters, due to keen competition, are endeavoring to reduce operating charges. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$23.56 to $24.56
East. Penn., silicon 1.75 to 2.25	23.06 to 24.06
Buffalo, silicon 2.25 to 2.75	25.96 to 26.46
Buffalo, silicon 1.75 to 2.25	25.46 to 25.96
Virginia, silicon 2.25 to 2.75	31.08 to 33.08
Virginia, silicon 1.75 to 2.25	30.58 to 32.58
Alabama, silicon 2.25 to 2.75	30.16 to 31.16
Alabama, silicon 1.75 to 2.25	29.66 to 30.66

Coke.—The general foundry coke situation shows no improvement. Consumption continues below normal, forward bookings have not increased nor have New England oven outputs, and both the New England Coal & Coke Co. and the Providence Gas Co. quote spot and contract fuel at $10.66 delivered, where the local freight does not exceed $3.40.

Finished Material.—Within six weeks Boston will be in the market for a round tonnage of steel for the Allston bridge over the Boston & Albany Railroad tracks. Later, bids will be asked on structural steel for a Beacon Street bridge, specifications for which will include trusses weighing 67 tons each; also on 435 tons of structural steel for approaches on the Chelsea bridge, as well as 15 to 20-in. steel columns and a tonnage of sheet steel piling. The Strauss Bascule Bridge Co., Chicago, will supply double-leaf underneath counterweight type of bascule for the last named bridge, taking approximately 300 tons of steel. Steel mill representatives continue to report bookings for bars, plates and sheets as comparing favorably with those for July.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—Among the more important old material houses, business the past week was confined very largely to scattered car lot sales of No. 1 machinery cast to foundries at $16.50 to $17.50 delivered, and borings at $3.50 to $4.50 f.o.b. shipping point, for chemical and Pennsylvania mill consumption. The situation in New England is unusual. Dealers maintaining large yards are heavily stocked, cannot take in additional stock and cannot afford to sell at going prices. Small yard owners are well stocked and are offering material to local and nearby foundries at prices quoted to large dealers, usually around 65c. per cwt. for No. 1 machinery cast. The average foundry melt is only sufficient to absorb such offerings and there is little incentive to anticipate wants. Bids made by Pennsylvania mills on heavy melting steel and other material usually do not allow yard interests more than to break even, consequently there is a deadlock between buyer and seller. Although business is dull, prices are generally reported as very firm, but unchanged.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 17.50
Stove plate	16.00 to 17.00
Railroad malleable	15.50 to 16.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.00
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.50
Cast iron borings, chemical	3.50 to 4.50
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 11.50
Rerolling rails	9.00 to 10.00

Birmingham

BIRMINGHAM, Aug. 22.

Pig Iron.—Birmingham pig iron is firm at a minimum of $19 and seems headed to a higher level on slight provocation. One maker, who began the week with 1800 tons to sell, was almost cleaned out at its close and is about to retire from market, not being a producer at this time. Ill-assorted stocks and growing depletion of yard accumulations is gradually leading up to a point of acuteness. Melters wishing 2.25 to 2.75 per cent silicon analysis took 1.75 to 2.25 per cent. Inquiries coming by mail have been anticipated before arrival by the same inquiry and acceptance by wire. The off-grades have disappeared and leave no ground for false reports of a lower base than really exists. The Southern melt is increasing each week, stove plants and small foundries adding to production, while pipe founders seem scheduled for continuous appearance in the market unless they buy for forward delivery. Some inquiries for fourth quarter have been received. Makers do not care to quote, but, when they do, ask from $1.50 to $2 above the present base. The entire South is beginning to respond to the better feeling in the agricultural sections, which has led to increased activities in all lines. Business of the week includes about 6000 tons of merchant iron placed by four makers. It is agreed that the corner has been turned.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	32.00

Cast Iron Pipe.—High pressure pipe has hardened

and the nominal base of $35 for 6 in. is the minimum. Quotations for Southern delivery on small lots were $2 higher last week than in the one before. Total business of 6000 tons was done in the first three weeks of the month with the Pacific Coast and more is reported in sight. An influx of new business is expected shortly on a conviction that the corner has been turned. It is not stated which shop will make the 3500 tons for Milwaukee recently awarded to the United States Cast Iron Pipe & Foundry Co. Sanitary pipe melt is increasing, but price cutting is reported as still affecting the nominal base of $40.

Finishing Mills.—The Tennessee company went beyond 50 per cent of capacity operations in finishing mills this week, when, in addition to another week on full turn at the Bessemer plate, bar and guide mill, it also put in operation the structural mill at Fairfield. The rail mill, car works and tie-plate departments were also continued at work. Conners-Weymann began the fourth week of continuous operation of the cotton tie, band and hoop mill at Woodlawn. The Gulf States Steel Co. continued operation of blooming mill on better showing of order books.

Coal and Coke.—Coal production has increased and movement is larger. Standard foundry coke is active at $6 to $6.25 with Pacific Coast and Texas again in market.

Old Material.—Cast scrap is quite active and prices are firm. Steel shows slight tendency to harden, but transactions are few.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Buffalo

BUFFALO, Aug. 23.

Pig Iron.—Increased foundry operation at points east of Buffalo is reflected in the volume of business placed here. With the exception of one producer, who has maintained a $21 base price throughout the period of price cutting and did but little business, other producers in general report improvement. With a stronger price the extraordinary tonnages reported last week have eased off—and while the sales have not been up to the point, the improvement is manifest, nevertheless. The base price now touches the $21 mark. One furnace has sold 6000 tons through its various branches and is working on inquiries for considerably more than this figure. Another furnace has inquiries in hand for 10,000 tons including one for one-third of this amount from a national buyer who is in the market about every 30 days. Its sales were 5000 tons and consisted of an unusually large number of small lots. The low limit in prices demanded by the newest factor in pig iron sales is now $20 and prices range from that level to $22. About 1000 tons have been booked on the basis of the new prices. Small lots of malleable have been moved at $21. Shipments of basic iron by a furnace still working on old contracts continues without unusual change. Like the others this furnace quotes $21 on No. 2 plain.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$20.75 to $21.75
No. 2X foundry, 2.25 to 2.75 sil.	19.75 to 20.75
No. 2 plain, 1.75 to 2.25 sil.	19.00 to 20.00
Basic (nominal)	20.00 to 21.00
Malleable (nominal)	21.00 to 22.00
Lake Superior charcoal	36.00

Finished Iron and Steel.—Flurries in buying which had their inception with the announcement of the most recent price reductions have been maintained in a steady way. This is particularly the case in structural business, although no large orders have been placed. But one mill finds it impossible to join in a general expression of improvement. This interest started several open hearth furnaces and a blooming mill recently but orders have not kept apace with necessary mill schedules and unless some business not in prospect at this time develops a curtailment may be expected. Pipe business continues brisk and orders and inquiries show a marked increase. Much of this business is in carload lots. Nails and some wire products are quiet. Plate and shape business has shown marked improvement this month with one mill but bar business is slow. Operation will be increased with a large steel interest and all mills will be in operation before the end of the month with the exception of a rail mill. Proposed erection of a new power line from Niagara Falls to Buffalo at an estimated cost of $11,000,000 interests structural mills with reference to steel requirements for towers and foundations. A Masonic building at Jamestown involving 100 tons of shapes is engaging a few of the structural interests. Fifty per cent operation recently put into effect by a sheet interest which was down for several weeks, will likely be continued indefinitely.

Warehouse Business.—Improvement growing out of most recent price reductions is sustained and demand seems more stabilized than heretofore. An interesting and encouraging sidelight is the fact that a greater demand for machine tools is coming in—indicative of improved operation in shops. Customers out of the market for ten months have manifested growing interest within a week. Movement of all warehouse materials is more balanced, a change over the previous condition of the market when last week the best movement was in sheets. The general impression is that business is better with respect to both the number of orders as well as quantities asked for.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.45c.; galvanized steel sheets, No. 28 gage, 5.30c.; black sheets, No. 28 gage, 4.30c.; cold rolled strip steel, 6.40c.

Old Material.—Little can be said of the demand for old material except that transactions are on the same level from week to week. Prices are generally accepted as the lowest likely to be reached. Some strengthening of the market for heavy melting steel is noticed with reports of $13 and $13.50 delivered Pittsburgh. This would bring about $11 f.o.b. Buffalo.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$10.00 to $11.00
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

Cincinnati

CINCINNATI, Aug. 23.

Pig Iron.—The market has slipped back into its customary dullness as far as sales are concerned. The stimulating influence of the recent price advances has apparently subsided, and only occasional sales are reported. With the foundry industry in this district running approximately 25 per cent of capacity, buyers are only disposed to cover for one or two months ahead, and at the rate of melting small tonnages will suffice for their needs. There are some melters who are willing to contract for first quarter of next year at to-day's prices, but furnaces are not inclined to quote that far ahead. Reports are heard that stocks of iron have found their way into brokers hands, but these cannot be confirmed. On Northern iron $20 is still the minimum, with some furnaces asking $20.50. Most of the sales are being made at $20, and included in these are several 100-ton lots. The largest sale reported was 300 tons to an Indiana melter. Carload sales are again taking their place as the market activity, but in the opinion of the trade the general situation is much improved. Stocks on furnace yards are perceptibly dwindling, and it is reported that at least two furnaces will be lighted in the Ironton district shortly after Sept. 1. The only inquiry of any size is one for 500

tons to a melter in nearby territory.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—While buying has not been very heavy, it is on a little larger scale than has been the case during recent months. The sheet market is the most active and a few orders for 100-ton lots have been placed in the week. Prices are inclined to hold firm although a couple of mills are reported to be shading the regular schedule. On an inquiry during the week, 2.90c. was quoted on black sheets and 3.75c. on galvanized. The majority of the sales, however, are being made on the basis of 3c. for black and 4c. for galvanized. It is reported that a considerable tonnage of reinforcing bars for the Columbus stadium have been placed with a Central, Ohio, re-rolling mill. Bar prices are holding firmly at 1.75c. There is very little plate or structural tonnage moving. In wire products it is said that plain wire has been sold at 2.25c., an order for 100 tons having been placed with an Ohio mill at this figure. The market on nails is steady at $2.75 per keg, Pittsburgh, and while reports are heard of $2.50, these are not confirmed. In the structural field the Mt. Vernon Bridge Co. has been awarded a contract for a bridge on the Evansville, Terre Haute & Eastern Railroad involving approximately 600 tons. The Indiana Bridge Co. has taken 200 tons for a hospital at Lafayette, Ind. The King Bridge Co. is reported to be low bidder on 800 tons of track elevation work for the Big Four at Indianapolis. The tonnage involved in the Kellogg Avenue bridge at Cincinnati is approximately 1000 tons instead of 400 as previously reported. A bridge over the Warrior River in Alabama, 600 tons, will shortly be up for figures. A telephone exchange building and a market building at Covington, Ky., are prospects which will develop in the near future.

Warehouse Business.—Small orders for immediate shipment continue as the prevailing activity. Some jobbers report an increased tonnage during the week. There have been no price changes since the ones recently announced. We quote:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—The American Rolling Mill Co. is understood to have closed for 10,000 tons of Connellsville furnace coke at a price said to be $2.90 per net ton at ovens. The company will blow in one of its furnaces at Columbus shortly. Several other inquiries are before the trade, but the tonnages are small and immediate shipment is requested. Local houses profess to see a firmer tone to the coke market, but prices have not advanced.

Old Material.—Cleveland and Wheeling district consumers were purchasers in the local scrap market in the week. Heavy melting steel was sold in the Cleveland district at around $13, delivered, and some mixed borings and turnings to Wheeling at $9, delivered. The local market is quiet, the larger consumers still being closed down. Foundry scrap is exceptionally quiet. Prices, while having a firmer tendency, are quotably unchanged.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

St. Louis

ST. LOUIS, Aug. 23.

Pig Iron.—The market is firm. Buyers are showing more interest by far than for some time past. More inquiries are being received, and more orders, and there is generally a better feeling among consumers except in the stove trade, whose business has not yet recovered from the effects of the buyers' strike of the farmers. Inquiries were out for about 3000 tons in various lots for prompt shipment. A Quincy, Ill., stove plant bought 300 tons for last quarter shipment and a local stove plant which had an inquiry out for 100 tons bought 400 tons. There is an inquiry out for a car of 49 to 51 per cent ferrosilicon.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham:

Northern foundry No. 2	$22.88
Northern malleable	22.88
Basic	22.88
Southern foundry, sil. 1.75 to 2.25	24.74

Coke.—There are more inquiries and more business is being placed, although there are no large orders. Interest is being shown in an inquiry for 2000 tons from Mexico for August and September delivery. Prices are unchanged. Standard Connellsville foundry coke is being quoted at $4 to $4.50 per net ton at ovens, with special brands up to $5.25. The furnace product is $1 lower.

Old Material.—The slight flurry among dealers last week has about subsided, although advances of about 50c. per ton are noted in most grades. Steel foundries and rolling mills are on a still hunt for bargains, but are declining to pay the prices at which dealers are holding material. Thus far there has been no increase in mill operations, and only slight improvement in foundry operations. The American Steel Foundries announced that it would light up one furnace at its East St. Louis plant on Sept. 6, employing about 450 men, but the resumption has been postponed indefinitely. No railroad lists are before the market this week.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Iron rails	$13.00 to	$13.50
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft.	10.50 to	11.00
Relaying rails, standard section	29.00 to	31.00
Cast-iron wheels	11.50 to	12.00
No. 1 heavy railroad melting steel	10.00 to	10.50
No. 1 heavy shoveling steel	9.50 to	10.00
Ordinary shoveling steel	9.00 to	9.50
Frogs, switches and guards, cut apart	10.00 to	10.50
Ordinary bundled sheet	4.00 to	4.50
Per Net Ton		
Heavy axle and tire turnings	5.50 to	6.00
Iron angle bars	11.00 to	11.50
Steel angle bars	8.50 to	9.00
Iron car axles	16.50 to	17.00
Steel car axles	12.50 to	13.00
Wrought iron arch bars and transoms	13.00 to	13.50
No. 1 railroad wrought	9.50 to	10.00
No. 2 railroad wrought	9.00 to	9.50
Railroad springs	10.00 to	10.50
Steel couplers and knuckles	10.00 to	10.50
Locomotive tires, 42 in. and over, smooth inside	9.00 to	9.50
No. 1 dealers' forge	6.00 to	6.50
Cast-iron borings	5.50 to	6.00
No. 1 busheling	9.50 to	10.00
No. 1 boilers cut in sheets and rings	5.50 to	6.00
No. 1 railroad casts	12.00 to	12.50
Stove plate and light cast	11.00 to	11.50
Railroad malleable	9.50 to	10.00
Agricultural malleable	9.00 to	9.50
Pipes and flues	7.00 to	7.50
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.00 to	3.50
Railroad grate bars	7.50 to	8.00
Machine shop turnings	4.00 to	4.50
Country mixed iron	7.00 to	7.50
Uncut railroad mixed	7.50 to	8.00
Horseshoes	10.00 to	10.50
Railroad brake shoes	8.50 to	9.00

Finished Iron and Steel—An improvement is noted. No big tonnage is being placed, but there is a fair amount of carload business. The Missouri Pacific Railroad, which is showing more activity than other lines, will place an order in October for tie plates, in addition to the 3000 tons mentioned last week as having been ordered. This railroad also has out an inquiry for building 20 bodies and fire boxes. An inquiry has been received by the Rock Island for 200 50-ton composite coal cars. Orders are being received from some of the lines for carloads of wheels and axles. Chief interest in structural steel lies in the steel airship hangar at Scott Field, Belleville, Ill., which will be placed through

the chief of construction service at Washington on Sept. 15; 3000 tons are involved. Local fabricators are working through contractors here. The inquiry for 450 tons of reinforcing bars for the Frost National Bank Building, San Antonio, Tex., is still pending. The American Car & Foundry Co. announces that its plant at Madison will be reopened within two weeks to repair 1500 cars for the Big Four lines.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.62½c.; No. 28 black sheets, cold rolled, one pass, 4.75c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Cleveland

CLEVELAND, Aug. 23.

Iron Ore.—The Algoma Steel Co., which so far this year has taken no ore has advised shippers that it will at once begin to take shipments and, while the amount has not been definitely announced, it is expected that it will be close to 250,000 tons. This company has long time contracts and consequently will buy no ore in the open market. Price concessions by one seller apparently are not disturbing the market. Other ore firms claim that the interest naming the lower prices has not maintained regular quotations during previous years. August shipments are expected to show some improvement over July.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Probably the most interesting feature of the pig iron market is the increase in the demand as shown by improvement in shipments. Comparing the first three weeks of August with the corresponding period of July, one producer has shipped almost twice as much iron this month as last, two others have increased shipments 50 per cent and another 33 per cent. Inquiries and sales also showed some improvement the past week, although most orders are for carlots. Prices on foundry iron are firm and range from $20 to $21, with a large proportion of orders taken at $20.50. Some sellers are not going below that level and one is trying to work its price up to $21. With the recent stiffening of the market, iron for Cleveland delivery is about 50c. per ton higher. The American Radiator Co. was in the market during the week for 1000 tons of foundry iron for its Springfield and Titusville plants and is reported to have made purchases. It also bought 250 tons additional low silicon iron for its Detroit plant. An Erie consumer purchased 300 tons of foundry iron. An Ohio foundry is inquiring for 1000 tons of foundry iron and the American Car & Foundry Co. is in the market for 1000 tons of malleable iron for its Detroit plant. On an inquiry for 500 tons of basic iron from a western Pennsylvania consumer, a Cleveland interest having a freight advantage over the Valley has quoted $19.25, Valley furnace, but the consumer is reported to have secured a quotation of $18.50, Valley furnace.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$19.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.92
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Semi-Finished Steel.—There is a fair demand for sheet bars on which $30, Youngstown, is generally regarded as the market price. One inquiry for a 5000-ton lot from a Valley district consumer is reported.

Finished Iron and Steel.—Demand has improved somewhat and August orders will show a moderate gain over July. Orders usually are for small lots for immediate shipment, indicating that consumers' stocks are low. The heaviest demand is still from the automobile industry. Several of the leading Detroit motor car builders now expect to keep operating at about the present capacity during September, and are buying steel to cover their requirements. The Ford Motor Co. has placed 2500 tons of light plates with a Youngstown district mill, and is understood to have bought the same tonnages from another mill. There are signs of increasing activity on the part of some agricultural implement manufacturers, but one farm tractor manufacturer has curtailed production somewhat. The demand for plates has improved and the Otis Steel Co. is operating its Lakeside plant at full capacity this week. There is considerable irregularity in plate prices but price cutting is less pronounced on structural shapes, although a desirable order would probably bring out a 1.75c. quotation. The 1.75c. price on soft steel bars is being quite generally maintained. On plates 1.75c. has become the fairly well established price, but there are apparently authentic reports of quotations as low as 1.65c. for desirable orders. A Cleveland manufacturer has placed 600 tons of plates, shapes and structural material for a coal handling plant for Duluth. This inquiry brought out a 1.75c. quotation for all the material, but was placed at a slightly higher price before the lower price appeared. An inquiry is pending on 675 tons of plates for stills for the Standard Oil Co. This company has placed 133 tons of shapes and plates. Whitehead & Kales, Detroit, has taken the contract for the municipal car barns in that city, and an office building and shops for this railroad system, requiring 1500 tons, will be placed shortly. An Indiana interest is inquiring for 500 tons of structural material and 1200 tons of plates, presumably for Ohio River boats.

Sheets.—Demand shows an improvement and manufacturers report a broadening in the market in that they are getting orders from some consumers who have not been buyers for months. Orders are mostly for small lots for early requirements. On blue annealed sheets quotations range from 2.25c. to 2.40c. Black sheets are generally quoted at 3c., although a 2.85c. price is being named. Automobile body sheets are being quoted at 4.70c. for No. 28 gage.

Warehouse Business.—Local jobbers report some improvement in warehouse business and August sales will show a fair gain over July.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 5c.; No. 10 blue annealed sheets, 3.25c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Bolts, Nuts and Rivets.—Bolt, nut and rivet makers believe that a turn for the better has come. Prices are still somewhat irregular. The demand for rivets for car repair and oil country work has improved and the leading local producer increased operations this week to nearly full capacity. The Navy Department has reinstated an order for 1500 tons of rivets taken by this plant but held up several months ago. Most sales are being made at 2.50c. for structural and 2.60c. for boiler rivets, but these prices are being shaded $1 a ton for large orders.

Old Material.—The market is firm at the recent advance and there is a fair volume of inquiry from dealers who either have orders to fill or want to make speculative purchases. Several Valley mills have been buying scrap recently and one Youngstown consumer is reported to have made an additional purchase of cast borings and compressed steel the past week. These grades and heavy melting steel and turnings are the most active.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Philadelphia

PHILADELPHIA, Aug. 23.

With the closing of a few tonnages of foundry iron on the basis of $19, Eastern furnace, the foundry iron market is on a firmer basis, the minimum for No. 2 plain iron now being $19.50, furnace, while No. 2X is quoted at $20. One or two furnaces are naming $20 and $20.50 on these grades. Eastern Pennsylvania furnace operators are apparently determined to take no more business below these prices, but are willing to sell for delivery over the remainder of the year, a factor which has caused a number of buyers to close for practically their entire requirements for the last four months.

Few inquiries of importance for steel are being received by the mills, with the result that prices remain untested and virtually unchanged. Plates are available at 1.70c. to 1.75c., Pittsburgh; shapes are fairly firm at 1.85c., though sizable projects might bring concessions; steel bars are firm at 1.75c.; bar iron is off $1 a ton at 1.65c., Pittsburgh; sheets are weak, the minimum prices now appearing to be 2.25c. for blue annealed, 2.90c. for black and 3.75c. for galvanized, Pittsburgh; stock tin plate is offered at $4.50; bolts, nuts and rivets continue irregular and weak, though one leading Eastern producer has virtually withdrawn from the market by advancing prices.

Buyers with definite projects in hand for which steel must eventually be purchased are withholding inquiries, making the explanation to mill representatives that they expect lower prices. The attitude of the mills seems to indicate that the initiative must come from the buyer; in other words, if lower prices are quoted it will be when definite tonnages invite more spirited competition.

Ferroalloys.—A British agent is reported to have received authorization to quote $60, seaboard, on imported ferromanganese. Domestic producers continue to quote $70, delivered, but will probably meet competition.

Pig Iron.—Several thousand tons of foundry iron has been sold within the past week, but these transactions were at prices quoted more than a week ago. Following the price advance of Eastern furnaces, a smaller volume of business has been done at the higher quotations and there is comparatively little business pending. Notable among the week's sales were two lots of about 3000 tons each to the Whitin Machine Works, Whitinsville, Mass., and to the Florence Iron Works, Philadelphia. Both of these transactions were on the basis of $19, furnace, for No. 2 plain iron. Other smaller lots, including one of 800 tons bought by the Thatcher Furnace Co., New York, and one of 1500 tons bought by the Richardson & Boynton Co., New York, make up a fairly good week for this market. The bulk of this business was booked by one furnace company, whose prices are now $19.50, furnace, for No. 2 plain and $20, furnace, for No. 2X. One or two eastern Pennsylvania furnaces are quoting $20 for No. 2 plain and $20.50 for No. 2X. Apparently it would now be difficult to buy foundry iron below $19.50, base. Reports of lower prices emanate usually from buyers and upon being traced are found to relate to quotations which were made a week or ten days ago. Whatever the future may bring forth, it is quite certain that the local pig iron market is now on the firmest basis it has experienced this year. With the larger business of the past few weeks the few furnaces now in blast in this district find themselves in a fairly comfortable position and it is the expectation of their operators that consumption will continue to exceed the output, which is exceedingly small. There is a considerable tonnage of iron on furnace banks, but the owner of the largest quantity shows no disposition to throw this upon the market at lower than the prevailing market prices, but on the contrary is seemingly anxious to obtain all that the market will afford. There seems no likelihood that additional merchant furnaces will go into blast until market prices have ascended above the cost line and until business has expanded sufficiently to assure them of a backlog upon which to start operations. Our quotations for foundry iron show an advance of 50c. per ton over the prices of last week.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.75 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.24 to 29.74
Basic deliv. eastern Pa.	19.00
Gray forge	20.00 to 21.00
Malleable	20.00 to 21.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Plates.—The demand continues light and prices are stationary. While some mills continue to quote 1.85c., Pittsburgh, plates are available at 1.70c. to 1.75c., Pittsburgh, and these prices may be more nearly regarded as the market on sizable lots than the higher figure. On small lots 1.85c. has been obtained.

Structural Material.—Current low prices on fabricated work have led to the presumption that prices on plain material have been made below 1.85c., Pittsburgh, but there is so little open competition owing to the scarcity of projects that definite information to this effect is lacking. One Eastern mill is credited with quotations on a mill basis which figure back $2 or $3 a ton below the 1.85c. Pittsburgh basis, but generally the price situation on shapes appears to be firmer than on plates. Some mill representatives declare their willingness to make slight concessions on sizable tonnages. A municipal pier at the foot of Chestnut Street, now being figured upon, involves about 500 tons of shapes.

Bars.—Steel bars continue firm at 1.75c., Pittsburgh. Apparently buyers have not found it easy to shade this price except, perhaps, on rerolled material for concrete work. Bar iron is weaker and can be had at 1.65c. to 1.75c., Pittsburgh, according to the specification.

Sheets and Tin Plates.—While the nominal quotations on sheets are 2.40c. for blue annealed, 3c. for black and 4c. for galvanized, Pittsburgh, these prices are being quite freely cut on desirable lots. The minimum prices appear to be 2.25c. on blue annealed, 2.90c. on black and 3.75c. on galvanized. Production tin plate continues to be quoted at $5.25 per base box, but stock tin plate is being sold at $4.50.

Bolts, Nuts and Rivets.—Prices continue weak, some of the current prices, it is stated, being below cost. One of the principal Eastern makers has advanced bolts to the basis of 60 and 10 per cent off list, which is equivalent to a withdrawal from the market as lower prices are being made by competitors.

Old Material.—The belief of scrap brokers and dealers that prices of old material are at the bottom is borne out by the rise in price which occurs with any demand however slight. Within the past week buying of blast furnace borings and turnings forced the price up 50c. a ton. Rerolling rails and carwheels have sold at slightly higher prices than quoted a week ago. Heavy melting steel is still to be had at $11.50, though some brokers say they would not sell below $12 or $12.50. In the past few weeks there have been more advances than declines despite the dullness of business. We quote for delivery at consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 8.50
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for rolling mills)	9.50 to 10.00
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 17.50
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

INTEREST IN GERMAN MATERIAL

Nails, Wire and Spiegeleisen Quoted at Competitive Prices New York—Japan Continues Active

NEW YORK, Aug. 23.—Transactions at present are still confined to Far Eastern markets. There is evident a rapidly increasing interest in German iron and steel by consumers in the United States, who are obtaining from German mill representatives in New York quotations and terms of delivery on such materials as blue annealed sheets, structural and ship rivets, machine bolts, wire nails, plain and barbed wire, bars and similar products. In one case negotiations are in progress for the purchase of about 28,000 kegs (133-lb. kegs) of wire nails, which it is said may be put down in New York at about $2.75 per keg or better. Galvanized wire can be delivered, c.i.f. New York, at 2.75c. per lb. Sheets, however, are not a profitable importation at present. The best possible price on galvanized sheets of Belgian origin at present is about 4.80c. per lb., c.i.f. New York, which cannot compete with the domestic quotations.

German foundry iron has shown another decrease and can now be obtained for export at $15 per ton, f.o.b. Hamburg, which price, however, is not sufficiently low to import it profitably for American consumption. German spiegeleisen, 45 to 50 per cent, may prove marketable here, as it can now be put down in New York or other Atlantic ports at about $60 per ton, against the domestic price of $65 to $70 per ton. Even better than $60 could probably be done on a large tonnage.

German Prices in the Orient

To Oriental markets German prices prevent anything like American competition on a price basis. The galvanized wire offered at 2.75c. per lb., New York, is quoted to the Far East as low as 2.72c. per lb., c.i.f. Dairen, Manchuria, and wire nails, 133 lb. to the keg, are offered to the Orient at about $3.80 per keg. A recent sale of 535 tons of soft steel bars to Japan, which was handled by a New York exporter, resulted in the bars being delivered, c.i.f. Japanese port from Germany, at a price better than $45 per ton.

A lot of 500 tons of reinforcing bars for a building project in Osaka, Japan, has been placed with an American mill through the New York office of a large Japanese export house. Sheet buying continues to lead in exports to Japan. There is some interest also in tin plate, one inquiry being in the market for about 1500 base boxes. Copper buying is also beginning to show signs of revival despite the recent cessation of purchases caused by the temporary ban on imports for minting purposes, issued by the Chinese Government for political reasons. The new buying is largely of cathode copper, which will be used in wire drawing, the wire to be used in the various hydro-electric projects in the Far East. One exporter has closed on a total of about 2000 tons of cathode copper in the past fortnight.

Oriental Railroad Orders to Belgium

Keen competition is not entirely confined to German sellers in the Oriental markets. On the recent inquiry issued by the Association of Chinese Bankers, calling for 41 locomotives of various types, 200 covered freight cars and 40 open cars, only five of the locomotives (2 prairie type and 3 Pacific type) were placed with American locomotive builders. The remainder of the locomotives and cars went to Belgium. As an evidence of Belgian bidding on rails, a recent inquiry for 300 tons of 40-lb. basic Bessemer rails brought out a price of £10 12s. ($38.70), f.o.b. Antwerp, bid by the Ougree-Mayihaye works, Belgium, while Wendel & Co., Lorraine, submitted a bid of £8 4s. 10d. ($30.10) per ton, f.o.b. Antwerp, on a tonnage of 85-lb. Bessemer rails.

Some small orders of light rails for Japan have recently been placed with American mills and there is an inquiry still in the market for about 700 tons of 20-lb., 25-lb. and 35-lb. rails for Japan. Evidently a fairly large volume of inquiries is being withheld by Japanese buyers in anticipation of still lower prices here. With a clarification of the price situation, some exporters look for renewed buying from the Far East. A large Japanese export house in Japan recently obtained from its European branch a bid of £12 per ton, c.i.f. Chinese port, on the 15,000 tons of 85-lb. rails inquired for by the Pekin-Mukden railroad, but did not submit this quotation because of unsatisfactory financial conditions that would have been involved in the contract with the railroad.

Although China is generally considered as potentially an American market, the recent report of the British customs service shows that in 1920, 44 per cent of the imports and 39 per cent of the exports were British, while the American exports and imports were 18 per cent and 12 per cent and the Japanese 29 per cent and 26 per cent. This shows an increase of British imports of 35 per cent over 1913.

The Imperial Japanese Government recently purchased two 62-ton electric freight locomotives, totaling about $150,000. The locomotives, which are of a box cab, narrow gage type, will operate on the main lines of the Government railroads. They are equipped with four 250-hp. motors each, and are being built by the Westinghouse Electric & Mfg. Co., East Pittsburgh.

The Argentine Minister of Public Works has requested new tenders on 70 freight cars, broad gage, 40 tons capacity, for use on the port railroads, according to a cable to the Bureau of Foreign and Domestic Commerce. Bidding will close Sept. 2. Either the minister of public works or the director general of railroads (Direccion General de Ferrocarriles) may be addressed for specifications at Casa Gobierno, Buenos Aires, Argentine.

Adolfo Vazquez, Andres Mellado 19, Malaga, Spain, wishes communication with a reliable firm to represent him in the United States in the sale of various minerals, oxide of iron, etc.

The contract for the erection of a 112-mile high tension electric line between Victoria Falls and Melbourne, Australia, has been awarded to Milliken Brothers Mfg. Co., New York. The contract, which involves about £75,000 ($273,750), calls for the erection of 634 steel towers, over which a current of 132,000 volts will be carried. The contract was obtained in competition with British, German and Australian companies. This company reports contracts under way in Burma, South Africa and Norway.

British Iron and Steel Market

More Iron Being Made—Steel Prices Cut to Meet Continent—Wages Going Down

(*By Cable*)

LONDON, ENGLAND, Aug. 23.

Eleven Cleveland blast furnaces are now in blast. Producers are asking purchasers of No. 3 G. M. B. to take equal quantities of No. 4 foundry iron at a combined price of £6 12½s. ($24.25). There is practically no demand, however, owing to the cheapness of Continental offerings. Luxemburg basic pig iron is being sold at £4 5s. ($15.56) c.i.f. Tees. Hematite makers are moderately sold and less disposed to cut export quotations.

There is a small reduction in British home trade steel prices, but these are still far above Continental figures. German billets are being sold at £6 12½s. ($24.25) f.o.b., on the basis of shipments in five weeks. German wire rods are being sold at £8 10s. ($31.11) f.o.b. for October and November shipment. German plates are being sold at £7 15s. (1.27c. per lb.) f.o.b. for October shipment. German steel strip is quoted at £11 10s. (1.88c. per lb.) f.o.b., for shipment in 18 weeks.

French 2-in. billets are being sold at £6 8½s. ($23.52) f.o.b., and Luxemburg billets at £6 10s. ($23.79) c.i.f. Newport. Australia is buying fair supplies of Belgian and Luxemburg steel, owing to the prohibition against the importation of German material.

Settlement of the ship joiners' strike has been made,

with an immediate wage reduction of 3s. (55c.), and with further reductions to go into effect in October and December. Sheffield steel furnacemen's wages have been reduced 17½ per cent.

Tin plates are quiet after the revival of demand from the Far East. Business is being done at 23s. ($4.21) f.o.b. for September and October. Some business is reported in oil sizes. Quarter wasters are being sold at 17s. ($3.11) f.o.b. Some mills are starting up again, while others are closing after completing their rolling programs. The Welsh output is about 30 per cent of normal. Small sales are reported of galvanized sheets to India, at around £21 (3.43c. per lb.) f.o.b., but there is little demand in other markets. Belgium is quoting £11 10s. (1.88c. per lb.) f.o.b. for 18-gage black sheets.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.66 per £1 as follows:

Durham coke, at ovens	£1 15	$6.40	
Cleveland basic	7 7½ & £7 10*	26.99	& $27.45
Cleveland No. 1 foundry	7 0	25.62	
Cleveland No. 3 foundry	6 15	24.70	
Cleveland No. 4 foundry	6 10	23.79	
Cleveland No. 4 forge	5 17½	21.50	
Hematite	7 0*	25.62	
East Coast mixed	8 0 & 7 15*	29.28	& 28.36
Ferromanganese	18 0 & 14 0*	65.88	& 51.24
Rails, 60 lb. and up	10 10 to 14 0	38.43 to	51.24
Billets	8 0 to 8 10	29.28 to	31.11
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.28 to	31.11
Tin plate base box	1 2½ to 1 4½	4.12 to	4.48
		C. per lb.	
Ship plates	14 0	2.29	
Boiler plates	19 0 to 20 0	3.10 to	3.27
Tees	14 0 to 14 10	2.29 to	2.37
Channels	13 5 to 13 15	2.16 to	2.25
Beams	13 0 to 13 10	2.12 to	2.21
Round bars, ¾ to 3 in.	13 0 to 13 10	2.12 to	2.21
Galvanized sheets, 24 g.	21 0 to 21 10	3.43 to	3.51
Black sheets	17 0	2.78	
Steel hoops	17 0	2.78	
Cold rolled steel strip, 20 g.	26 10	4.33	

*Export price.

Keen Competition in Pig Iron from the Continent—Resumption of Plants Slow

LONDON, ENGLAND, Aug. 11.—There is no marked improvement in general trade conditions. Prices are gradually getting down to a more reasonable basis on which this country will be in a better position to compete for overseas trade. Labor is settling down and accepting the inevitable in reduced wages, and the necessity for work, production and reasonable prices are apparently being realized.

The signs apparent recently of an awakening of business in the East are further confirmed, and inquiries and orders for various material are appearing. Orders have been coming in for galvanized sheets, for example, from both India and South America. At the same time it is realized that it will probably be a long time before trade really recovers to anything like normal conditions here.

Up to the present the pig iron markets have been extremely dull. Demand was not particularly good; continental competition was keen, and in view of the high price of fuel, ironmasters here saw little object in starting their works when they could not possibly produce iron at a competitive price. This is illustrated by the fact that the large plant of the Staveley Coal & Iron Co. is out of commission, and there is no output of coke, by-products or pig iron. Some of the foundries, it is understood, have been kept going, but only because Belgian pig iron could be bought, and a managing director stated that to-day labor alone on a ton of pig iron costs £4 15s., while it is possible to buy iron from Belgium at £5 17s. delivered. In addition, the Belgians are working longer hours. He further stated that if the company started its furnaces they would lose 15s. per ton on all coke produced, and between £2 to £3 per ton on pig iron.

A step has now been taken, however, toward getting the cost of production of both pig iron and steel down, a reduction of 15s. per ton having been made in Midland furnace coke. This makes the new quotation 30s. per ton at the ovens. At the same time a decrease of 8s. per ton in the price of Welsh coal is reported.

While export prices here are being shaded, there is no doubt that the bulk of the business is going to the continent. Indeed, German bar makers seem to have booked themselves up so well that they are now less keen sellers, and 10 to 12 weeks are required for delivery. Belgian prices meanwhile are high and, owing to the scarcity of orders, works are in some cases only working part time. The bulk of the business in finished continental material is for export, home buying in this country still being dull.

There is nothing new in the shipbuilding situation. There is still a fair amount of work on hand, but new orders are few. It is interesting to note that the firm of Sir W. G. Armstrong Whitworth & Co. state that on March 22, this year, their output had reached 3,000,000 tons of shipping. The company has now completed 1000 vessels, of which 800 are passenger and merchant ships.

GERMAN PRICES STRONG

Export Business Continues to Increase Particularly with Holland and Scandinavia—Upper Silesia Buys

(By Aerial Mail to London)

BERLIN, GERMANY, Aug. 10.—With the extraordinary rise in prices during the past fortnight consumers have adopted a more reticent attitude and jobbers, on the contrary, are buying up large stocks in anticipation of further advances. Consumers complain that while prices during the past months have been on a rather low level, the recent feverish advances are not justified by prevailing conditions.

Prices continued strong throughout the past week, and in some instances further advances were registered. In the pig iron market the reduced prices for French and Luxemburg iron could not keep pace with the depreciation of the mark. Export business is increasing, rolled material, especially bars, being particularly in demand from Holland and Scandinavian countries. Semi-finished material has improved, but the pipe market is weaker with the exception of boiler tubes. The wire market reports increasing demand with prices tending upward.

Rather encouraging reports are coming in from the Upper Silesian market, where comparative order has been restored and customers are beginning to place orders. Although regular railroad service has been interrupted for two months, production has continued on a small scale and enormous stocks have accumulated which are being cleared off with prices rapidly recovering and few concessions.

Quotations are as follows, per metric ton:

	Marks	(At 1.14c.)
Bar iron	2050	$23.37
Structural shapes	2000	22.80
Tees and channels	2200	25.08
Squares	2250	25.65
Flats and angles	2200	25.08
Concrete bars	1950	22.23
Hoop iron, non-punched material	3500	39.90
Rails, heavy	2400	27.36
Mine rails, including fishplates	2000	22.80
Sheets, heavy	1900	21.66
Sheets, medium	1960	22.34
Sheets, black, according to gage	3100-3400	$35.34 to 38.76
Sheets, double, planished for stamping	4000-4200	45.60 to 47.88
Sheets, galvanized, according to gage	3000-6000	34.20 to 68.40
Plates, light	2300	26.22
Sheet bars	1500-1700	17.10 to 19.38
Billets, open-hearth	1680	19.15
Billets, basic	1550	17.67
Wire rods	2050	23.37

	Marks	Cents per Lb.
Wire nails, per 100 kg	270	1.4
Wire, galvanized, per 100 kg	290	1.5
Rivet and bolt stock, per 100 kg	250	1.26
Barbed wire, closely spaced, per 100 kg	320	1.66

Pipe and Boiler Tubes

	Marks per Metre	Cents per Ft.
Boiler tubes, 2⅜ in., per metre	25	8.7
Boiler tubes, 4 in., per metre	75	26.1
Cast iron pipe and sockets, 1-ft. dia	240	83.5
Gas pipes, ¾ in., per metre	7.30	2.5
Gas pipes, 1¼ in., per metre	13.25	4.6
Gas pipes, ⅜ in., galvanized, per metre	6.90	2.4
Gas pipes, 1 in., galvanized, per metre	15.50	5.4

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.80c. to 1.85c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.35 to $2.50
Large boiler rivets.....2.45 to 2.60
Small rivets ....65, 10, 10 and 5 to 70, 10 and 10 per cent off list
Machine bolts, small, rolled threads, 70 and 7½ to 70 and 10 per cent off list
Machine bolts, small, cut threads, 65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer, 65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..65 and 10 per cent off list
Cut threads .....60 and 10 per cent off list
Longer and larger sizes.....60 and 10 per cent off list
Lag bolts .....70 and 5 to 70 and 10 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60 and 5 per cent off list
Larger and longer sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80 and 10 per cent off list
Stove bolts in bulk.....80, 10 and 2½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $42; chain rods, $42; screw stock rods, $47; rivet and bolt rods and other rods of that character, $42; high carbon rods, $50 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.50 to $2.60 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel

1¾ in.	21½
2 to 2¼ in.	36
2½ to 3 in.	47
3¼ to 13 in.	52

Charcoal Iron

1½ in.	List
1¾ to 1⅞ in.	10
2 to 2¼ in.	20
2½ to 3 in.	25
3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15–2.30	Nos. 11 and 12	2.35–2.50
Nos. 9 and 10 (base)	2.25–2.40	Nos. 13 and 14	2.45–2.60
		Nos. 15 and 16	2.55–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45–2.70	No. 28 (base)	2.75–3.00
Nos. 22 to 24	2.50–2.75	No. 29	2.85–3.10
Nos. 25 and 26	2.65–2.90	No. 30	2.95–3.20
No. 27	2.70–2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75–3.00	Nos. 25 and 26	3.45–3.70
Nos. 12 to 14	2.85–3.10	No. 27	3.60–3.85
Nos. 15 and 16	3.00–3.25	No. 28 (base)	3.75–4.00
Nos. 17 to 21	3.15–3.40	No. 29	4.00–4.25
Nos. 22 to 24	3.30–3.55	No. 30	4.25–4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 17 to 21	2.60–2.85	No. 29	2.80–3.05
Nos. 22 to 24	2.65–2.90	No. 30	2.80–3.05
Nos. 25 to 27	2.70–2.95	Nos. 30½ and 31	2.85–3.10

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Aug.	Lake	Electro-lytic	New York	New York	St. Louis	New York	St. Louis
17	12.00	11.75	25.62½	4.40	4.25	4.70	4.20
18	12.00	11.75	25.75	4.40	4.25	4.70	4.20
19	12.00	11.75	26.00	4.40	4.25	4.70	4.20
20	12.00	11.75	.....	4.40	4.25	4.70	4.20
22	12.00	11.75	26.00	4.40	4.25	4.67½	4.17½
23	12.00	11.75	26.12½	4.40	4.25	4.67½	4.17½

New York

NEW YORK, Aug. 23.

The markets are prcatically all marking time with demand light and prices unchanged. Buying of copper does not improve. Transactions in tin have been of good proportions. The lead market is very quiet but exceedingly firm. There is no improvement in the demand for zinc and prices have eased slightly.

Copper.—There is practically no change in the general situation, some of the large producers still remaining out of the market, while two or three others are taking such business as is offered at 11.75c., New York, or 12c., delivered, for early delivery. While there have been a few small sales, made slightly below this level, the foregoing quotations are regarded as the minimum for any substantial business. Domestic demand is light and foreign demand is not much better, although Japan has been a consistent buyer to the extent of several thousand tons in the last two or three weeks. Demand for Lake copper is light and prices are nominal.

Tin.—Importers of tin state that sales last week were exceedingly good, amounting to close to 500 tons future shipment Straits tin at advancing prices. On Wednesday, Aug. 17, 300 to 400 tons was sold, mostly to consumers, part of them located in the interior, but on the two following days the market was dull and nominal. On Saturday, however, about 100 tons is reported to have been sold, also future shipment metal. Spot Straits tin has been firm but neglected, with the quotation to-day at 26.12½c., New York. The market as a whole yesterday and to-day has been inactive and nominal. Prices in London to-day are about on a level with those reported a week ago. Arrivals thus far this month have been 1785 tons, with 3055 tons reported afloat.

Lead.—A fairly steady demand from consumers is reported by most sellers with prices firm. Exactly two months ago to-day the leading interest established its New York and St. Louis price at 4.40c., at which level it has continued until the present time. The outside market is on the same level in this market, but the metal can be purchased from independents at St. Louis at 4.25c.

Zinc.—The market continues extremely quiet and reports that some business has been done under the quotation which has prevailed for several weeks are confirmed. It develops that prime Western for early delivery is obtainable at as low as 4.17½c., St. Louis, or 4.67½c., New York, which we quote as the market.

Old Metals.—The market has quieted down again and business is practically impossible. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.50
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Antimony.—Wholesale lots for early delivery are still obtainable at 4.50c., New York, duty paid.

Aluminum.—The leading producer continues to quote 24.50c., f.o.b. plant, for wholesale lots of virgin metal, 98 to 99 per cent pure, for early delivery and the same grade from importers can be purchased as low at 19c. to 20c., New York, duty paid.

Chicago

AUG. 23.—The metals are very dull and copper and tin have weakened slightly. Old metal prices are unchanged. We quote Lake copper at 12.25c. to 12.50c. in carload lots; tin, 28.25c.; lead, 4.35c.; spelter, 4.30c.; antimony, 7.50c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 23.—In none of the non-ferrous metals is there any demand. Lead is quoted at 4.25c., car lots and zinc at 4.20c. We quote Lake copper, car lots, at 12.73½c. to 12.98½c.; tin, 26.86c.; antimony, 5.23½c. On old metals, we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Production and Shipments of Refractory Brick

PITTSBURGH, Aug. 22.—Figures of production and shipments of fire clay and silica brick for the month of July, and stocks on hand and unfilled orders as of July 31, have just been released by the Refractories Manufacturers' Association. The figures are compiled from reports of all manufacturers regardless of whether they are members of that association or not, and cover, as nearly as it is possible to do so, the entire industry. It is interesting to note that shipments and production of fire clay brick were identical during July, indicating that manufacturers finally have been able to make output conform to demand. Shipments of silica brick in July exceeded production by 1,825,000, this resulting in a reduction in the stocks on hand. The figures follow:

	Fire Clay Brick	Silica Brick
Production	31,893,750	2,555,000
Shipments	31,893,750	4,380,000
Stock on hand	207,900,000	57,870,000
Unfilled orders	38,981,250	16,060,000

Bureau of Standards Tests Canadian Meter Bar

One of Canada's official standards of length, a meter bar that had been calibrated at the International Bureau of Weights and Measures in Paris, has been in Washington at the Bureau of Standards where it was compared with the official length standards of this country.

The Canadian meter bar is made of invar, an alloy of nickel and steel that changes only slightly in length with variation in temperature. This bar has made the trip to Washington in previous years for comparison with the American standards, and the Topographic Survey Laboratory of Ottawa is now obtaining several other standard bars from the International Bureau so that they may be used in checking the accuracy of the rules, yardsticks, tapes, and other length-measuring instruments of that dominion.

Comparisons were made between the four platinum-iridium meter bars that are official standards of this country and the Canadian bar.

While only 43.3c. of each $1 of railroad gross revenue went for railroad wages in 1917, 59.9c. was labor's toll in 1920.

PERSONAL

Allen G. Goldsmith, Milwaukee, who during the period of 1911-1917 was associated with the American Rolling Mill Co., Middletown, Ohio, in various capacities up to department manager, has been appointed to take charge of the western European division of the Bureau of Foreign and Domestic Commerce. He was educated in the public schools of Chicago and at Kenyon College. He has also studied in Berlin. From 1917-1919 he served in the army as second lieutenant, and finally as secretary of the general staff of the 83d division. On April 1, 1919, he was detailed to the American Relief Administration as executive officer, and later was appointed chief of the Roumanian mission with headquarters in Bucharest.

Chester Lloyd Jones, of Orange, N. J., has been appointed acting American Commercial Attache to Cuba, and will make his headquarters with General Crowder in Havana. This is the first time the Department of Commerce has been represented in Cuba, which is described as the best market for American goods in all of the Latin-American countries. Mr. Jones represented the Department of Commerce in Spain, as commercial attache, in 1919. He will devote his time in Cuba to the development of American trade. He has given considerable study to commercial conditions in Latin-American countries, and in 1920-21 was employed as trade advisor and director of C. Tennant Sons & Co., New York. His educational and training experience was obtained at the University of Wisconsin, the University of Pennsylvania, the University of Berlin and University of Madrid.

C. A. Ducharme, formerly with Republic Iron & Steel Co., is now associated with the iron and steel firm of J. Edward Grinfield-Coxwell, 40 Central Street, Boston, as sales agent.

William C. Reilly, general superintendent of the Youngstown Sheet & Tube Co., Youngstown, Ohio, has been selected by the provincial Government of Nova Scotia as its representative in arbitration proceedings with the Dominion Steel Co., involving settlement for steel used during the war aggregating $9,000,000. During the war, the Dominion Steel Co. erected a large plate mill at the request of the government and entered into a contract for plates for military purposes. When the armistice was signed the contract was half completed and the government having no further use for the plates, cancelled its contract. In the interim efforts have been made between the company and the Government of Nova Scotia to agree upon an amicable settlement, but without avail. Mr. Reilly has gone to Sydney, N. S., where the plate mill is located, to meet with representatives of the company.

M. L. Filley has joined with Barnard Eberlin, under the firm name of Filley & Eberlin, to act as district sales agents at 50 Church Street, New York, for the Superior Sheet Steel Co., Canton, Ohio. The firm will occupy the same offices Mr. Filley is now using as manager of the New York office of the American Zinc Products Co., maker of slab zinc and sheet zinc, Greencastle, Ind. Mr. Filley was for years Eastern sales representative of the Deforest Sheet & Tin Plate Co., Niles, Ohio, until it was sold to the Republic Iron & Steel Co. Mr. Eberlin was connected with the Merchant & Evans Co., New York, from 1910 to 1917, when he joined the United States Army, participating in the campaigns in France as a captain of infantry. On his return he rejoined the Merchant & Evans Co. as sales representative in Cleveland and vicinity. Mr. Eberlin will be associated with Mr. Filley in the New York office of the American Zinc Products Co., where Willard Fisher will continue to act as Eastern sales manager.

B. G. Dann, for the past four years connected with the engineering department of the Truscon Steel Co. in Youngstown, Ohio, and New York, has resigned to become manager of the New York office, 30 Church Street, of the Hendrick Manufacturing Co., maker of perforated metal screens, elevator buckets, general sheet and light structural work, and also light and heavy steel plate construction. He is a graduate of the engineering department of Lafayette College. B. G. Shotton is the manager of the Pittsburgh office of the Hendrick company, located in the Union Bank Building.

E. A. Woodworth, formerly railroad representative, Imperial Belting Co., Chicago, has resigned to take charge of southwestern territory for the United States Metallic Packing Co., Philadelphia, with headquarters at Chicago.

W. M. Dambach, designing and consulting engineer, formerly associated with Hazel-Atlas Glass Co., Wheeling, W. Va., has become affiliated with the Carlem Engineering Co., Keystone Bank, Pittsburgh, as vice-president. For a number of years he was assistant superintendent of construction of the Pittsburgh board of education.

J. W. Hocking, secretary Wheeling Steel Corporation, Wheeling, W. Va., who resigned recently, was secretary of the Whitaker-Glessner Co. prior to the combination of that company with the Wheeling Steel & Iron Co. and LaBelle Iron Works, into the Wheeling Steel Corporation.

Clarence T. Warner, general manager of the Michigan State Investment Co., Benton Harbor, Mich., has resigned to become president of the new Warner Auto Equipment Co., Benton Harbor, which will manufacture a new shock absorber. This article is now being manufactured in the plant of the National Axle Co., Benton Harbor, but the company plans soon to obtain its own factory.

J. T. Kane has been appointed warehouse superintendent for the Sheet Metal Mfg. Co., Youngstown, Ohio, which recently completed a new warehouse at the westerly city limits of Youngstown, near the plate mills of the Brier Hill Steel Co. He was formerly superintendent in charge of shipping for the Trumbull Steel Co., Warren, Ohio.

John C. Robinson, after 30 years' continuous service as manager of New England sales for William Wharton, Jr., & Co., Inc., has resigned and will devote himself to his interests in the firm of Harrington, Robinson & Co. of Boston. The office of the Taylor-Wharton Iron & Steel Co. and of William Wharton, Jr., & Co., Inc., in the future will be located at room 235, Boston Safe Deposit Building, 201 Devonshire Street, in charge of Walter H. Allen.

Fall Meeting of Iron and Steel Institute in Paris

The fall meeting of the Iron and Steel Institute will be held at the headquarters of the Comité des Forges de France, 7, Rue de Madrid, Paris (in close proximity with the Gare St. Lazare), on Monday and Tuesday, Sept. 5 and 6. At the conclusion of the meeting alternative visits have been arranged to works in Lorraine, in Burgundy and in Normandy. The following is the list of papers which it is expected will be submitted:

"Damascene Steel," by N. T. Belaiew, C. B.

"An Experimental Investigation of the Mechanical Properties of Steels at High Temperatures," by E. L. Dupuy.

"The Situation of the French Metallurgical Industry in the North and in the East of France; Its Destruction and Reconstruction," by L. Guillet.

"Does the Critical Point Depend on the Strength of the Magnetizing Field?" by K. Honda.

"On Constituents Found in Tungsten and Molybdenum Steels," by A. Portevin.

"A Contribution to the Study of Coalescence," by A. Portevin and V. Bernard.

"On the Characteristic Curves of the Heat Treatment of Steels," by A. Portevin and P. Chevenard.

"Iron Ore Deposits of Eastern and Western France," by P. Nicou.

"An Investigation of Various Forging Operations Carried Out Under Hydraulic Presses," Part II, by E. Schneider.

"Manufacture of Shells in Canada During the War, 1914-1918," by Capt. H. W. B. Swabey, C.B., and R. Genders, M.B.E.

OBITUARY

ROBERT TEN EYCK LOZIER, aged 53, consulting engineer, died of pneumonia on Aug. 21 at the Post Graduate Hospital, New York. He was a pioneer in the development of electrical power, entering the employ of Thomas A. Edison at the age of 14. He had taken out many electrical patents and for the last fifteen years had been a consulting engineer. During the war he was in charge of hydroplane construction at the League Island Navy Yard, Philadelphia. He was a member of the Engineers Club of New York, a Fellow of the American Institute of Electrical Engineers and a life member and past president of the New York Electrical Society.

ALFRED D. BAUER, president Technical Advertising Service, Inc., New York, died from injuries received in an automobile accident at Stamford, Conn., on Aug. 13. For 19 years he had been connected with the advertising profession and before organizing the Technical Advertising Service he was advertising manager of *Chemical and Metallurgical Engineering*. He was born in Bremen, Germany, 42 years ago and was a graduate of the University of Baden. Mr. Bauer was among the first to recognize the possibilities of an advertising service devoted entirely to engineering products and carried on by engineers and merchandising experts.

JAMES HENRY TOWER, president and director James H. Tower Iron Works, Providence, R. I., fabricators, died Aug. 13 at his home in Wakefield, R. I., after a long illness. He was born in Providence, May 23, 1846, and was graduated from Brown University of that city. Early in his life he was active in city politics. He is survived by a daughter, Mrs. Benjamin P. Harris, and two sons, Louis P. and James Henry Tower.

WALTER N. LOWELL, superintendent Waterbury Brass Co., Waterbury, Conn., who died at his home, 166 Bunker Hill Street, following a long illness, was superintendent of the Waterbury Brass Co. for thirty years. He was born at New Bedford, Mass, July 22, 1852, and previously was associated with the Pratt & Whitney Co., Hartford, Conn.

CHANDLER ROBBINS, formerly president Robbins & Myers Co., Springfield, Ohio, died in a hospital at Baltimore, Md., on Aug. 18, of pulmonary embolism. He was 77 years old and had been ill only 10 days.

WALLACE D. GLIDDEN, assistant treasurer the Kewanee Boiler Co., Kewanee, Ill., died suddenly at Boulder Junction, Wis., on Aug. 13.

WILLIAM HENRY WARRINGTON, president the Vulcan Iron Works, Chicago, died in that city on Aug. 11, at the age of 75.

JOHN KRYL, president Pilsen Foundry & Machine Works, Chicago, died in that city on Aug. 15, at the age of 53.

Merger of Massillon Companies

The merger of the Massillon Rolling Mill Co. and National Pressed Steel Co., Massillon, Ohio, with the Central Steel Co., Massillon, was approved at a meeting of the stockholders of the three companies Aug. 18. The combination will be effected in accordance with the terms recently agreed upon by the boards of directors of the three companies. The merger involves about $18,000,000, as represented by the combined capital stock of the three companies. R. E. Bebb, president of the Central Steel Co., will be at the head of the combined organization.

The last issue of the *Commonwealther*, the plant publication of the Commonwealth Steel Co., reports an address of President Clarence H. Howard to the company's employees describing his European trip of the early summer. Mr. Howard was a delegate to the International Chamber of Commerce.

Reduction in Steel Corporation Wages

Chairman Elbert H. Gary of the United States Steel Corporation announced on Friday, Aug. 19, a reduction in day labor rates from 37 cents to 30 cents an hour, effective Monday, Aug. 29.

This wage cut is equivalent to a reduction of nearly 20 per cent from the rate established July 16 when time and one-half for work over 8 hr. per day was abolished although no change in the 37 cents an hour rate was made at that time. Other wages and salaries will be equitably adjusted to the new rate for day labor. Judge Gary's statement follows:

"In view of the prevailing low selling prices of steel as compared to costs of production, it is necessary to make reductions in wage rates, and therefore we will recommend to subsidiary companies that the general rates of day labor be decreased to 30 cents per hour, to become effective on Monday, Aug. 29, and that other wages and salaries be equitably adjusted."

Following table shows the wages of common labor after each advance or decrease in wages by the United States Steel Corporation, the percentage of each advance or decease, and the cumulative percentage of each advance or decrease over the 1915 rate:

Date	Wages 10 Hr.	Date	Wages 10 Hr.
1915	$2.00	Aug. 1, 1918	4.20
Feb. 1, 1916	2.20	Oct. 1, 1918	*4.62
May 1, 1916	2.50	Feb. 1, 1920	5.08
Dec. 15, 1916	2.75	May 16, 1921	†4.05
May 1, 1917	3.00	July 16, 1921	†3.70
Oct. 1, 1917	3.30	Aug. 29, 1921	3.00
Apr. 16, 1918	3.80		

*Eight-hour basic day established and time and one-half paid for overtime.
†Approximated.

Pittsburgh View of Wage Cut

PITTSBURGH, Aug. 22.—Announcement by the Steel Corporation of its intention to reduce the wages and salaries came as no great surprise to the trade here, as it had been figured that eventually the corporation must come down to the independent company schedules. Although higher efficiency is claimed for corporation plants than for a number of the independents, it was quite generally believed that this condition hardly would overcome the difference between Steel Corporation and independent scales, with the corporation meeting the independent selling prices. The belief is pretty general that present steel prices are as low as they can consistently go, barring a cut in cost in the shape of lower freight rates, and because of that feeling few are inclined to believe that the wage reduction will be productive of a formal downward revision of prices. The more common expression is that the corporation merely is matching wages to the selling prices it is obliged to accept in competition with independent companies.

No Wage Cuts Contemplated by Independents

YOUNGSTOWN, Aug. 23.—In normal times, about 6000 employees of the Carnegie Steel Co. in the Youngstown district would be affected by the wage reduction effective Aug. 29. The new common labor rate of 30c. an hour is the same as that paid by the independents since July 16.

Owing to the scarcity of employment, independents experienced no difficulty in getting workmen even at the lower rate. While a number of Eastern independents have reduced the day labor wage to 27c. an hour, no further cut is contemplated at present by independent interests in this district. In Canton, Ohio, a number of steel plants are paying 27c. per hr. Valley steel makers look for closer competition in prices from the leading interest as a result of the wage adjustment.

The Reeves Pulley Co., Columbus, Ind., has arranged with Manning, Maxwell & Moore, Inc., 119 West Fortieth Street, New York, whereby the latter assumes the exclusive agency for the Reeves variable speed transmission in the New York territory. Repair parts will be carried and transmissions of various sizes and classes as well as the Reeves wood split pulley will be kept in stock.

YOUNGSTOWN MARKET

August Bookings Exceed Those of Any of Four Preceding Months

Inasmuch as it was generally expected that improvement in the steel industry would be mixed with periods of recession, little surprise is expressed at indications of letting down in buying. James A. Campbell, president Youngstown Sheet & Tube Co., warns against over-optimism, although he believes September will prove a satisfactory month. Tonnage booked by Valley interests in August has exceeded that placed in any of the four previous months, and in some lines has exceeded purchases of any month this year. Severn P. Ker, president Sharon Steel Hoop Co., anticipates a bigger volume of business in September than in August and looks for general improvement.

While jobbing interests have been placing some tonnage, it has been largely against current requirements and there has been little effort to build up depleted or unbalanced stocks. Sheet buying is in smaller volume than has prevailed. Recent business placed with Valley producers involved upward of 1800 tons of black sheets, accepted at 2.90c. base, or 10c. per 100 lb. below the current market. The buyer is regarded as a careful student of the market and declares that sheets at 2.90c. are cheaper than they were at 1.75c. before the war. Other lots ranging from 50 to 200 tons have been placed with district interests, including tonnages for shipment to Japan. On the whole, the market is active, though buying is chiefly for small tonnages.

Inasmuch as shipments are being currently made from stock accumulations, not only in sheets, but in other finished commodities, prompt consignments are possible. Frequently a telegraphic order is filled the same day it is received. Because certain gages of sheets have been exhausted, some makers have been compelled to turn down business recently, especially in galvanized sheets, through inability to meet delivery requirements.

More inquiries are circulating through the trade for by-product coke, presaging more active blast furnace production. One such inquiry put out by the American Rolling Mill Co. calls for 14,000 tons of coke. A Cleveland interest is also in the market for coke for one of its furnaces, which has been idle all summer. A Valley interest reports the purchase of first-grade coking coal at $1.60.

Strengthening of the basic pig iron and the old materials markets has been one of the constructive developments of the past two weeks, say Valley steel makers. Scrap grades have generally firmed up an average of $1 per ton. An average quotation on basic iron is now $20, which compares with a recent low of $18, at which a number of 1000-ton lot purchases were made by the Sharon Steel Hoop Co. before it started its own furnace at Lowellville. Steelworks interests operating blast furnaces state there is firmer demand from the foundry trade than heretofore, and that foundry iron stocks have generally been reduced to low levels.

Plate buying is in sufficient volume to keep one of four mills in this district partially engaged. The price range is from 1.70c. to 1.80c. in the Valley, though makers in nearby districts are reported to have accepted tonnage at 1.60c. Most of the current business is from car repair concerns. Recent inquiries included one for 250 tons of plates for railroad car repair work, and 1500 tons of ½-in. plates for fabrication.

Sheet prices are still uncertain, the market ranging from 2.75c. to 3c. for black and 3.75c. to 4c. for galized, while blue annealed has dipped to 2.25c. and ranges up to 2.40c. Some makers contend that the 2.75c. price for black sheets is more attractive than the 3.75c. quotation for galvanized owing to the fact that galvanizing cost is more than 1c. per lb. Full finished sheets are firm with the principal maker in this territory at 4.70c. for 22-gage auto body stock, which is a differential over black of from 1.70c. to 1.90c., though 1.35c. is the recognized spread.

Sustained demand for strip steel is one of the bright features of the market in the Mahoning Valley, being sufficient to support production at an average rate of 50 to 60 per cent. Concessions from recent levels are more frequent, cold-rolled ranging from 3.85c. to 4c. and hot-rolled selling down to 2.25c., from 2.40c., base sizes. An inquiry before the trade this week called for four carloads. Most of the production is going to the automobile trade, though hardware manufacturers and makers of electrical appliances have likewise been seeking tonnage.

Pipe business has been accelerated due to activity of jobbers in filling up pipe stocks. Five of six buttweld furnaces of one interest have been fired, while the tube department of another maker has been operating at 50 per cent. Demand is usually in carload lots. There is little buying of oil country goods or line pipe and the usual discounts are being closely observed.

New business in tinplate is largely lacking with exception of scattered inquiries from oil companies. Regular customers are specifying slowly against existing contracts. Stock plate continues to be quoted at $4.75 per base box and production plate at $5.25.

PRE-WAR AND PRESENT PRICES

Steel as Low Today as in 1910-14, Considering Freight and Wage Advances

YOUNGSTOWN, OHIO, Aug. 23.—Prices of steel commodities, both finished and semi-finished, are as low as, or lower than, actual average prices during the five-year period 1910 to 1914 inclusive, considering the difference in production costs due to the higher freight charges and higher wages of to-day. The sales executive of an important independent producer in this city makes this statement as the result of a recent study. Transportation rates are from 100 to 115 per cent higher than they averaged during the five-year period.

Freight charges on iron ore from mines on the Mesabi range to Youngstown averaged $1.81 from 1910 to 1914, whereas the current freight rate is $2.93 for the same haul, plus war tax of $.0879 per ton, or a total of $3.01. Similarly, the freight rate on coke from the Connellsville district to the Mahoning Valley averaged $1.20 per ton in the five-year period, whereas the present charge is $2.60, including tax of 8c.

The present freight rate (with tax) of $1.55 per ton on coal from the Pittsburgh district to the Valleys compares with 70c. in 1910 to 1914. On limestone the freight rate from Hillsville to Youngstown, plus tax, amounts to 86.5c., as compared with 34.5c. The current carrying charge on coal per ton from the Connellsville district to Youngstown is $1.627, compared with 85c.; freight charges on ferromanganese from Philadelphia or Baltimore aggregate $6.44 per ton, which compares with $2.28 from Philadelphia to Youngstown during 1910-1914, and $2.08 from Baltimore.

Market prices also yield some interesting comparisons. The current quotation of $5.55 per ton for non-Bessemer Mesabi ore compares with an average price of $3.32 between 1910 and 1914. Connellsville coke at $2.75 to $3.25 compares with $2.01. Ferromanganese at $57.60 compares with an average for the five-year period of $48.36, while spiegeleisen at $27, the current market, compares with an average of $23.86.

The differences in semi-finished and finished steel complete the comparison. Black sheets, for instance, now quoted at 3c., Valley, averaged from 1.86c. to 2.23c. per lb. between 1910 and 1914; plates at 1.75c. to 1.80c., this month, compare with 1.32c., the five-year average; basic pig iron at $19 to $20, compares with $13.88 during 1910-1914; open-hearth billets at $30 compare with $23.18. Sheet bars, now ranging from $30 to $32, compare with an average price between 1910 and 1914 of $23.17.

During the five years in which the averages were taken, the common labor rate changed from 16c. per hr., which prevailed prior to May 1, 1910, to 19½c., or an average of 18.39c., calculated by months. This compares with the going rate of 30c. in the Valleys.

Considering the differences in freight rates and wages between the period 1910-1914 and the present, prices of steel products are to-day as low proportionately, it is contended, as in 1910-1914.

Machinery Markets and News of the Works

BETTER TONE

Some Markets Report More Inquiries for Machine Tools

Actual Orders Have Not Shown Much Improvement, but Sentiment Appears to Be More Cheerful

Without much actual change in the machine-tool situation so far as orders are concerned, a better tone and more cheerfulness is reported from some market centers, notably Chicago, Cincinnati and Boston.

In Chicago, where the bulk of the trade is handled by dealers with showrooms, there has been a noticeable increase in the number of callers. Mail inquiries have also been in greater number.

Cincinnati reports that inquiries appear to be more genuine; in fact, seem to indicate that the business will be closed in the immediate future. One inquiry that is looked for at Cincinnati is for the General Motors Co. plant at Dayton, Ohio. The Big Four Railroad list is still pending, but it is expected that it will be closed shortly.

A fair degree of interest in machine tools is shown by the automobile industry. Purchases consist mainly of single tools, but there is some evidence that motor car manufacturers are planning for continued and steady production.

The F. C. West Corporation has practically completed purchases of factory equipment, including machine tools, for a Minneapolis plant, the outlay being about $250,000. Many used machines and some re-sale tools still in their original crates were purchased. The corporation has issued another inquiry calling for 19 tools and 10 trucks.

There is a little activity in New England. Action on two school lists are expected soon. A textile machinery manufacturer is inquiring for three or four tools. A Fitchburg, Mass., company is asking for prices on miscellaneous used tools.

New York

NEW YORK, Aug. 23.

If business in machine tools is no better it can at least be said that it is no worse. There continues to be a small demand for single tools from scattered sources, but large inquiries are unknown. The Board of Education of the city of New York is understood to have selected a part of its list of about 20 tools for vocational training. The local trade is simply waiting and hoping and there is no indication as to when an improvement in demand may be expected.

The crane market, as far as overhead traveling cranes are concerned, is about as dull as it has been at any time. In locomotive crane inquiries, however, there is evidently some slightly increased activity, numerous inquiries being in the market particularly from contractors and construction companies. The total sales of nine crane builders during July amounted to only about $70,000, representing about 3 per cent of the capacity of their plants. George P. Coulter, 1713 Sansom Street, Philadelphia, is inquiring for a 5-ton and 10-ton, 35-ft. span, overhead traveling crane. Frazar & Co., 30 Church Street, New York, and Okura & Co., 30 Church Street, New York, are handling an inquiry from Japan for a 70-ton, short span, overhead traveling crane. W. R. Grace & Co., New York, have been receiving bids on a 5-ton hand-power crane for export to South America. The Erie Railroad purchasing agent at 50 Church Street, New York, is accepting quotations on an 8-ton hand-power crane for the Forest City Colliery, Forest City, Pa. Hodgson-Freck, Ltd., Montreal, has inquired for a 15-ton, crawl-tread locomotive crane.

Among recent sales are: Shepard Electric Crane & Hoist Co., two 7½-ton, 38-ft. 3½-in. span overhead traveling cranes to Davies & Thomas Co., Catasauqua, Pa. (another 7½-ton crane will probably be purchased later); Chisholm-Moore Mfg. Co., a 5-ton, 18-ft. span hand-power crane to the San Francisco Mines of Mexico, Parral, Mexico. The Chesapeake Iron Works recently sold three 3-ton pillar cranes to the Third Avenue Railroad, New York, instead of one as reported.

The Electro Thermo Co., 206 Broadway, New York, recently incorporated to make electrically operated household appliances, such as washing machines, will shortly be interested in obtaining prices and catalogs, according to Leo H. Strauss of the company, relative to sheet metal working machines, bending machines, punch presses, etc.

The Willart Instrument Co., 13 Rose Street, New Rochelle, N. Y., has plans under way for the erection of a new two-story factory at the foot of Hugenot Street, 70 x 250 ft., estimated to cost about $60,000. Construction will commence at an early date. George Ferrischild, 220 North Avenue, is architect; William Nelson is president.

The Cylent Flush Meter Mfg. Co., Brooklyn, has been incorporated with a capital of $100,000 by J. Harris, C. Rice and B. Weissman, Brooklyn, to manufacture water meters, parts, etc. The company is represented by M. Eichner, 1545-47 Broadway, New York.

The American Bar Lock Co., Brooklyn, has been incorporated with a capital of $75,000 by D. E. and L. B. Mulford, and C. H. Law, Brooklyn, to manufacture skylights and other metal products. The company is represented by Caldwell & Polhemus, 50 Church Street, New York.

The Board of Directors, Utica State Hospital, Utica, N. Y., will take bids at an early date for a new cold storage plant, 70 x 100 ft., estimated to cost about $65,000.

The Fibre Tire & Rubber Co., New York, has been incorporated with a capital of $100,000 by E. F. Stoeckle, M. N. Salmon and E. F. File, New York, to manufacture tires and other rubber products. It is represented by C. Foley, 38 Park Row.

Topping Brothers, 122 Chambers Street, New York, heavy and marine hardware products, have awarded contract to the White Construction Co., 95 Madison Avenue, for a four-story and basement, reinforced-concrete building at Varick and Vandam streets, to total about 67,000 sq. ft. of floor space. Foundation work will provide for the addition of three more stories at a later date.

Fire, Aug. 17, destroyed a number of industrial plants on the block bounded by Greenpoint Avenue, Diamond, Calyer and Newell streets, Brooklyn, including the Greenpoint Motor Co.; Alexander Koby, forge and machine shop; Davis Wood Turning Co.; Manhattan Show Case Co.; Lelberine Stone Co.; and the Universal Reed & Willow Co., with total loss, including equipment, estimated at $1,000,000.

The Bangert Electric Co., Jamaica, L. I., has been incorporated with a capital of $40,000 by W. A. and A. M. Vangert, and T. Breiling, to manufacture electrical specialties. John Adikes, 285 Fulton Street, Jamaica, represents the company.

The Oil Burning Installation Co., New York, has been incorporated with a capital of $125,000 by B. Alexander, E. A. Pierce and A. W. Levy, 60 Wall Street, to manufacture oil burning equipment.

The A. L. Nichols Mfg. Co., Poughkeepsie, N. Y., has filed notice of change of name to the Algonquin Electric Mfg. Corporation.

The William A. Zeidler Co., Locust Avenue and 136th Street, New York, manufacturer of machinery and parts, has leased a building at 135th Street and Third Avenue for a branch plant.

The Corinth Electric Light & Power Co., Corinth, N. Y., has been granted permission to build a new electric power plant.

The Summit Brass & Bronze Works, Inc., Hoboken, N. J., has been incorporated with a capital of $100,000 by Fred

Hausmann, N. J. Shapiro and Henry P. Mertel, 700 Madison Street, to manufacture electric fixtures, and other brass and bronze products.

The Board of Fire Commissioners, East Orange, N. J., William H. Wilson, president, will take bids up to 8 p. m., Sept. 6, for 5 miles of underground fire alarm cable.

Reorganization plans are under way by the Eastern Foundry Co., Jamesburg, N. J., specializing in the production of piano plates. New interests will assume active control, and additional capital will be placed in the business for general expansion.

The National Metal Products Co., Passaic, N. J., has been incorporated with a capital of $50,000 by C. S. and Myron L. Wells, and Albert S. Bray, 12 Lexington Avenue, to manufacture metal goods.

The T. B. Lewis Co., Newark, N. J., has been incorporated with a capital of $100,000 by Theodore B. and F. E. Lewis, and J. J. Maloney, Newark, to manufacture locks and safety locking devices. It is represented by Frederick N. Esher, 586 Newark Avenue, Jersey City, N. J.

The Tousek Engineering Corporation, Newark, N. J., has been incorporated with a capital of $100,000 by Emil A. Kern, Paul Bernath and Edward B. Tousek, 228 Jelliff Avenue, to manufacture electrical devices and equipment.

E. E. Steiner & Co., 20 Orange Street, Newark, have leased the one-story building at 2-16 Avenue C, at Harper Street, 60 x 130 ft., for the establishment of a new plant to manufacture portable ovens and other metal products.

The Detonating Toy Mfg. Co., Newark, N. J., has been chartered under State laws to manufacture mechanical and other toys. The incorporators are Christian and Joseph Mayer, and Charles A. Scheihing. The company is represented by Russel H. Scheihing, 261 Walnut Street.

The Van Dorn Steel Products Co., 324 William Street, Long Island City, N. Y., has acquired two one-story buildings, at 310 Coit Street, Irvington, N. J., for a branch plant. It is proposed to construct several additional floors.

The First International Mfg. Corporation, Newark, N. J., has been chartered under State laws to manufacture cans, containers and other metal products. The incorporators are Harry A. Knauss and Frank A. Rizollo. The registered office is at 277 Livingston Street.

New England

BOSTON, Aug. 22.

Sentiment among a majority of local machine-tool houses appears more cheerful, due to several inquiries for one or more new and used machines. These are largely from small metal-working concerns enjoying increased business or planning to place on the market products not heretofore made in the hope of keeping plants in operation. A few of the better known companies are also inquiring. A large textile machinery maker is asking quotations on three or four tools, including a six spindle heavy duty radial drill. The Cambridge Plumbing Supply Co. and the Corcoran Supply Co., Cambridge, Mass., and similar companies elsewhere contemplate purchases of pipe threading and cutting machinery. One local dealer reports an inquiry from Montreal covering a considerable quantity of small equipment.

It is intimated that the Manchester, N. H., school lists will be acted upon in the near future. The Lynn, Mass., school list has been materially cut and other municipalities are not showing any more action on their lists than heretofore. Quite a slump is noted in garage inquiries for metal-working equipment.

The Leighton Machine Co., Manchester, has bought a 30-in. lathe. The Vaughn Foundry Corporation, Norwich, Conn., is considering the manufacture of pipe fittings and is inquiring for equipment.

William A. Hardy & Sons, Fitchburg, Mass., brass screen plates for paper mills, are asking quotations on miscellaneous used machine tools. A Philadelphia dealer the past week has purchased considerable used equipment from a local dealer. A number of companies purchasing Government tools the past year or more are adapting these for work other than the machines were originally intended and inquiring on used parts. Otherwise the market for used equipment is without special feature.

A reduction of 20 per cent on South Bend lathes is announced. Prices on the leading makes of files have been reduced 10 per cent. Two leading New England manufacturers of machinists' small tools have issued new discount sheets showing a reduction of 10 per cent, which leaves a net result of only 10 per cent as contrasted with the 1915 cost to the consumer. That is, prices to the consumer to-day are but 10 per cent higher than in 1915, allowing for the list price advances made by manufacturers in July, 1919.

Instead of one 50-ton and one 10-ton crane for the Green Island, N. Y., Ford plant, Stone & Webster, Boston, are inquiring for one 40-ton and one 10-ton crane.

The Machinery Clearing House Corporation, dealer in new and used machinery, 718 East Pratt Street, Baltimore, is in the market for the following lathes: One 24-in. to take 6 ft. 6 in. between centers; one 18-in. or 20-in. with 8-ft. or 10-ft. bed, Lodge & Shipley, LeBlond or American, motor driven; also one screw machine to take 2¼-in. stock.

Contract has been awarded by the Albert Russell & Sons Co., Newburyport, Mass., for rebuilding its foundry destroyed by fire several weeks ago.

The Heppenstahl Forge Co., Harvard Avenue, Bridgeport, Conn., has been granted permits to erect oil tanks and a one-story pumping station.

Bids are asked by C. W. Parks, chief of the Bureau of Yards and Docks, Washington, for mechanical equipment and piping for and alterations to a Government owned boiler plant at Boston.

The Rowe Calk & Chain Co., Plantsville, Conn., is perfecting plans for the manufacture of an automatic device for carrying spare tires on automobiles, a patent on which recently was granted.

Lockwood, Green & Co., Boston, are preparing plans for an addition to the factory of the H. L. Judd Co., Cherry Street, Wallingford, Conn., brass andirons, etc., to cost about $100,000.

The F. T. Ley Co., Springfield, Mass., has been awarded a contract for the construction of a power house, dam and penstock for the South Berkshire Power & Electric Co., Williamsville, Mass.

William S. Thompson is president, Benjamin W. Woodward, vice-president, and Charles M. Cornins, treasurer, of the Woodward Wrench Co., Springfield, Mass., recently incorporated under Massachusetts laws. It is capitalized for $500,000.

Robert W. Merrick, 32 Greenleaf Street, Quincy, is president and Charles B. Putnam, 32 Queensbery Street, Boston, treasurer of the Electric Highway Signal Co., Boston, which has taken out a charter to manufacture highway safeguarding and regulating devices.

George M. Wright, formerly president and general manager Wright Wire Co., Worcester, and his son, George F. Wright, until recently vice-president Wickwire-Spencer Steel Corporation, which took over the Wright Wire Co., this fall plan to engage in the manufacture of wire drawing machinery and equipment in Worcester. Offices have been secured in the Park Building, that city.

The Hunt-Lasher Co., Inc., has been granted a charter to manufacture blow pipe alcohol torches, automobile accessories, household and electrical appliances, machinery and tools. Lester L. Lasher, 53 Lawton Avenue, Lynn, is president, and Joseph M. Hunt, 319 Temple Street, West Roxbury, Boston, treasurer.

J. E. Conant & Co., Lowell, Mass., will sell at auction Sept. 1 the equipment and stock of the No. 1 plant of Burgess Co. & Curtis, Marblehead, Mass., aeroplanes.

New interests, headed by Garrett M. Ross, have acquired the plant and business of the Cushman Electric Co., Concord, N. H., manufacturer of motors, motor-generator sets, etc. The present name will be retained and the plant continued in operation for the same products. Mr. Ross is president of the new company; A. L. Cushman, vice-president, and Alexander P. Achimore, manager.

The Wallace Barnes Co., Wallace Street, Bristol, Conn., manufacturer of steel springs, etc., is arranging for the early opening of a branch plant at Hamilton, Ont., to be operated under the name of the Wallace Barnes Co., Ltd., recently organized as a subsidiary, with capital of $300,000.

The Forestdale Mfg. Co., Forestdale, R. I., has completed plans for the construction of a new power house at its cotton mills.

The F. A. Whitney Carriage Co., Leominster, Mass., has filed plans for a three-story addition, 45 x 70 ft.

The L. & H. Motors Co., Hartford, Conn., manufacturer of automobile equipment, has awarded contract to the Lawrence & Coe Construction Co., 372 Trumbull Street, for an addition to its plant on High Street.

The National Folding Box & Paper Co., New Haven, Conn., is taking bids for an addition to its plant on James Street, 62 x 140 ft., estimated to cost about $150,000, including machinery. Westcott & Mapes, Inc., 207 Orange Street, are architects and engineers.

Chicago

CHICAGO, Aug. 22.

There has been a noticeable increase in the number of callers at local machine tool houses and inquiries coming through the mail are also more numerous. Prospective buyers who visited the local market the past week were from such distant points as Nebraska and Ohio. Dealers are encouraged by the increased interest, and while buying is still relatively light, it is felt that business has turned the corner and is now on the upswing.

The F. C. West Corporation, referred to last week, has practically completed purchases of equipment for a new Minneapolis plant. The total outlay for all equipment, including machine tools, will amount to about $250,000. Thus far most of the machines have been bought second-hand and in many cases practically new tools which have never been put to use have been acquired at favorable prices. Many of the machines were bought in the East and several carloads have been shipped to Minneapolis. The new plant, the name of which has not been disclosed, is in the new industrial section of Minneapolis and has 44,000 sq. ft. of floor space. It will manufacture automotive replacement parts. Edward M. Heller & Co., 144 West Kinzie Street, Chicago, now in direct charge of machine tool purchases, have issued the following inquiry for equipment not yet bought:

One 60-in. wheel lathe for trimming treads on locomotive drivers and car wheels.
One 20-in. x 14 or 16-ft. motor driven engine lathe.
One lathe to cut threads on bolts up to 2 in. in diameter with universal head.
One Baker elevating type electric factory tractor.
Two piston boring machines.
Two 10 x 50-in. plain Norton grinding machines.
One 75-ton back-geared punch press.
Ten to 15 3½ x 60-in. Fitchburg Lo Swing lathes.
Ten Steubing hand-operated elevating trucks.

The Huenengarth Co., Lincoln, Neb., recently organized to manufacture washing machines, has been sounding the local market for a hand screw machine, turret lathe, disk grinder and a hack saw. The Arctic Corporation, Michigan City, Ind., recently incorporated, has gone into the manufacture of ice machines, and has closed for some metal-working equipment. The formal letting of the Illinois Central machine tool orders was made last week.

As previously intimated, there has been an encouraging movement of second-hand equipment of late. One dealer reports a single transaction involving two gear generators and two upright drills. Many users particularly the smaller buyers, evince an interest in second-hand offerings and if they do not find what they want in new equipment frequently purchase used tools.

Two manufacturers of milling machines in addition to those mentioned a week ago have reduced prices. One, a Western maker, has cut quotations 10 to 15 per cent, and another, an Eastern builder, has marked off 15 per cent. A Western manufacturer of hand screw machines has made a reduction of 10 per cent. South Bend engine lathes have been marked down 20 per cent. In connection with this reduction it is announced that the prices of Jan. 1, 1914, were only 37 per cent lower than present quotations. This comparison does not take into consideration the fact that the present machines are not the same as those sold in 1914. In fact, practically all machine tool builders have redesigned their equipment since that time with the result that their machines are more rugged and have a greater output. One large manufacturer of radial drills spent $250,000 on redesigning. The column was increased in diameter, the saddle was lengthened, tapping frictions were increased 40 per cent and now run in oil instead of in the open, the gears are now of chrome nickel steel whereas they were formerly of cast iron, the weight of the machine was increased 33⅓ per cent, and the range of feeds and speeds was expanded.

E. J. Gaddis, 1548 East Sixty-seventh Street, Chicago, has let contract for a one-story battery repair station, 50 x 127 ft., 1540-42 East Sixty-seventh Street, to cost $20,000.

The Hannifin Mfg. Co., 621 South Kolmar Avenue, Chicago, has postponed until next spring the construction of a two-story factory, 90 x 150 ft., at the northeast corner of Knox and Wellington avenues. The structure will cost $200,000.

The Wickey Battery Co., East Chicago, Ind., has been incorporated with $75,000 capital stock to manufacture electric batteries. The directors include E. W. and W. G. Wickey, J. E. Francis, D. L. White and H. E. Zoeger.

The Saperston Mfg. Co., 28 North Clinton Street, Chicago, has been incorporated with $8,000 capital stock to manufacture arch supports and foot appliances. The incorporators include Perry Saperston, Charles D. Saperston, and Frederick L. Wallace.

H. A. Zimmer, formerly of Moline, Ill., will open a general machine shop at 127 South Prairie Street, Galesburg, Ill. It will be equipped to do die, gear and grinding work.

The Malleable Iron Co., Kokomo, Ind., which recently completed a new foundry, will commence operations within a few weeks. It will supply material for the Haynes Automobile Co., Kokomo, and the Service Motor Co., Wabash, being a subsidiary of these two companies. G. A. Wagner will be general manager.

Washington, Ind., has sold $100,000 worth of stock in the Union Steel Mfg. Co. as an inducement to that company to move its factories and offices to that city. The company controls two plants, one at Brazil, Ind., and the other at Chicago. The Chicago plant is largely given over to the manufacture of die castings.

The construction of a new plant for the Otsego Angle Steel Co., Plainwell, Mich., will start soon, according to an announcement by one of the officers.

S. Buchsbaum & Co., 159 North State Street, Chicago, jewelers, plan to build a six-story office and factory building, 100 x 175 ft., East Huron and Fairbanks streets, to cost $300,000.

The Grand Avenue Building Co., E. H. Gill, engineer, Interstate Building, Kansas City, Mo., has let a contract for a two-story garage, 80 x 122 ft., at 714 Grand Avenue, to cost $100,000.

The board of directors, St. Lucas Hospital, Faribault, Minn., is arranging plans for the erection of a new one and two-story power house at the institution.

The Mattson Wire Mfg. Co., Market and Lucas streets, Joliet, Ill., has been chartered under State laws to manufacture wire goods, and other metal products. The incorporators are J. A. Tune, C. N. and Elmer L. Crouch.

Chalmers-Williams, Inc., 208 South La Salle Street, Chicago, manufacturer of mining machinery, has awarded contract to the Arnold Co., 207 South La Salle Street, for a one-story addition to its plant in the Chicago Heights section, estimated to cost about $50,000.

Philadelphia

PHILADELPHIA, Aug. 22.

The Electric Storage Battery Co., Nineteenth and Allegheny streets, Philadelphia, has acquired a building at New Orleans for a new branch works.

The Metropolitan Body Co., Philadelphia, is being organized to manufacture motor-truck and automobile bodies. Application for a State charter will be made on Sept. 12. It is represented by Nathaniel I. S. Goldman, 812 Lincoln Building.

The Department of City Transit, Philadelphia, is considering the erection of two new power plants for the municipal electric railroad system to cost in excess of $500,000.

Fire, Aug. 15, destroyed a portion of the plant of the Atlantic Refining Co., Philadelphia, with main offices at 3144 Passyunk Avenue, with loss estimated at close to $1,000,000. The equipment destroyed included four pumping plants with machinery, five steam stills, oil tanks, agitator tanks, separator equipment and other apparatus.

The Tioga Engineering & Pattern Co., Philadelphia, Pa., has been incorporated with a capital of $65,000 to manufacture machine parts, castings, patterns, etc. William S. Cox, Fifth Street and City Line, is treasurer.

Charles Wacker, Philadelphia, operating a wagon and wagon parts plant at 1345 West Cumberland Street, has filed plans for a new factory at 1304-1308 West Cumberland Street.

The Multilite Mfg. Co., Philadelphia, is being organized to manufacture lighting fixtures and other metal products. Application for a State charter will be made on Sept. 6. The company is represented by Rose & Fischer, 803-6 Victory Building, 1011 Chestnut Street.

D. P. Brown & Co., 264 North Fourth Street, Philadelphia, manufacturers of belting, etc., have acquired the two four-story factory buildings at 405-7 Wood Street, to be used in connection with general operations.

The King-O-Tone Phonograph Co., Philadelphia, has been incorporated under Delaware laws with capital of $500,000 to manufacture talking machines and parts. It is represented by F. R. Hansell, Land Title Building.

The Mercer Motors Corporation, Trenton, N. J., is arranging for the sale of a bond issue of $500,000, following which notes amounting to $2,000,000 will be issued, the proceeds to provide working capital for resumption of production and expansion. The company is being reorganized to operate independently of Hares Motors, Inc., heretofore holding supervision.

The Franklin Air Compressor Works, Inc., Norristown, Pa., has been incorporated with a capital of $50,000 to manufacture air compressors and other machinery. George C. Yates, 27 West Pomona Street, Philadelphia, is treasurer.

The Wilson Motor Co., 1721 Haddon Avenue, Camden, N. J., has completed plans for the erection of a new one-story plant on Haddon Avenue, to cost about $45,000. Construction will commence at once.

The Anthracite Refractories Co., Blakely, Pa., has been incorporated with a capital of $150,000 to manufacture fire brick and other refractory products. D. J. Beardslee, Peckville, Pa., is treasurer.

The Deca-Disc Co., Hanover, Pa., has been incorporated under Delaware laws with capital of $500,000 to manufacture a newly patented talking machine. Paul D. Bodwell is president, and George L. Creager, secretary.

Buffalo

BUFFALO, Aug. 22.

The L. G. Schoepflin Co., 80 West Mohawk Street, Buffalo, has plans under way for a two-story automobile service and repair works, 60 x 175 ft., at 306 Franklin Street, to cost about $55,000.

The Lightning Change Auto Wheel Corporation, Rochester, N. Y., has ben incorporated with a capital of $250,000 by J. M. Sebring, B. R. Robin and F. Hesse, Rochester, to manufacture metal automobile wheels. It is represented by H. H. Cohen, Trust Building.

The Genesee Light & Power Co., Batavia, N. Y., is planning for extensions and improvements in its local electric plant and system.

The E. Bartheimes Mfg. Co., Rochester, has been incorporated with a capital of $300,000 by E. Bartheimes, A. C. Wischmeyer and W. Haefele, Rochester, to manufacture stamped metal products. It is represented by McLean, Duffy & Kaelber, Insurance Building.

Th W. J. Hall Co., 54 South Fitzhugh Street, Rochester, is taking bids for a two-story machine shop and automobile service building on Lake Street, 61 x 70 ft. Leander & McCord, Powers Building, are architects.

The Wickwire Limestone Co., River Road, Buffalo, is planning to rebuild the power plant at its properties at Lockport, N. Y., recently destroyed by fire with loss estimated at about $30,000.

Frostholm Brothers, manufacturers of special machinery and tools, Syracuse, N. Y., have opened a tool and cylinder regrinding shop in Rochester under the name of Frostholm-Treiber, Inc. The incorporators are C. C. and J. H. Frostholm. Melvin & Melvin, First Trust and Deposit Building, Syracuse, represent the company. The name was incorrectly given last week as the Crostholz-Trieber Co.

Baltimore

BALTIMORE, Aug. 22

The Board of City Commissioners, Oxford, Md., has made application for permission to construct a local electric power plant for municipal service. Bonds for the project will be issued at an early date.

The Maryland Motor Machine Co., Frederick, Md., recently reorganized with Charles H. Kehne as president, is planning for the erection of an addition to its factory.

The Smoot Specialties Corporation, 614 West North Avenue, Baltimore, has been incorporated with a capital of $50,000 by William B. Smoot, John G. Chapman and Gerard W. C. Smoot, to manufacture automobile equipment.

The Freedom District Electric Light Co., Sykesville, Carroll County, Md., has been chartered under State laws to equip and operate an electric light and power plant and system. The incorporators are John T. Scott, Charles C. Williams and Charles W. Melville, Sykesville.

Fire, Aug. 13, destroyed a portion of the plant of the American Manganese Steel Co., New Castle, Del., including a four-story pattern shop, with loss estimated at about $100,000.

The Aircraft Construction & Transportation Corporation, Wilmington, Del., has been incorporated under State laws with capital of $100,000,000 to manufacture airplanes and parts. It is represented by the Delaware Charter Co., 904 Market Street.

William Shinn & Co., Inc., 407 Orange Street, Wilmington, Del., has been incorporated with a capital of $100,000 by William I. and John A. Shinn and M. N. Parry to manufacture cornices, skylights, metal window frames and other sheet metal products.

The Ringless Piston Replacement Co., Wilmington, Del., has been incorporated under State laws with capital of $3,000,000 to manufacture pistons, piston rings and kindred products for automobile engine service. The company is represented by the Corporation Trust Co. of America, duPont Building.

The Neill-Buick Co., Inc., 111 West Mount Royal Avenue, Baltimore, has been incorporated with a capital of $100,000 by Daniel S. Neill, John Kimmell and Benjamin B. Nyce, to manufacture automobile trucks, tractors and parts.

The Paragon Motor Car Co., Cumberland, Md., manufacturer of automobiles, will break ground at once for the first unit of its new plant on Mount Savage Road. It will be 165 x 480 ft., and will be supplemented by a number of smaller buildings. A power plant will also be erected.

Fire, Aug. 9, destroyed a portion of the plant of the Armour Fertilizer Co., Bull Creek, Columbus, Ga., with loss estimated at about $300,000. Headquarters of the company are at 209 West Jackson Boulevard, Chicago.

The Columbia Railway & Navigation Co., Columbia, S. C., is planning for the construction of a new hydroelectric generating plant on a canal to be constructed, connecting the Santee and Cooper rivers, with initial capacity of about 30,000-hp. The work, including canal construction, is estimated to cost close to $5,000,000. G. A. Guignard is president.

The Lullwater Co., Atlanta, Ga., recently organized with a capital of $2,000,000, has acquired a six-story and basement building, totaling about 110,000 sq. ft., for the establishment of a plant to manufacture automobile equipment and accessories. The different departments will include parts manufacture, nickel plating works, machine and repair department, grinding room, welding department, etc. A portion of the works will also be given over to battery repair operations. Lionel J. Kahn is manager.

The Caldwell Power Co., Lenoir, N. C., recently organized with a capital of $300,000, has preliminary plans under way for a hydroelectric generating plant. J. H. Beall and J. L. Nelson head the company.

The Southern Electro Steel Co., Scott Building, Lynchburg, Va., has increased its capital stock to $100,000 and will install additional machinery. Joseph Keyser is president.

Detroit

DETROIT, Aug. 22.

The Hercules Steel Post Co., Niles, Mich., care of G. J. Pammel, secretary local Chamber of Commerce, representative, has plans nearing completion for a new one-story factory, 50 x 250 ft., estimated to cost about $30,000.

The Perry Mfg. Co., Inc., Argentine, Genesee County, Ind., has been incorporated with a capital of $100,000 by D. F. Hopkins, W. L. Coop and George E. Taylor, Argentine, to manufacture barn and dairy equipment, farming implements and kindred products.

Ralph J. Handy, Inc., Detroit, has been incorporated with a capital of $100,000 by Mark A. Bertaire, Karl O. Hawley and Ralph J. Handy, 2074 Seward Avenue, to manufacture motor trucks and parts.

The City Council, Lansing, Mich., has plans under way for a new municipal electric power plant estimated to cost about $1,600,000. Woodwell & Resler, 501 Fifth Avenue, Lansing, are architects and engineers.

The Algonac Boat & Machine Co., Algonac, Mich., has acquired property adjoining its plant for extensions. It recently completed an addition, and greater capacity is again required. Jan Smits is president.

The Greater Hart Association, Hart, Mich., a community betterment organization, is arranging for a site for a new plant for the Hart Quick Change Rim Co., recently organized to manufacture a collapsible metal rim for automobile wheels and attachments. It is said that the initial plan will cost about $50,000. The company is headed by George W. Powers and L. P. Hyde, Hart.

The plant of the H. M. Reynolds Asphalt Shingle Co., Grand Rapids, Mich., was recently destroyed by fire with a loss of $250,000 to $400,000. Plans are under way for new works of steel and concrete.

The True Mfg. Co., Eaton Rapids, Mich., which will manufacture several lines of automotive accessories, expects to begin construction of a new plant within 30 days.

The LaBelle Washing Machine Co., Ecorse, Mich., has been organized by Alfred Robinson, Ecorse; William H. Rouston, Detroit, and Hugh McLain, Oakwood, Mich. The product will be handled at the Robinson plant in Ecorse and the business headquarters will be in Detroit.

The Columbia Body Corporation, Detroit, has acquired the plant of the American Chemical Co. in Ford, Mich., and is removing to that town.

Pittsburgh

PITTSBURGH, Aug. 22.

As far as actual business is concerned, the local machinery market is exceedingly quiet. Representatives of crane manufacturers have had a fair number of requests for prices for estimating purposes, some of which may later develop into definite inquiries, but the only order placed in the past week was for a 10-ton, 40-ft. span, 3-motor overhead, by the Ladel Mfg. Co., New Philadelphia, Ohio, which is building a new foundry, the order going to the Northern Engineering Works, Detroit. Inquiry put out by the Wheeling Steel Corporation several weeks ago for a 5-ton, 7½-ton, and a revolving jib crane is dormant. Machine-tool activities are confined largely to individual pieces which are absolutely required to replace old or worn-out equipment. One dealer reports the sale of a heavy duty Diamond grinder with 40-hp. motor and attachments. Such tools ordinarily form part of the equipment of railroad shops, but this grinder is said to have been taken by a company engaged on different work. There is an absence of railroad inquiry and the manual training school lists, issued by the cities of Johnstown and Butler, Pa., and Wheeling, W. Va., do not appear to be near the closing stage. The school board of Johnstown, Pa., has decided upon a new high school and this is expected to delay the placing of tools for the manual training department until the completion of the building. Considerable difficulty is being experienced in securing appropriations for school purposes in these cities. The Westcott Chuck Co. has increased the discount to jobbers from 16⅔ per cent to 25 per cent, and has not reduced prices 16⅔ to 25 per cent as was stated in THE IRON AGE of last week.

The Oberndorf Mfg. Co., 7509 Thomas Boulevard, Pittsburgh, manufacturer of pipe, steamfitters' supplies, etc., will take new bids on revised plans at an early date for its one-story addition, 160 x 200 ft., estimated to cost about $150,000. Edward Oberndorf is president.

The Standard Specialty Co., Pittsburgh, is being organized by E. W. Gibson, F. G. Leslie and F. J. Semasko, Pittsburgh, to manufacture metal products. Application for a State charter will be made Sept. 6. It is represented by Owen S. Cecil, 1016 Berger Building.

The Westinghouse Electric & Mfg. Co., East Pittsburgh, is reported to be planning for a new foundry at Trafford, Pa., to give employment to more than 300 men.

The Ingram-Richardson Mfg. Co., Beaver Falls, Pa., manufacturer of enameled iron signs, and other metal products, has completed plans for a one-story addition, 95 x 130 ft., estimated to cost about $60,000, including equipment.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, has plans under way for extensions and improvements in its hydroelectric generating plant on Little Island, near Logan, W. Va., to cost in excess of $500,000. The work will include the installation of two new 15,000 turbo-generators with auxiliary machinery. Francis R. Weller, Hibbs Building, Washington, is consulting engineer.

The Puritan Coal Co., Williamson, W. Va., will build a new steel tipple at its properties, with daily capacity of about 4000 tons, estimated to cost $60,000.

The Rosedale Coal Co., Monongalia County, W. Va., with offices at Morgantown, W. Va., will build a new steel tipple at its properties, estimated to cost about $50,000.

The Central South

ST. LOUIS, Aug. 22.

The St. Louis Pump & Equipment Co. has leased the two-story brick building at the corner of Forest Park Boulevard and Spring Avenue, and will make alterations and improvements. John C. Roberts, Jr., is president.

The Standard Stamping Co., 2000 North Broadway, St. Louis, manufacturer of stamped metal products, has taken bids for a one-story plant, 107 x 132 ft., for the manufacture of enameled metal ware products. It is estimated to cost about $50,000. Klipstein & Rathman, Chemical Building, are architects.

The Nichols Wire & Sheet Metal Co., Tenth and Missouri streets, Joplin, Mo., is having plans prepared for a one-story building, 50 x 200 ft., at 513 East Fifth Street.

Fire, Aug. 7, destroyed a portion of the works of the Rhinock-Flexner Co., Hancock Street, Louisville, steel and metal specialties, with loss estimated at about $32,000.

The Beggs Machinery & Supply Co., Beggs, Okla., has been incorporated with a capital of $25,000 by William H. Donohue and H. T. Purnell, Beggs; and E. J. Little, Tulsa, Okla., to manufacture machine products, etc.

The Huckabee Tractor & Mfg. Co., 704 South Valmar Street, Little Rock, Ark., is planning for the installation of new machinery at its works. N. F. Wilson is general manager.

The Board of Directors, University of Missouri, Columbia, Mo., is completing plans and will soon call for bids for a new one-story and basement power plant estimated to cost about $150,000. Prof. Guy D. Newton is engineer.

The Chattanooga Warehouse & Cold Storage Co., 212 King Street, Chattanooga, Tenn., has plans under way for the erection of a two and four-story addition to its cold storage plant. Bouchard & Co., Nashville, Tenn., are engineers.

The Little Rock Auto Tow Service Co., 115 West Twentieth Street, Little Rock, Ark., recently organized, has plans under way for a two-story automobile service works, with machine and repair departments, 50 x 100 ft. William Rinke is president and general manager.

The Mercury Motor Corporation, Quapaw, Okla., has been incorporated with a capital of $250,000 by W. I. Bingham, Quapaw, and W. E. Douthat, Commerce, Okla., to manufacture automobiles and parts.

The Ohio-Kentucky Fluorspar & Lead Co., City National Bank Building, Paducah, Ky., recently organized with a capital of $1,000,000, is planning for the construction of new works in the vicinity of Smithfield, Ky., with daily output of 100 tons. It will include crushing plant, refinery, etc., and is estimated to cost in excess of $200,000. The company has acquired the property of the North American Fluorspar & Lead Corporation in this section. T. J. Clay is president, and F. B. Moodie, vice-president and manager.

Indiana

INDIANAPOLIS, Aug. 22.

The Indiana Electric Corporation, Indianapolis, Ind., recently organized, has plans under way for a merger of a number of light and power companies, following which a large hydroelectric generating plant will be constructed on the Wabash River, near Terre Haute, Ind. The plant will have a capacity of 30,000-kw., and with transmission system is estimated to cost more than $2,000,000. The company is planning for a bond issue of about $5,000,000 to carry out the project. It is headed by Joseph H. Brewer, president American Public Utilities, Inc., Grand Rapids, Mich.; Charles O'Brien Murphy and Paul D. Birdsall, both of the Merchants' Heat & Light Co., Indianapolis.

The Berry Oil Gas Burner Co., Schnellville, Ind., has been chartered under State laws to manufacture oil and gas burners. The incorporators are J. A. Berry, F. A. Haas and J. W. Haas, all of Schnellville.

The Public Service Commission, Indianapolis, will receive bids at the office of the secretary up to 1 p. m., Aug. 29, for a quantity of galvanized posts to be used for carrying metal disk warning signs at railroad crossings. The disks will be manufactured at the State prison.

The Haynes Tractor Co., Kokomo, Ind., affiliated with the Haynes Automobile Co., has tentative plans in preparation for a new one and two-story plant to manufacture automobile tractors. Elwood Haynes is head of the company.

The City Council, Kendallville, Ind., has completed arrangements for the erection of a one-story addition to the municipal electric power plant, 50 x 100 ft.

Cincinnati

CINCINNATI, Aug. 22.

The Ford Motor Co. was a purchaser of machines the past 10 days, taking a number of tools. Manufacturers and dealers report a better tone to inquiries and expect that in the near future some buying will develop. An inquiry for a number of machines is looked for shortly from the General Motors Co. for plants in Dayton, Ohio. The Big Four list is still pending, but is likely to be closed at any time. An Eastern list involving a number of lathes will probably close this week. The automotive industry is showing some activity and local manufacturers received several orders from this source.

The Criterion Automotive Products Co., Dayton, Ohio, has been incorporated with a capitalization of $75,000 to manufacture automobile accessories. Frank Moeschel, H. A. Rietdy and Carl Brough are incorporators.

It is understood that the Burton-Townsend Co., Zanesville, Ohio, is contemplating the erection of a brick plant at Darlington, Ohio. Plans have not yet been completed.

The Cincinnati Sash & Door Co., whose plant at Sixth Street and Freeman Avenue was recently damaged by fire, has secured a new location in the adjoining neighborhood. The damage to the equipment amounted to approximately $30,000. New machinery has been installed and the plant is again in operation.

The Gulf States

BIRMINGHAM, Aug. 22.

The Texas-Mexia Co., Mexia, Tex., is completing plans for a new oil refinery to cost about $400,000, including machinery. The company recently acquired about 40 acres of land.

Edward Boehm and F. T. Fehrenkamp, Moulton, Tex., are organizing a company to construct a new electric power plant. An ice-manufacturing plant will also be erected.

The Jahnacke Ship Repair Co., New Orleans, is negotiating for the purchase of the river front property occupied by the Jackson Barracks, for proposed extensions in its plant.

The Efficiency Engineering Co., Orlando, Fla., has been incorporated with a capital of $30,000 to manufacture special driving mechanisms and other mechanical equipment. M. O. Overstreet is president and treasurer; P. L. Billingsley is secretary.

The Golden State Refining Co., Mexia, Tex., is planning for the erection of a new refinery with initial daily output of 6000 bbl. It recently acquired a site for the plant.

The Bastrop Pulp & Paper Co., Bastrop, La., is planning for installation of machinery at its new plant, to be ready for operation in October and estimated to cost close to $1,000,000. It is a subsidiary of the Kansas City Packing Box Co. and the Kansas City Fibre Box Co., both of Kansas City, Mo. L. H. Fox is head of the companies.

The Freeport Gas Co., Freeport, Tex., has completed plans for the construction of a new plant to manufacture steel drums. It is proposed to develop a daily capacity of about 500. C. A. Jones is manager.

J. Schlecht, Bradentown, Fla., is organizing a company to establish a plant for the manufacture of spark plugs and kindred products.

O. H. Foster, Breckenridge, Tex., and associates, have acquired property at Mexia, Tex., for the erection of a new oil refinery, estimated to cost about $350,000.

The Merritt Island Light & Power Co., Merritt, Fla., has plans under way for a new electric light and power plant. O. R. Grosse is president.

The Chapman Carriage Factory, Jacksonville, Fla., will build a plant at a cost of about $200,000 for the manufacture of carriages, automobile tops and parts. W. E. Sweney is president.

Milwaukee

MILWAUKEE, Aug. 22.

In the past week more indications of the beginning of an actual recovery from the depresion in the metal-working industries have come to the surface. While the machine tool market has not yet felt an appreciable effect, the nature and scope of inquiry portends improvement and new business is developing with greater frequency. Individual orders though small and limited principally to single tools, are becoming more numerous, and it is believed that some good business may be expected in the coming three months. A general view of the local metal-working industry shows that manufacturers are more disposed to make capital investments and some projects intermitted three and six months ago are being resumed.

The F. Rosenberg Elevator Co., 174 Reed Street, Milwaukee, manufacturer of freight and electric passenger elevators, is taking bids for a new plant at Franklin and Becker streets and the Chicago, Milwaukee & St. Paul tracks. It will be of brick and steel, 120 x 223 ft., and cost about $100,000 complete. Considerable new equipment, including a 5-ton electric traveling crane, will be installed. Bids are being taken on the equipment. The architects are Martin Tullgren & Sons, 425 East Water Street, Milwaukee.

The Wrought Washer Mfg. Co., Milwaukee, manufacturer of wrought iron washers and similar bolt, nut and screw specialties, is starting work on the construction of two additions to its plant at Wilcox and South Bay streets. One will be 179 x 135 ft., for manufacturing, storage, warehouse and shipping, and the other, 15 x 89 ft., for offices, stock storage, etc. The cost of the improvements is estimated at $50,000. The general contractors are Klug & Smith, Mack Block, local.

The Marsh Refrigerator Service Co., Milwaukee, manufacturer and repairer of refrigerator cars, is liquidating its business and has sold its plant on the Port Washington Road and the Milwaukee Road tracks to the Matthews Brothers' Mfg. Co., 61-75 Fourth Street, manufacturer of fine interior woodwork, office fixtures, aircraft propellers, etc. The Matthews company in turn has disposed of its present plant to the Rundle-Spence Mfg. Co., 63-67 Second Street, manufacturer of plumbers, and steamfitters' supplies, etc. Both plants will undergo considerable alteration, improvement and retooling by the new owners. The Matthews company will take possession of the Marsh plant about Sept. 1, and give occupancy of its plant to the Rundle-Spence company on Nov. 1. The latter company will operate its newly acquired plant as a branch of the works on Second Street, which will be kept intact. The two transactions involve in excess of $500,000.

The Peter Pirsch & Sons Co., Kenosha, Wis., has engaged Charles O. Augustine, local architect and engineer, to design a one-story brick and steel addition, 100 ft. sq., for the production of fire apparatus for mounting on horse-drawn and motor chassis, and complete vehicles. The investment in building and equipment now being purchased is estimated at $50,000.

The Maribel Straw Cutter Co., Maribel, Manitowoc County, Wis., has been organized with $50,000 capital to manufacture a patented straw cutter and a self-feeding device attachable to all feed cutting machines. Work is under way on a factory, 40 x 100 ft., and equipment is now being purchased. Operations will begin about Oct. 1. Officers of the company are: President and general manager, Henry Elmer; vice-president, Patrick Carberry; secretary, Martin Kvitek; treasurer, Dr. V. V. Kellner.

The Valley Paper Mills, Inc., Neenah, Wis., recently organized with $800,000 capital stock, has acquired a water power site of 17 acres at Blair Springs on the Fox River and is having plans prepared for a paper and pulp mill and auxiliary buildings, to cost with equipment about $600,000. The architect is Edward A. Wettengel, Appleton, Wis., and the engineer for equipment, etc., is Albert C. Ehlman, 835 Caswell Block, Milwaukee. The main building will be 80 x 550 ft., part two stories; the boiler house and engine room, 60 x 165 ft.; machine room, 80 x 170 ft.; beater room, 80 x 100 ft., and finishing room, 80 x 150 ft.. all of brick and steel on concrete substructures. G. W. Burnside, Neenah, is general manager.

The Allis-Chalmers Mfg. Co., Milwaukee, has taken the contract for furnishing and installing four electric generating units with a combined capacity of 8000 kw. in the new tractor plant to be established at Troy, N. Y., by the Ford Motor Co. The contract amounts to approximately $200,000. It also recently completed the equipment of a $500,000 saw and planing mill and general wood-working plant at Iron Mountain, Mich., for the Ford interests, which operate this division as the Michigan Lumber, Land & Iron Co.

The Elto Outboard Motor Co., Milwaukee, is the name adopted by Ole Evinrude for a new corporation which he is organizing to take over his business, established about a year ago at 62 Mason Street, of manufacturing gas engines for application to rowboats, canoes and other light water craft. The company is now in quantity production and early next spring intends to build a new plant, although details have not yet been worked out. Mr. Evinrude was the founder of the Evinrude Motor Co., Milwaukee. He retired in 1913 and since then has developed a new light twin-cylinder engine producing 3-hp. and weighing complete 46 lb. Officers of the new company are: President and general manager, Ole Evinrude; vice-president and advertising manager, Mrs. B. Evinrude; secretary-treasurer and sales manager, George B. Treviranus.

The Wisconsin State Board of Control, Capitol Building, Madison, has let the general contract to the American Contracting Co., 198 Milwaukee Street, Milwaukee, at $34,800 for the construction of a power house at the State Home for Feeble-Minded in Union Grove, Racine County.

The Milwaukee-Western Fuel Co., 120 Wisconsin Street, closed bids Aug. 22 for a reinforced concrete, brick and steel garage, machine shop and mechanical service building, 136 x 138 ft., part two stories and basement, at Clinton and South Pierce streets. The equipment will include two 5-ton electric traveling cranes, which probably will be purchased locally. The architects and engineers are Klug & Smith, 30 Mack Block, Milwaukee. William F. Ardern is vice-president and general superintendent.

The Clark Cylinder Regrinding Co., Racine, Wis., has filed articles of incorporation with a capital stock of $25,000 to build a machine shop specializing in automotive engine repairs. The principals are John Clark, Joseph Keidel and Leonard P. Baumblatt, all of Racine.

The Board of Education, Prairie du Sac, Wis., has engaged J. R. & E. J. Law, architects, Madison, Wis., to design a new high school with vocational training departments, to cost about $100,000.

The Northern Wisconsin Hydro-Electric Power Co., Port Wing, Wis., has been organized by T. N. Okerstrom, Port Wing, to develop a waterpower site with a potentiality of 3385-hp. at Orienta Falls on the Iron River. The initial work, which will be undertaken early next spring, will involve an investment of about $375,000.

The Clarkson Coal & Dock Co., Ashland, Wis., which is investing about $500,000 in a new coal dock, handling equipment, etc., has reincorporated under the laws of Delaware with an authorized capital stock of $3,700,000. The incorporators are M. P. Clarkson, J. A. Vaughn, H. R. Johnson and H. P. Porter.

The Continental Axle Co., Edgerton, Wis., advises that it did not sustain a fire loss on July 4. Its building and equipment are intact and the company is under production.

California

LOS ANGELES, Aug. 22.

Buttress & McLean, 205 North Los Angeles Street, Los Angeles, has filed plans for three one- and two-story buildings at Fifty-first Street and Santa Fe Avenue, for the manufacture of mining machinery and parts. The structures will aggregate 60 x 280 ft., and are estimated to cost about $100,000 with machinery.

The Reliable Enameling & Plating Co., 2221 South Main Street, Los Angeles, has filed notice of organization to manufacture enameled and plated metal products. B. H. Brown, 5307 South Main Street, heads the company.

Loading and unloading machinery, hoisting equipment, etc., will be installed on the new dock to be constructed by the Board of City Commissioners, Oakland, Cal., at the foot of Clay Street, estimated to cost about $100,000. City Commissioner Albert E. Carter is in charge.

The Great Western Power Co., 14 Sansom Street. San Francisco, has arranged for a bond issue of $500,000, the proceeds to be used for extensions and improvements to plants and system.

The California Metal Products Co., 8613 Moneta Avenue, Los Angeles, has filed a notice of organization to manufacture metal goods. Thomas D. McHale, 634 West Ninety-second Street, heads the company.

The San Joaquin Light & Power Corporation, Fresno, Cal., has plans under way for the erection of a one-story works building, 130 x 150 ft., to cost $25,000.

The Pomona Sheet Metal Works, Pomona, Cal., has removed to a new building at 174 North Gordon Street, where increased facilities will be provided for the manufacture of gas furnaces, ventilating equipment, etc.

The Crystal Ice & Cold Storage Co., Sacramento, Cal., has plans under way for the erection of a new three-story cold storage plant at Sixteenth and R streets, estimated to cost about $100,000 with machinery. Rasmus Carstensen is president.

Canada

TORONTO, Aug. 22.

The Canadian Automobile Corporation has taken over the building formerly occupied by the Rapid Tool & Machine Co., at Lachine, Que., and has commenced the manufacture of motor cars. The present plant is only temporary, the company having secured a site of 163,000 sq. ft. at Longueuil, Que., and proposes to start work in the near future on the erection of a plant. The directors include F. W. Stewart, H. W. Austin, J. D. Henderson and others.

The International Harvester Works, Chatham, Ont., will build an addition to its plant and proposes to go into the manufacture of motor trucks, etc.

The Hollinger Consolidated Mines, Ltd., Timmins, Ont., proposes to spend $2,000,000 on hydroelectric development there. Sutcliffe & Neelands, New Liskeard, Ont., are the engineers.

The East Kootenay Lumber Co., Jaffray, B. C., is having plans prepared for repairs to a planing mill to cost $40,000. Some new equipment will be required.

The contract for foundations for the paper mill to cost $2,000,000 for the Provincial Paper Mills, Ltd., 54 University Avenue, Toronto, to be erected at Port Arthur, Ont., has been awarded to Chambers, McQuigge & McCaffrey, Port Arthur, Ont.

The Smithville Metals, Ltd., Smithville, Ont., will erect a new factory to cost $11,000. The steel contract has been let to the Standard Steel Construction Co., Welland, Ont.

The Wire Co. of Canada, Ltd., Hamilton, Ont., recently incorporated to manufacture wire and stamping specialties, has taken over the plant and equipment of the MacPherson Wire Co., Ltd., Hamilton.

The Canadian Austin Machinery, Ltd., Woodstock, Ont., has been incorporated with a capital stock of $50,000 by Henry A. Little, Arthur S. Robertson, Stanley A. Ross and others to manufacture concrete mixing machines, steam shovels, contractors' equipment, etc.

The British American Fuel & Metals, Ltd., Toronto, has been incorporated with a capital stock of $50,000 by Thomas Gibson, 67 Yonge Street; Henry C. Draper, 100 Binscarth Road; Edward M. Stoer and others to manufacture iron and steel products, etc.

The National Slag Products, Ltd., Hamilton, Ont., recently incorporated with a capital stock of $300,000 will start work in the near future on the erection of a plant for the production of tile, brick, roofing material, posts, etc. The officers and directors are William H. Yates, Hamilton, president; David Dick, Welland, vice-president; J. P. Anglin, Montreal; Hon. G. D. Robertson, Ottawa, Ont.; H. J. Daly and W. R. Fleming, Toronto; Gordon Hutton and E. J. Robertson, Hamilton.

IRON AND INDUSTRIAL STOCKS

Constructive Forces Have Failed to Stimulate Investment Buying

Steel mill operations are improving and there has been greater activity in the pig iron market and in various manufacturing lines. National finances, as represented in Federal Reserve and private bank reports, are daily strengthening. These constructive forces have failed to stimulate investment buying of iron and industrial stocks to a point in excess of liquidating sales. Average quotations for securities consequently are lower than they were a week ago and in quite a few instances lower than they have been before this year.

Six months' earnings statements, issued recently by important industrial concerns, almost uniformly revealed the necessity of absorbing inventory losses, thus postponing the time when normal earnings power will have been restored. Fear that forthcoming earnings statements will show such internal conditions is said to be the basis for at least a part of the present liquidation in securities.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	29½ - 30⅝	Midvale Steel.....	23¼ - 24
Allis-Chalm. pf...	72¾ - 73	Nat.-Acme	14 - 14⅛
Am. Can com.....	24¼ - 25½	Nat. E. & S. com.	39 - 43¾
Am. Can. pf.....	78½ - 80	Nat. E. & S. pf...	— - 89½
Am. C. & F. com.	120½-123½	N. Y. Air Brake..	47½ - 53
Am. C. & F. pf...	— -109½	Nova Scotia Steel.	— - 23½
Am. Loco. com....	83 - 84	Press. Steel com..	53⅝ - 57
Am. Radiator com.	— - 68½	Ry. Stl. Spg. com.	69 - 74½
Am. Steel F. com.	22½ - 25½	Ry. Stl. Spg. pf...	— -100
Am. Steel F. pf...	— - 80½	Replogle Steel.....	— - 20
Bald. Loco. com..	71¾ - 75	Republic, com.....	45 - 46¾
Beth. Steel com..	— - 45⅝	Republic pf.....	82½ - 84
Beth. Stl., Cl. B..	47¾ - 49	Sloss com.....	— - 33½
Beth. Stl., 8% pf..	97 - 97¼	Un. Alloy Steel...	— - 23
Chic. Pneu. Tool..	— - 48	U. S. Pipe com...	12 - 12½
Colorado Fuel.....	22½ - 23¼	U. S. Pipe pf.....	40 - 42
Cruc. Steel com...	51⅛ - 54¼	U. S. Steel com...	73⅜ - 74¾
General Electric..	109⅞-114½	U. S. Steel pf.....109 -110	
Gt. No. Ore Cert..	— - 28⅜	Vanadium Steel...	26¼ - 27½
Gulf States Steel.	— - 31	Va. I. C. & Coke..	59 - 62
Int. Har. com.....	69½ - 73	Westingh'se Elec.	39½ - 43⅛
Lackawanna Steel.	37½ - 38		

Industrial Finance

All outstanding 5 per cent first mortgage bonds dated Oct. 1, 1914, of the Quigley Furnace & Foundry Co., Brightwood, Mass., due in 1924, have been called for payment Oct. 1 at the office of the State Street Trust Co., Boston. This company was taken over by the Huron Metals Co. some time ago, and eventually the plant was run by the General Electric Co. and other interests.

Frank E. Malone, New York, and Thomas B. Coughlin, Springdale, R. I., have been appointed receivers for the British-American Mfg. Co., Springdale, R. I., to succeed three original receivers, Edward J. Maurer, Frederick Stern and Louis C. Hasell.

The General Motors Corporation, in the six months ended June 30, last, showed a surplus after all charges, federal taxes, preferred stock and debenture dividends of $6,468,550, which is equal to 31c. a share on the 20,528,790 outstanding common shares of no par value. In the corresponding period last year the company earned $1.66 a share on 19,518,895 shares of common stock.

Peter Gray & Sons, Inc., Cambridge, Mass., maker of railroad lanterns, etc., has increased its capitalization $30,000 or 300 shares of preferred stock and making the total capitalization $140,000. George M. Gray is president, and Mason H. Gray, treasurer.

The Nelson Rivet Co., Taunton, Mass., has increased its capitalization from $10,000 to $25,000 by an issue of 50 shares of common and 100 shares of preferred stock issued against real estate, merchandise and machinery. A. E. Nelson is president and Walter H. Nelson, treasurer.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	4.05c. to 4.30c.	.....
Nos. 22 and 24	4.10c. to 4.35c.	4.70c.
No. 26	4.15c. to 4.40c.	4.75c.
No. 28	4.25c. to 4.50c.	4.85c.
No. 30	4.50c. to 4.75c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c. to 4.25c.
Annealed soft	4.00c. to 4.25c.
Galvanized annealed	4.75c. to 5.00c.
Coppered basic	4.50c. to 4.75c.
Tinned soft Bessemer	6.00c. to 6.25c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	18½c. to 20 c.
Copper tube, seamless	20 c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20	
		Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....$6.80	$6.55
		90 lb.... 6.90	6.65
		100 lb.... 7.00	6.75
IC..$10.60	$9.50	IC... 7.20	6.95
IX.. 11.80	10.75	IX... 8.10	7.85
IXX.. 13.60	12.25	IXX... 9.10	8.85
IXXX.. 15.60	14.25	IXXX...10.50	10.25
IXXXX.. 17.20	16.00	IXXXX...11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	37c. to 38c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6¼c. to 6½c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6½c. to 7c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	30c. to 32c.

Old Metals

The market has settled back into a quiet, sluggish condition. Dealers' buying prices are as follows:

	Cents Per Lb
Copper, heavy and crucible	9.50
Copper, heavy and wire	8.75
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

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Features of a Non-ferrous Metal Foundry

Cost of Handling Reduced to Minimum—Melting Equipment Located at Center—Fumes and Smoke Satisfactorily Removed

BY F. L. PRENTISS*

THE outstanding features of the new jobbing brass and aluminum foundry of the National Bronze & Aluminum Foundry Co., Cleveland, are the arrangements for the reduction of the cost of handling material to a minimum, the location of the melting equipment in the center of the foundry and the method of providing ventilation for carrying away the fumes from the furnaces.

The plant includes a main building 150 x 250 ft., a cleaning and shipping room on one side 80 x 100 ft., and a sand mixing room 20 x 100 ft. adjoining the core room, part of which is used for core room purposes.

The plant is designed for mass production work and has sufficient flexibility to permit its use for making either heavy or light castings with equal facility. It is so laid out that all of the production departments are virtually in one room, and the superintendent, from points near the center of the foundry, has a good view of all departments. The casting goes in turn from the

The Melting Equipment Is Located at the Center of the Foundry to Reduce the Distance the Metal Has to Be Carried to the Molds. The crucibles are arranged in a double row in the pit and the fumes from the furnaces are carried out through a hood and ventilating stack in the roof above the crucible furnaces. Other melting equipment is located at the right of the crucibles, only one group of these appearing in the picture

*Resident editor of THE IRON AGE at Cleveland.

molders' floor to the shake-out room, finishing department, sand blast and shipment room, all on one floor. With continuous glass sections in the side walls the lighting facilities are unusually good. The plant has a daily capacity of 16 tons of aluminum and 50 tons of brass castings.

The advantage of locating the melting department in the center of the main building is in the reduction of the distance the metal has to be carried to the molding floors which surround the melting furnaces. The average distance that crucibles of metal are carried from the furnaces to the molds is 75 ft., and 100 molding floors can be reached in that distance. Two jib cranes attached to the building columns handle the crucibles. With the convenient arrangement of the foundry and the short distances that the metal is carried, the management states that the cost of non-productive labor, which includes all labor except molders and core makers, has been reduced 50 per cent from that in its former plant.

The Arrangements for Lighting and Convenient Handling of Machines and Materials Are Apparent in the General View of the Foundry Floor

The Smaller View Covers a Part of the Cleaning Department. The rough castings are placed in a bin back of each grinding machine. When the operator finishes a piece he places it on a cleaning table at the side of the machine, where any filing necessary is done

For melting brass there are 30 oil-fired, pit type, crucible furnaces with No. 80 crucibles. About 300 lb. of brass is melted in each crucible. The crucibles are arranged in a double row in a pit, instead of in the usual one row. The pit, of concrete construction, is 45 ft. long, 10 ft. 6 in. wide and 18 in. deep. Between the two rows of furnaces is a concrete covered manifold that supplies the furnaces with air. The oil lines are carried above the manifold. The control of both air and oil is at each end of the pit. A special feature of the furnace arrangement is the provision of a pit, 6 ft. deep, that extends under the furnace pit. Under each crucible is a hole 4½ in. in diameter. Through this the metal passes in case a crucible breaks, and is deposited in a compartment in the pit beneath, from which it is later recovered. With this arrangement interference with operations of other furnaces should a crucible break is avoided, and the escaped metal does not spread out in the bottom of the pit and become mixed with the dirt under the furnace.

Fumes from the furnaces are carried from the foundry through a ventilating stack 10 x 16 ft. that extends up to the roof and is connected at the bottom to a hood 50 ft. long and 20 ft. wide extending down in the trusses directly over the furnace pit. Sufficient air comes in from the sides of the building to provide circulation and the products of combustion are carried straight up the furnace and out through the ventilating stack. As a result the foundry is remarkably free from fumes and smoke.

The melting equipment includes two large specially designed oil-fired furnaces of the reverberatory type, one of 2000 lb. capacity for melting aluminum and the other with melting capacity of about 2 tons for brass, these being used for production work, three roll-over brass melting furnaces and a Booth electric furnace of 500-lb. capacity for melting brass. A feature of the two large reverberatory furnaces is that the dirt and slag cannot be poured out with the metal but stays in the furnace. The furnaces are cleaned every night by pouring out the refuse from the bottom of the furnace. The melting furnaces are located near the center of the foundry at the side of the pit furnaces and the fumes from the former are also carried up through the ventilating stack. They are so placed that all handling of metal from the furnaces to the molders' floors is done by hand. Practically all the molds are machine made, various types and sizes of jar ram roll-

over pattern drawing machines being used. Jar ram squeezers are provided for making smaller molds. Air hoists are used for handling the molds and shaking out castings.

The core room is equipped with eight Swartwout core type oil-fired double core ovens, 7 ft. 6 in. wide and 8 ft. 10 in. deep. Elevating trucks, both hand and electric, are used for charging these ovens. There are also three shelf type ovens, 5 ft. wide and 30 in. deep, for small cores.

The ovens are at the sides of the core room adjoining the foundry floor. The large ovens have doors on both sides so that cores, after being baked, are taken out the opposite side into the core storage room. Cores baked in the small shelf type ovens are also removed from the opposite side of the ovens, thus reducing the distance in handling. Foundry sand is unloaded from a siding only 30 ft. from the sand mixing machine.

The cleaning room is reached from the foundry floor by two aisles, one for heavy brass and aluminum castings and the other for light brass castings. On the foundry side of the cleaning room is a row of sprue cutters and band saws, the former for cutting the sprues from brass castings and the latter mostly for work on light aluminum castings. Back of the sprue cutters and band saws is a double row of grinders for grinding small brass castings. The rough castings are placed in a bin back of each grinder, and when the grinding machine operator finishes a piece he places it on a cleaning table at the side of the machine, where the filing is done. With this arrangement of the cleaning room the superintendent can see at a glance if any employee is lagging. Air hammers are provided on the side of the cleaning room where the heavy work is handled, for chipping the heavy brass and aluminum castings.

From the cleaning-up tables the brass castings go to the sand blast machine back of the grinders for the final cleaning operation. This machine has two combined cleaning units consisting of a rotary table for small work and a sand blast room for large work. The machine is furnished by the MacLeod Co.

NICKEL AND COBALT IN IRON

German Experiments on Iron Castings—Nickel Improves Physical Properties

Two authors, Prof. O. Bauer and Dr. E. Piwowarsky, in an article in *Stahl und Eisen*, Sept. 30, 1920, discuss the effect of nickel and cobalt on cast iron based on experiments which they conducted. It was attempted to ascertain whether the addition of these metals to cast iron had a similar effect to their addition to steel. An abstract of the original article, made by *Technical Review*, London, follows:

"The raw material used in the tests was pure Swedish charcoal pig iron containing 3.90 per cent total carbon, 2.80 per cent graphite, 0.048 per cent phosphorus, 0.18 per cent manganese, and 0.69 per cent silicon. The nickel was used in the form of electrolytic nickel. Small melts were first of all made for obtaining the cooling curves, and it was found that the nickel easily alloyed with the pig iron at a temperature that was only 50 deg. C. above the temperature of the iron. Larger melts were then made, in conical graphite crucibles of 200 mm. height and 100 mm. diam. at the top. These crucibles each contained 2250 grams of pig iron, which was then melted in a Helberger furnace with a liberal addition of graphite. They were heated 100 deg. C. above the melting point, the nickel, carefully weighed, being added in small pieces. After the mixture was thoroughly stirred with a carbon rod, the metal was poured into dry sand molds, and gave castings 20 mm. diam. and 650 mm. long. Four melts were made in this way, the first without any metallic addition, and the other three with various added percentages of nickel.

"Suitable samples were taken for purposes of analysis, tensile tests, notch-impact tests, compression tests, and Brinell hardness tests, the dimensions of the test pieces being given. The results of all the tests are given in a table. They show the best figures for about 1 per cent of nickel. The increase in bending strength as compared with the original cast iron is approximately 30 per cent; the compressive strength is increased 30 per cent, and the tensile strength by only 18 per cent. The freedom from acid decreases slightly, but not to the extent anticipated. Probably the catalytic effect of the graphite is too considerable. The following mean figures are given for a nickel addition of about 1 per cent: Per cent nickel added: 0.87; total carbon, 3.89 per cent; graphite, 2.85 per cent; graphite expressed as percentage of total carbon, 74.1; bending strength, 31.3 kg. per sq. mm.; extent of bending or deflection, 6.8 mm.; tensile strength, 12.5 kg. per sq. mm.; compressive strength, 74.75 kg. per sq. mm.; Brinell hardness, 171; specific work of impact (resilience [Charpy]), 0.43 kg. per sq. cm; per cent loss of weight of a 10 gram cube when subject to a 1 per cent solution of sulphuric acid, 14.6. On metallographic examination, all melts exhibited the normal structure of a good gray cast iron, that is, very uniformly distributed graphite needles in a ground mass of ferrite, and pearlite in the form of laminæ.

"For the manufacture of high quality castings for machine parts, gear-wheels, etc., the writers recommend a percentage of added nickel of up to 1.20 per cent.

"Two test melts with added cobalt were prepared, the percentages of cobalt being 1 per cent and 2 per cent respectively. The results show the effect of cobalt to be opposite to that of nickel. The bending strength drops considerably, and the tensile and compressive strengths exhibit a gradual decrease, while the hardness increases slightly. There is therefore no possibility of using cobalt for improving the properties of cast iron."

Steel Mill Electrical Engineers' Meeting

What is called "fuel economy day" will be a feature of the annual convention of the Association of Iron and Steel Electrical Engineers at the La Salle Hotel, Chicago, in the week of Sept. 19. On Wednesday, Sept. 21, papers are announced on fuel problems as follows:

"Waste Heat Utilization for Steam Generation," by G. R. McDermott, assistant engineer, Illinois Steel Co., South Chicago, Ill.

"Combustion Control," by W. N. Flanagan, steam engineer Ohio works, Carnegie Steel Co., Youngstown, Ohio.

"Fuel Requirements of Steel Mills," by F. E. Leahy, fuel and experiment engineer, Carnegie Steel Co., Duquesne, Pa.

After the discussion of these papers, it is proposed to take up the advantages that may be derived from the use of such appliances as CO_2 recorders, flow meters, indicating combustion pressure meters, pyrometers and regulators.

New Sales Plan of Thos. Firth & Sons

The agency arrangement for the sale of sheet steel heretofore existing between Thos. Firth & Sons, Ltd., Sheffield, Eng., and Wheelock, Lovejoy & Co., New York and Cambridge, has been terminated, and Thos. Firth & Sons have appointed as their general sales manager for the United States Horace G. Hides, Hartford, Conn., who for the past 20 years has represented Wm. Jessop & Sons.

The stock of Firth-Sheffield sheets will be carried in the warehouse of the Firth-Sterling Steel Co., 312 Hudson Street, New York, an associate company.

Thos. Firth & Sons and the Firth-Sterling Steel Co. are also opening a joint office in Hartford, Conn., where Mr. Hides will have his headquarters, and where Henry I. Moore will represent the Firth-Sterling Steel Co.

DOLLAR CONTROL

Executive Management Should Watch Purchases No Less Carefully Than Income

BY JOHN J. RALPH*

There has been a great advance in the use of past records of business in judging the effect of past measures and present happenings. Years ago it was general practice to balance books once a year. This balancing was merely a bookkeeper's proceeding. To-day in some concerns balances are drawn as often as every month, and there is a thorough examination of what may be called fixed items, to see that there has really been no change and to allow for the effects of time. It is realized that plant investment, good will, machine equipment, design and patent properties are not fixed capital, but only relatively so.

The movement of the point of exact information is toward the exact time of the happening. Occasionally the cost-keeping system is so perfect that the results of to-day are available to-morrow morning. This makes it possible to keep an exact control on the dollar that is being spent on goods going through the works.

Specialty Development

Of late years business and professional literature has been full of a developing series of specialties, which in turn have exploited the possibilities of the different departments of a business, and each in turn has insisted that it was the major and essential element of success. In many cases these widely heralded discoveries are not really new, but are popularization of principles which have been known for many years, having reached considerable perfection in certain industries and trades.

Intense study of mass production was developed to a high degree in the agricultural implement and sewing machine industries. Perhaps the pioneer of machine mass production was the fire-arms manufacturer.

Cost accounting is to-day recognized universally as absolutely essential. There have been few new principles evolved. Costs and their elements have been known by progressive men since the foundation of industry. But the practice has now been codified, the elements laid bare, and the knowledge has been made general.

Similarly, there have arisen efficiency engineering, industrial management, statistical analysis, so-called scientific salesmanship and other "isms." There has been progress, both in actual accomplishment and in dissemination of knowledge of engineering, chemistry, agriculture and other basic sciences.

The Master Faculty

Proud as is each exponent of the specialties, yet there is one faculty upon which they all depend, to which they all yield obedience, of which they all pretend knowledge, but which belongs to none of them alone and includes all of them. This is plain business judgment and initiative.

Perhaps because of the universal knowledge of the truth of this, perhaps because of its empirical nature, its exceedingly personal nature; because of the general slavery to it and the dislike for making a display of bonds, scant justice has been done to it by the various specialties. Not that he who exercises it cares, for he handles the cash and cracks the whip for the rest of the "isms."

As business increases in size it becomes necessary to develop the various specialties. The general adoption of modern methods of accounting and cost finding is a special instance of this. Their purpose is to furnish to the executive an accurate small-scale reproduction of the entire institution, so that he may follow all that is being done, and thus control it.

He it is who is responsible for the dollar, its growth and its protection. The bookkeeper tells him of what has been done. The cost-keeper brings the record up to yesterday. The efficiency engineer cares for the securing of the maximum returns on it to-day. His is the problem of the dollar control. The height of its perfection is shown in the accuracy of the forecasts of the future and the aptness of the steps that have been made to take advantage of it. Just as the increasing size and complexity of modern business have forced the evolution of modern record keeping, so that the executive might keep track of developments, so the same cause has taken out of his hands many of the control functions which, whether he realizes it or not, are now exercised by his subordinates. His power is more and more that of mere control, of approval or of veto.

Executive Reluctant to Give Up Power

Still the old feeling of the power of the executive persists. He is reluctant to give it up, reluctant to see how he has been compelled to delegate to others. And throughout the organization there is the reluctance of the individual to see responsibility and to assume it.

Where, in the old days, judgments were made and initiative exercised by the executive, to-day he chooses between two or more alternatives offered by his subordinates. He is free, if he wishes to do so, to judge which of two different kinds of machines he will buy, but the design and manufacturing departments, by their prior decisions, have forced the type of machine he must choose.

Similarly, the sales department dictates what shall be the output of the coming years. Theirs is the responsibility of gaging the market, and of getting from the design department what they will want. Here again the executive must act, but this action is that of approval or veto. It is not an independent action. If John Fritz were alive to-day he would not design his own blowing engines, master steel maker that he was. There would be too much else for him to do, and others exist who could design as well as he.

Large decisions are made up of an infinity of smaller ones. Unless the entire organization is forward looking, and so closely knit together that the best collective judgment is used, the executive has poor alternatives from which to choose.

Bookkeeping or cost records can be a record only of what has already been done. It is necessary that the lessons contained in them be thoroughly learned, for they form the basis of future judgments. There are always hidden elements not revealed by these records. Part of these lie within the institution, part of them without. The intangible things of to-day—the happenings of to-morrow—are not to be found on a paper record. Here lies the element of speculation in business, for the business man must act and determine in advance of the actuality.

If the executive has lost much of his power to make decisions, to plan, to execute; if this has passed to his organization, it is a most important part of his duty to see that they develop the faculty of foresight, and realize the part they are actually playing in the life of the organization.

The Control Line

The cost record, the production chart, furnish the basis of control of what is going on now. The bookkeepers' record, the yearly balance sheet, tells the story of what has occurred in the past, and either justifies or condemns the errors of the past.

Where does the control of the future lie? The capable executive keeps in close touch with all parts of his organization, but there must be some particular point where all must recognize a formal control line.

The tendency is to watch carefully the point where the dollars come in. This is desirable, but they are the result of work done. The real point to watch is where the dollars go out. The incoming dollar is the fruit, the outgoing dollar is the seed, on which the institution depends for its life.

This is what makes buying so important.

Here is the logical point to control that which will happen in the future. If insistence is placed on the perfection of the methods of determining on purchases, the forethought involved, the co-operation in planning for the future, then the alternatives offered for decision will be worth while. This is the logical point from which to enforce realization of the part each one in the organization has in determining its future—the necessity of thorough work and of co-operation.

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Universal Steel Classification Code

Proposed New Code to Supplant Present S. A. E. System—Claimed to Be Simpler, More Elastic and Easily Expanded

—BY HORACE C. KNERR* AND ARTHUR L. COLLINS*—

THE present system of classifying steels, known as the S. A. E. system, was inaugurated by the iron and steel division of the Society of Automotive Engineers in 1912. The idea behind this movement was to afford a code by which any steel could be designated and to indicate concisely the important elements present in the steel with the approximate amounts of each. Those behind this movement decided on numerical symbols, believing that such a system would be sufficiently comprehensive. To quote from the S. A. E. handbook:

The numeral index system adopted in the numbering of the metal specifications renders it possible to employ specification numerals on shop drawings and blueprints that are partially descriptive of the quality of material covered by such numbers. The first figure indicates the class to which the steel belongs; thus, 1 indicates a carbon steel; 2, nickel, and 3, nickel-chromium. In the case of the alloy steels, the second figure generally indicates the approximate percentage of the predominant alloying element. The last two or three figures indicate the average carbon content in "points," or hundredths of 1 per cent. Thus 2340 indicates a nickel steel with approximately 3 per cent nickel (3.25 to 3.75) and 0.40 per cent carbon (0.35 to 0.45); and 52100 indicates a chromium steel with about 2 per cent chromium (1.20 to 1.50) and 1.00 per cent carbon (0.95 to 1.10).

AUTHORS' SYNOPSIS

The present system of steel classification is believed to be limited in scope, arbitrary rather than scientific and not inherently capable of consistent expansion.

The original simple plan is already outgrown; the proposed further expansion tends to complication. Examples of inconsistencies are shown.

A scientific system capable of unlimited expansion is needed. Symbols should be consistent and should suggest material represented, aiding the memory.

A straight number system is necessarily limited.

A combined letter and number system is suggested, which is mnemonic, simple and truly elastic, and which indicates both materials and their approximate quantities, if desired, without complication.

Illustrations of the proposed system are given.

The basic numerals for the various qualities of steels specified follow:

Carbon steels 1	Chromium-vanadium steels..6
Nickel steels 2	Tungsten steels 7
Nickel-chromium steels 3	Silico-manganese steels....9
Chromium steels 5	

It is claimed for this system that it is "capable of unlimited expansion and that no other system could be as simple."

Nevertheless consideration was recently given by the society to revising this system to take care of the rapidly increasing number of alloy steels. It was soon found that in expanding the old code to meet the enlarged requirements, it was necessary to depart from the original plan and to arbitrarily assign symbols to new types of steels without regard to consistency. In other words, it was impossible to adhere to the original method.

The following elements were regarded as being of sufficient metallurgical importance to be considered as possible constituents of alloy steels:

Aluminum	Nickel
Carbon	Silicon
Cobalt	Titanium
Copper	Tungsten
Chromium	Uranium
Manganese	Vanadium
Molybdenum	Zirconium

The method of expansion proposed by the society to take care of the new alloys may be illustrated by the following cases:

Group 1—Carbon steels.

10--Carbon steel as now specified.
10--(plus three figures for carbon contents above 1.00 per cent.)
11--Carbon steel, screw stock.
12--Carbon steel, castings.
13--Carbon steel, with manganese content from 1.00 to 1.50 per cent.
113--12-14 per cent manganese steel.

The figures 14 to 19 are reserved for additional carbon steels.

Group 2—Nickel Steels.

The first figure indicates the nickel group while the second figure represents the per cent of nickel, thus:

21--Nickel steel with 1.00 per cent nickel.
23--Nickel steel with 3.00 per cent nickel.
25--Nickel steel with 5.00 per cent nickel and so on.

The remaining numbers, 26 to 29 inclusive, are reserved for other nickel steels, such as NiV, NiMo, NiMn, NiSi.

Group 3—Nickel-Chrome Steels.

31--Nickel-chrome with 1.00 to 1.50 per cent nickel.
32--Nickel-chrome with 1.50 to 2.00 per cent nickel.
33--Nickel-chrome with 3.00 per cent Ni and 1.50 per cent chrome.
34--Nickel-chrome with 4.00 per cent Ni and 1.50 per cent chrome.

The remaining numbers, 35-39, inclusive, are reserved for other nickel-chrome steels such as NiCrV, NiCrMo, NiCrSi, etc.

Group 4—Unassigned.

Group 5—Chrome Steels.

51--Chrome steel as now.
52--Chrome steel with 1.00 to 1.50 per cent Cr.
52--Chrome steel with 3.00 per cent Cr.
54--Chrome-steel with 4.00 per cent Cr.
512--Chrome steel with 12.00 per cent Cr.

The remaining numbers are for other chrome steels such as CrMnSi, CrMo, CrSi.

Group 6—Vanadium and Chrome-Vanadium Steels.

60--Vanadium.
61--Chrome-vanadium as now.
62--Chrome-vanadium with 2.00 per cent Cr.
63--Chrome-vanadium with 3.00 per cent Cr.

The remaining numbers are reserved for other combinations such as CrMoV, CrSiV.

Group 7—Tungsten and Tungsten-Chrome.

70--Tungsten 5.00 per cent W.
71--Tungsten-chrome with 1.00 per cent W.
72--Tungsten-chrome with 2.00 per cent W.
73--Tungsten-chrome with 3.00 per cent W.
74--Tungsten-chrome with 4.00 per cent W.
75--Tungsten-chrome with 5.00 per cent W (Magnet).
713--Tungsten-chrome with 13.00 per cent W.
716--Tungsten-Chrome with 16.00 per cent W.

It was undecided whether to designate the straight 5.00 per cent W. steel as 70 or 75, and whether there would be occasion to classify any other tungsten steel in this group.

No provision has been made to take care of tool steels.

Group 8—Not Assigned.

Group 9—Silicon and Silicon-Manganese Steels.

90--
91--Silicon steel with 1.00 per cent Si.
92--Silicon steel with 2.00 per cent Si.
93--Silicon steel with 3.00 per cent Si.
94--Silicon steel with 4.00 per cent Si.
95--Silicon steel with 5.00 per cent Si.

*Metallurgical engineer, Philadelphia.

The remaining numbers are reserved for the other silicon combinations such as SiCr, SiNi, etc.

In all the above symbols, the dashes represent carbon content.

Limitations of Present S. A. E. System

It is believed that a careful analysis, entirely unprejudiced by the familiarity of usage and custom, would show that the present system of designation of steels by numbers, although it has perhaps been simple, convenient and workable up to the present time, is in reality unscientific, arbitrary and not inherently capable of wide expansion.

The original plan of using the first figure of the designating number to indicate the alloy, the second figure the approximate amount of the alloy and the final two figures the approximate carbon content of the steel was excellent so far as it went, but it has quite evidently been outgrown by the multiplicity of alloying elements and combinations which have come into use.

It is true that an arbitrary assignment of unused numbers may be made to cover the diverse alloys now immediately in view, with some margin for further expansion, but such numbers will necessarily be inconsistent with the fundamental plan of the system and must therefore lead to confusion.

Inconsistencies Illustrated

For example, under Group 2, nickel steels, the first figure, 2, indicates nickel, the second, from 1 to 5, the approximate percentage of nickel, and the third and fourth figures, the carbon content. It is now proposed to use the remaining numbers, 26- -, 27- -, 28- -, and 29- -, for nickel steels containing another alloy, excepting chromium, such as vanadium, molybdenum, manganese, silicon. The original plan is thereby abandoned and confusion is inevitable.

Moreover, is there any reason to feel sure that numbers at present unused will take care of all new or unlisted alloys and combinations of alloys? For instance, 26- -, 27- -, 28- - and 29- - are proposed to take care of four different alloys of nickel. When these are assigned, what about further alloys? And how will varying *quantities* of the alloys be indicated? Are there not several possible proportions of, say, nickel-molybdenum to be distinguished? How will a number such as, say 27- - for the nickel-molybdenum group do this?

To illustrate the inconsistencies which will result from further expansion of the present system, take several steels having an 0.30 per cent carbon content:

2330 = 3.50 per cent nickel.
2630 = say (?) per cent nickel, (?) per cent vanadium.
2730 = say (?) per cent nickel, (?) per cent molybdenum.
3130 = 1 per cent nickel, 0.60 per cent chromium.

Why should the second figure in the first case represent the amount of nickel? In the next two cases the presence, but not the amount of some other element, say vanadium or molybdenum, the amount of nickel being ignored; while in the last case the first figure indicates two elements, nickel and chromium, the second figure the amount of nickel, while the amount of chromium is ignored.

Furthermore, nickel-chrome-vanadium shall be, say, 36- -, which does not indicate the quantity of any alloy, whereas, without the nickel the same steel would be 61- - (chrome-vanadium), or if the chromium were omitted, it might be 26- - (nickel-vanadium). For chrome steels, we have the Group 5, which does not appear in any of the above combinations containing chromium. For tungsten-chrome steel we use 71- -, 72- -, etc., the first figure indicating the presence of tungsten and the second figure the amount, there being nothing to indicate either the presence or amount of chromium.

Many illustrations of such inconsistencies and departures from the original plan could be quoted. It would seem as if the matter might become almost as arbitrary and involved as the Chinese alphabet, if much expanded.

Need of a Universal System

Ten years ago, when the system was adopted, alloys were few. At the present time, the number of alloys and combinations has already outgrown the original simple plan. Is there not reason to believe that new discoveries and experiments may result in even greater expansion in the next 10 years? May it not, therefore, be time to develop a system founded upon a scientific basis, which can be expanded indefinitely to meet present and future needs without becoming arbitrary and complex or introducing exceptions?

Any straight numerical system is necessarily limited. For example, in the present system, the first figure (on the left) is sometimes used to designate one material and sometimes two (as 2- - - for nickel and 3- - - for chrome-nickel), while the second figure sometimes designates the amount of the first material (as 23- - for 3½ per cent nickel), sometimes the amount of the second material (as 32- - for chrome-nickel with 2 per cent nickel), sometimes the amount and presence of the second of two materials (as 63- - for chrome-vanadium, with 3 per cent Cr.), and it is now proposed to have the second figure sometimes designate the presence but not the amount of a third material (as 36- - for nickel-chrome-*vanadium*). Further complications are introduced by using two numbers to designate the amount of certain materials (as 113- - for 12 to 14 per cent manganese steel).

It seems clear, therefore, that by using numerals alone, a system permitting unlimited expansion without inconsistencies is impossible (unless, perhaps, a complicated decimal system running into high numbers were used, analogous to the Dewey decimal system, which is undesirable). One reason for this limitation is that the number of available units, 9, is less than the number of alloying elements, already more than 12.

Characteristics Desired

It is, therefore, worth considering whether a system involving letters may not indeed be developed to meet the requirements. A perfect system should be:

Brief, easy to say, write or print.
Universal, capable of unlimited expansion.
Comprehensive, capable of indicating approximate quantity of each alloy as well as its presence.
Mnemonic, easy to remember.

A letter system has the advantage that there are 24 available units (omitting O and I), as compared to 9 with numbers. A letter is as simple as a number for designating a material, and within certain limitations, the letters can be chosen so as to represent, or at least suggest, the name of the material in question, which a number cannot do. Numerals may then be used solely to indicate the quantities, which is their true function. This comes down to a simplified chemical system. Can such a system be made sufficiently simple to meet the requirements?

Proposed System

As indicated above, there are 14 elements at present recognized as likely to enter into alloy steels. Discovery may result in the use of a number of others. Let us consider the present ones listed in the following table, with a proposed designation for each:

Element	Chemical Symbol	Proposed Alloy Symbol
Aluminum	Al	A
Carbon	C	C
Chromium	Cr	K
Cobalt	Co	B
Copper	Cu	Q
Manganese	Mn	M
Molybdenum	Mo	L
Nickel	Ni	N
Silicon	Si	S
Titanium	Ti	T
Tungsten	W	W
Uranium	Ur	U
Vanadium	Vd	V
Zirconium	Zr	Z

Each of these elements is symbolized by a single and distinctive letter which suggests, in some degree, its name or chemical symbol, so that the system is so far mnemonic.

This leaves 10 letters of the alphabet to take care of other elements whose usefulness is still to be learned. The letters I and O should be omitted

on account of their resemblance to numerals.

This permits of nearly doubling the number of alloying elements now used, before combinations of two letters will be necessary. It is apparent that even should two letters be employed to designate any new element there would be no resulting confusion. This, of course, contemplates the use of capital and small letters for a symbol. The symbol for carbon would not necessarily appear, as will be seen below.

In order to indicate, approximately, the quantity of any alloying element, numbers would be used, as in the present system. The number would be placed after the symbol of the element referred to. When unnecessary to designate the amount of the element, this number could be omitted. The carbon content would be indicated by the figures at the extreme left, the prefix C being implied but not written, except in the case of straight carbon steels.

The letter X may be used to designate special steels, differing slightly from the standard, as in the present S. A. E. system. This would be placed at the end of the symbol, so as not to interfere with the carbon content.

Some illustrative examples of groupings and designations under this proposed system follow:

Carbon Steels

Proposed Symbol	Present Symbol
C10	1010
C20	1020
C95	1095
C125	10125
Etc.	

Nickel Steels ("N" Steels)

Proposed	Present	
20N1	2120	(1% nickel, 0.20% carbon)
20N2	2220	(2% nickel, 0.20% carbon)
35N3	2335	(3.50% nickel, 0.35% carbon)

Nickel-Chrome Steels ("NK" Steels)

Proposed	Present	
20N1K	3120	(1.25% Ni, 0.60% Cr)
30N2K1	3230	(1.75% Ni, 1.10% Cr)
40N3K2	3340	(3.50% Ni, 1.50% Cr)
35N3KX	X3335	(3.00% Ni, 0.80% Cr)

Chrome Steels ("K" Steels)

Proposed	Present	
20K1	5120	(1% Cr, 0.20% C)
30K2	5230	(2% Cr, 0.30% C)
60K12	51260	(12% Cr, 0.60% C)

Vanadium and Chrome-Vanadium Steels ("V" and "KV" Steels)

Proposed	Present	
20V	6020	(Vanadium)
20VK1	6120	(1% chrome)
35VK2	6235	(2% chrome)

Other Combinations

It may be seen that the symbol for any steel may be built up logically from the constituents present, thus:

First figures—carbon content.

Then the letter indicating predominating alloy, followed by a numeral showing its approximate percentage.

Next a letter representing second alloy followed by a numeral indicating its approximate amount, etc.

As in the present S. A. E. system, it is not necessary to indicate the less important elements, such as phosphorus, sulphur, etc. It quite often happens that manufacturers produce valuable steels that do not conform to the analyses set down, more or less arbitrarily, by the S. A. E. An undue multiplicity of alloy steels is to be avoided in the interest of standardization; nevertheless, a truly elastic code system should be such that any new alloy steel which has proved its usefulness may be symbolized easily and without confusion.

For example, take a steel of the following composition belonging to the chrome-nickel-molybdenum group:

Carbon—0.25–0.35 per cent
Chrome—0.70–1.00 per cent
Nickel—2.75–3.25 per cent
Molybdenum—0.30–0.50 per cent

In the proposed system, this would be symbolized as follows:

3ON3K1L4

In the present system, there is no way of indicating the quantities of alloying elements, and should a number be assigned it would be purely arbitrary. This is but one example of how difficult it will be, by the S. A. E. system, to classify many of the new alloy steels which have demonstrated their value during the last few years.

A few more illustrations of the application of the proposed system to some new steels follow:

Nickel-vanadium ("NV") steel, - - N - V -.
Nickel-manganese ("NM") steel, - - N - M -.
Nickel-molybdenum ("NL") steel, - - N - L -.
Nickel-chrome-vanadium ("NKV") steel, - - N - K - V -.
Nickel-chrome-molybdenum ("NKL") steel, - - N - K - L -.
Chrome-manganese-silicon ("KMS") steel, - - K - M - S -.

In the above, the dashes would be replaced by the numerals representing the approximate amounts of the elements, the first two numerals indicating carbon content. In case it were desired to show fractional percentages of any element, this could be done by introducing decimal points, thus 3.50 per cent nickel steel of 0.35 carbon would be written: 35N3.5.

It is evident that this system is perfectly elastic, any combination of alloys can be indicated, the quantities of each element can be signified without confusion, if desired, and the symbols are easy to remember.

The authors do not consider that this plan is by any means perfect and feel that the subject should receive very careful consideration from many angles before a new system of symbols is adopted. It seems that a combination of letters and numerals will provide the simplest form of symbol in the end and that, in fact, such a combination is essential in order to make the system truly expansible and at the same time give the information desired in the briefest form.

It is entirely possible that this system could be adapted to the important field of non-ferrous alloys, but this is beyond the scope of the present paper.

The fundamental principles of the plan may be recapitulated as follows:

Letters represent alloying element.

Numbers represent quantity of alloying element.

The number shall immediately follow the letter indicating the element to which it refers.

Single letters shall be used to represent all the most important alloying elements. (24 different letters are available for this purpose, omitting I and O, because of their similarity to numerals.) For the less important elements, a capital and small letter may be used.

The letters to be chosen to suggest the name or the chemical symbol as consistently as possible, at least for the most important metals.

Numbers, indicating quantity, may be approximate, or may be accurately expressed in several figures, if desired, without confusion.

Carbon content to be placed at the beginning of the symbol, rather than at the end as in the present system.

The number of figures (letters and numerals) in any symbol will depend upon the number of alloys present in sufficient quantities to warrant attention and upon the degree of accuracy to which it is desired to indicate the quantity of each element. It would be impractical to have the same number of figures in each symbol. The letter representing alloying elements should be arranged in order of the importance of the alloy.

It is not claimed that this plan is a final solution of the problem. It is offered in the way of constructive effort, in the hope that it will stimulate interest and discussion which, we trust, will lead to the development of a truly scientific, comprehensive and practical method of classification.

Hot metal will be transferred direct from the new blast furnace of the Trumbull-Cliffs Furnace Co. at Warren, Ohio, to the open-hearth furnaces of the Trumbull Steel Co., located on the opposite side of the Mahoning river. A bridge has been erected for conveyance of the metal direct. Officials state that no date has yet been set for starting the furnace, though ore piles are being built up. Construction of by-product coke ovens is the next step in the development at the Trumbull company's property.

The Link-Belt Co., Chicago, announces a reduction of 10 per cent in the selling prices of malleable iron and steel chains, sprockets, buckets and other products.

WAGE PROBLEMS

Some Steel Companies May Make Further Reductions Plants Losing Money

YOUNGSTOWN, OHIO, Aug. 30.—While advices are to the effect that a number of Eastern independent steel interests are preparing to reduce wages, following action by the Steel Corporation effective Aug. 29, independents in the Mahoning and Shenango Valleys are planning no further curtailments in this respect at present.

"We are losing money at present steel prices and will probably lose more money if we enlarge production," states the president of an important Valley producer. "The actual cost of manufacturing the steel which is sold to-day is higher than the selling price.

"We dislike to reduce wages and will not do so unless compelled to, but the situation is such that labor cost is the only element in current production costs which we control. We cannot expect a further reduction in the price of coal as long as miners are paid high wages. The miners refuse to talk about wages until their contract expires next spring.

"We cannot expect reduction in assembling charges of raw materials, because wages of railroad workers have not been reduced in proportion to the wage rates paid in the steel industry, and railroads as a consequence cannot sell transportation at reduced prices. Our stockholders are taking a loss now. We cannot expect them to take even larger losses, if we keep on operating.

"On the other hand, we cannot afford to shut down our plants entirely. We have a regular list of customers who gave us their business in good times, when we made a profit in dealing with them. We cannot now disregard them, but must fill their orders even at a loss to our company. We cannot disrupt our sales and operating organizations, though we have cut them to the bone and have simply skeleton organizations left.

"We thought that conditions would turn for the better in the fall, but readjustment is slower than we expected. While steel prices have tumbled next to farm products, other industries have not kept pace and we will have to mark time until conditions become equalized."

For the Real Open Shop

At a meeting of the Locomotive Crane Manufacturers' Association, held recently in Cleveland, resolutions were adopted opposing anything that interferes with freedom of contracts of employment and favoring "the real open shop, in which every worker's chance is as good as every other worker's chance, and from which no worker is shut out because he holds a union card and from which no worker is shut out because he has no union card."

Rainey Employees Strike

UNIONTOWN, PA., Aug. 29.—Dissatisfaction over wage reductions at W. J. Rainey, Inc., plants, reported in THE IRON AGE last week, spread during the week just closed with the result that five of the leading plants of the company were forced to suspend operations. Mt. Braddock, Allison, Royal, Revere and Elm Grove plants are closed to-day. Paull plant was closed Aug. 26, when men refused to go to work. A few, however, reported back, and there are some indications that the plants may all resume work next week.

After closing of Mt. Braddock and Allison, employees there prevailed upon the employees at the other plants to walk out. Large groups of the workers marched to the plants yet in operation during the early hours of the mornings and called the workers out of beds for meetings, resulting in their walking out in sympathy. In one instance, when a large group were marching to Paull, sheriff's deputies dispersed the men. Aside from this incident there has been no disorder of moment.

The men, in presenting their claims to their superintendents, demand retention of the Frick scale, lower commodity prices in company stores and a few changes in working conditions. In all 2500 men have been affected as a result of the walkout.

Inquiries for furnace coke are stronger this week than at any other time during the depression. Prices below $3 have been eliminated.

Cable Company Awaits Wage Reduction

ST. LOUIS, Aug. 30.—The Standard Underground Cable Co., Pittsburgh, will not start construction of its plant in St. Louis until the building mechanics recede from the present high scale of labor effective here of $1.25 an hour, which was practically the highest peak reached during the war period. The company, however, will go ahead with the grading of the site, which occupies approximately 600,000 ft. of ground, and the installation of spur tracks. The building will be approximately 320 x 520 ft., and the investment for grounds and buildings will represent $1,000,000.

This announcement was made by R. D. Sangster, industrial commissioner for the St. Louis Chamber of Commerce.

In the Field of Labor

Announcement has been made at the Lynn and Pittsfield plants of the General Electric Co. that, effective Nov. 1, the pay of all salaried employees will be reduced 10 per cent. The cut will apply to salaried officers as well.

Effective Aug. 29, wages of approximately 5000 employees of the American Steel & Wire Co., Worcester, Mass., were reduced 20 per cent, making a total reduction of 36 per cent within a few months. In addition, overtime pay has been abolished.

An application for an injunction against members of the Amalgamated Association of Iron, Steel and Tin Workers to restrain them from picketing the Belmont mill and interfering with the men working at the company's plant recently was filed by the Wheeling Steel & Iron Co., in the circuit court of Wheeling. The application will be heard on Monday morning, Sept. 5. The petitioners charge that the members of the Amalgamated Association are out on strike and are interfering with men employed at the mills.

Owing to irregularity of employment and unemployment in the steel mills at Youngstown, Ohio, the Spanish colony there has dwindled from 3000 to 700 men. Many of the Spaniards have migrated to other sections of the country.

The receiver for the United (Street) Railways, St. Louis, has announced a cut of more than 15 per cent in the wages of between 400 and 500 employees of their general repair shops. The reduction is due to general business depression and closing down of manufacturing establishments, which caused a heavy falling off in street railway travel. The cut is effective Sept. 1. The men entered a protest and negotiations have been started.

Railroad Conditions Improving

For the first time this year, total shipments of freight exceeded 800,000 carloads, when in the week ended Aug. 13 the number reached 808,000, says the *Railway Age*. This was substantially less than the railroad freight movement for the same weeks in 1920 and 1919, but reflected the slow but steady improvement in the railroad situation which is taking place. Railroad net earnings are increasing as business improves and expenses are brought under better control, and the July reports, when available, undoubtedly will make much the best showing this year.

The American Bosch Magneto Corporation, Springfield, Mass., has received a contract for starting, lighting and ignition systems from the Hudson and Essex automobile makers involving better than $1,250,000, deliveries to extend over a period of months. A large percentage of the work will be done at the Gray & Davis, Cambridge, Mass., plant subsidiary.

Continuous Foundry for Pipe Fittings

Designed for Minimum Handling of Sand, Castings, Cores, Hot Metal and Flasks —Novel Layout and Modern Details

BY HENRY M. LANE*

ORIGINALLY the castings for the General Fire Extinguisher Co. were made by the Carpenter Foundry Co. in Providence, R. I. When, later, the Carpenter interests were taken over, a new foundry plant built at Auburn, a suburb of Providence, was a pioneer in many features in the production of this type of castings. The Auburn foundry is a two-story structure, with three stories over part of the ground, the castings being made on the upper floor and passed to the lower floor for transportation to the cleaning room.

Recently the company has built, at Warren, Ohio, a large new plant in which advantage was taken of experience gained in the old plant, and information resulting from careful studies of the general foundry field. At Warren had been maintained for many years a pipe-cutting and assembly plant; the machine shop has now been extended to include pipe tapping, and a complete foundry has been built for producing all sizes of pipe fittings up to approximately 8 in. Heavy pipe fittings are practically all produced in the company's Southern plant, at Atlanta, Ga.

Incoming Coke and Metal Are Unloaded in the Yard at Left. All melting stock passes up the elevator tower in foreground, then across the bridge, and so reaches the cupolas, the stacks of which show above the roof. Sand bins are in the corner of the building, back of the blank walls

Like the Auburn plant, the new Warren plant is a two-story structure, but it has a number of new features in storage and handling. The incoming freight track runs alongside the building, and pig iron is unloaded from the cars into piles away from the building. Coke is unloaded into a big pit depressed below the general yard level, but at the time our picture was taken an additional supply had been piled above the yard level.

Incoming sand, dumped into a hopper under the track, is taken up by mechanical means and stored in sand bins. The material for melting stock is handled from the pig iron and stock yard onto a transfer car, electrically operated, which runs the length of the yard. Cars going to the charging floor are brought by this transfer track to the elevator shaft, taken up the elevator and across the bridge onto the charging floor. Under this bridge is the refuse bin, into which all such refuse as material from the cupola drop, burned sand and ashes are dumped. From this they can be dumped directly into outgoing cars.

The charging platform is on a level which would be really the fourth floor of the foundry building. Under the platform is a compact concrete structure, shown at the right of the bin, which consists of a series of sand bins nearly 40 ft. deep.

Above these bins is a belt system; the sand comes up an elevator and is transported over the bins by means of the belting, and scraped off into any given bin by plows, one of which is shown near the head of the belt. These plows can be lifted out of the way so that only one is in operation at a time. The bins are like grain elevators or silos and give a considerable depth of sand in storage, so that the number of tons on a given floor area is rather surprising. Sand is taken out from the bottom of these bins and transported by the monorail, for blending with the old sand in the molding sand equipment, or wheeled to the core sand mixer.

Only a few feet from these bins is the core sand mixer. Any sand which requires riddling before mixing is put through a gyratory riddle, which swings on the small crane shown. The mix is then bedded down so as to get the various ingredients thoroughly blended before they are shoveled into the mixer.

At this point the fact may be noted that the company is a pioneer in a good many things in the core line. At the Providence plant many years ago a core mixture was worked out which contains no oil, and this type of mixture has been used successfully ever since. The secret of its success, however, is largely due to the fact that in a continuous foundry a water soluble binder may be used, for the cores do not remain in the mold long enough to draw dampness.

*President H. M. Lane Co., Detroit.

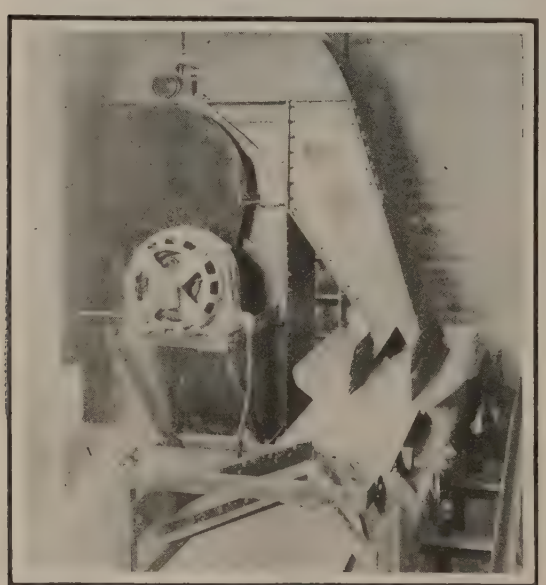
Core Sand Mixing Equipment Includes a Gyratory Sand Sifter for Riddling Sand and a Batch Mixer. At rear is the casing of the elevator which conveys the mixed core sand to the core room

In the Warren plant essentially the same mixture has been adopted, composed of a sharp or lake sand like Michigan City sand, a certain amount of molding sand and a binder made from waste liquor refuse from the sulphite paper process. After a mixture is made it is dropped directly from the bottom of the mixer through a chute into the elevator and passes up to the sand storage bins over the coreroom.

One view shows the Holcroft & Co. core ovens on the left, with some of the core racks on the right. The three rack-type ovens and three drawer-type ovens are all fired from one firebox on the first floor. Doors in a partition in the background lead to the coreroom proper. The core sand, discharged from the elevator into any one of several bins by a swinging spout, is then distributed by means of an overhead gallery and dumped directly into bins back of the coremakers' benches, or into bins for the Demmler core machines.

Behind the core racks at the right is a partition which immediately adjoins the molding floor; through windows in this partition boxes of cores are passed directly from the coreroom to the molders. The work is so arranged that practically all dry sand core work is located on this side of the foundry. These windows are shown in the view of the foundry floor.

Another view shows the end of the series of coremakers' benches, with the sand spouts leading from the platform above, and also the Demmler machines used in making a very large proportion of the cores. The Demmlers were located at the end of the room next to the core ovens so that there would be a minimum amount of handling of the unbaked cores.



Sand Comes Up the Elevator, of Which the Head Is Shown, and Is Distributed by the Conveying Belt Running Over the Sand Bins. The plow in foreground can be located where desired

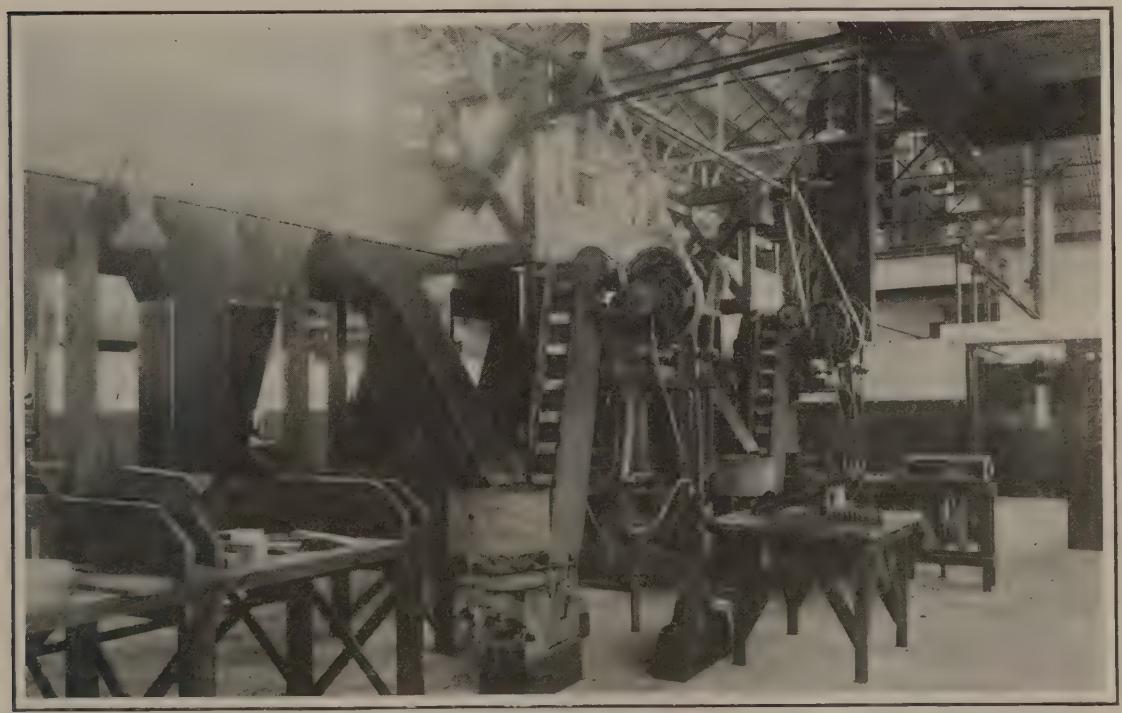
Sand Is Delivered to the Sand-Mixing System by a Monorail Grab Bucket, Which Removes the Sand from the Long Bin at Left, Where It Is Deposited After Being Shaken Out of the Used Molds

Core Ovens at Left and Racks at Right. Windows in the wall behind the racks permit passing of baked cores to the molding floor beyond. Core room is behind the double doors

Both sides of the molding floor are served by sand bins, but of slightly different type. In the general view of the molding floor are shown the undercut-gate bins which drop the sand directly into the molds. On this side of the shop is a continuous line of Nicholls molding machines. These are all jar ramming machines, and they are arranged with a cushion foundation, so that the vibration on the molding floor is reduced to a minimum. This illustration also clearly shows the windows back of each machine, through which cores are passed from the coreroom to the molding floor.

Tempered molding sand is taken in a car down the gallery over the molding machines and dumped directly into the bins. In front of the molding machines is an almost continuous dump-out grating, through which molding sand is dumped to the floor below, and at intervals are located casting chutes, through which the castings are sent down.

In practice, the molders set out a group of molds at one side of the floor, and the pouring gang then comes along and pours these while a group of molds is being put up on the opposite side of the floor. The first group is poured and shaken out and the flasks stacked back before the second group is completed. At the Auburn plant they have been able to utilize the floor



Demmler Core Machines Fitted Up for Making a Large Variety of General Fittings Cores. At left is beginning of a series of core-making benches for hand work. Sand from the elevated platform supplies both benches and machines

This Molding Bay Running Down the Center of the Building Is Supplemented by Another at the Left. Sand is distributed from the gallery at right. Core room is beyond the wall at right. Pouring cranes span each molding bay

from four to seven times, depending upon the type of work, and this in turn minimizes the distance that a molder must carry his molds to set them out. It also conserves floor space, and consequently investment in the plant.

Over the molding floor are a series of underslung cranes with Brillion pouring devices, so that the pouring gang can pour off without the use of hand ladles. The metal is distributed down the gangway in the center by means of a monorail.

On the opposite side of the foundry, part of the distance is taken up by a group of Nicholls machines and part by a group of larger Osborn machines. At the end of the plant next to the molding unit are located several large Osborn machines for making fairly heavy fittings.

Both castings and sand pass through the floor to the lower level, the sand landing in two long bins back of the casting chutes. Over these bins runs a monorail with a Sprague Electric Co. carrier and Blaw-Knox grab bucket, which carries the sand from the sand chutes to a bin at the end of the plant, under which a pan feeder feeds it through suitable mixing machinery in the basement under this part of the plant, where any core butts or scrap are riddled out. Sand from here passes up through an elevator to the top of the

Tumbling Barrels and Chutes for Delivering Castings. After being run through the tumblers, the castings are sorted into boxes and taken to the grinding room, behind the partition at right

Castings Are Brought from the Tumbling Department into the Grinding Room in Wooden Boxes Mounted on Stands Provided with Wheels. After grinding, they go into the barrels and are taken to the tapping room

sand towers, where it is tempered on a moving belt by adding sufficient water as it passes through a series of rakes and plows. It is then dropped through a Sellers centrifugal mixer and lands in a big bin over the sand galleries, from which it is fed by a pan feeder into cars for delivery back to the molders. The sand storage bins below and above are of sufficient capacity to hold sand equal to about six hours of molding, so that it is not necessary to have the grab bucket in constant operation.

One feature of this plant is the reduction of the handling distance to a minimum, by placing the tumbling barrels adjacent to the ends of the casting chutes. The series of casting chutes and the Sly tumbling barrels on the first floor are interspersed. Behind these tumbling barrels is located the long sand bin above referred to, and in front of them a monorail system for carrying castings to the grinding room.

The grinding room is located under the coreroom, the general view showing a series of Norton grinding wheels and sorting benches. More barrels are in view than would ordinarily be the case. In practice, the castings ready for grinding are brought in in the boxes, a few of which can be seen. These boxes are on wheels

Metal and Coke Brought to the Charging Platform in Cars Which Serve as Stock Bins Are Loaded in Charges onto the Small Cars Shown, Which Are Then Wheeled Over to the Cupolas for Use. All charges pass over the scale platform and are recorded

and are shoved up next to the grinding stand. As the grinding is done the finished castings are thrown into the barrels for transportation to the tapping shop.

Ingersoll-Rand Co. air-compressor and motor-generator sets necessary for the plant are located in a room on the first floor adjacent to the core sand mixing unit.

In the general view of the charging floor, the Kron scale at the left is located at the end of the bridge from the elevator in the yard. At the time this picture was taken the final charging system was not fully worked out. In practice, various grades of pig iron are brought from the yard on cars, in bulk, each car carrying from one to two tons of a given grade. On reaching the charging platform, the cars are used as stock piles from which the several charges are made up. The scrap likewise comes in cars. The charges are made up on small flat-wheeled cars on the scale, the material for each mixture being taken from the cars carrying the material in bulk, which are located around the scale. As soon as the charge is made up, the small car is shoved over near the cupola, and as several charges are made up ahead, the cupola never has to wait.

There is sufficient space on the charging platform for the storage of metal sufficient for two or more days' run, so that in case of bad weather it will not be necessary to bring in material from the yard. As the metal is kept in the cars, there is no labor used in unloading onto the charging platform. Attention is called to the fact that this charging platform is open to the main foundry structure, so that the heat from the stacks ascends directly into the monitor of the Pond roof and gives immediate ventilation to the charging floor.

Three Otis platform elevators of the micro-drive type are used in connection with this plant. One is in the tower of the yard, for bringing up pig iron and foreign scrap, and this runs below the general yard level, to the bottom of the depressed coke storage yard, to get coke. Adjacent to the charging platform is an elevator used for bringing up returned scrap to the charging floor level and also to handle rubbish into the rubbish bins. At the opposite end of the plant is an elevator for handling patterns, arbors, flasks, etc., from storage to the pattern-shop or to the foundry, and for handling general supplies to the stockroom, and serving the various floor levels at the end of the building.

Up to the foundry level the structure is of solid concrete of the beam type, and so designed as to reduce vibration from the molding machines to a minimum. Above the foundry floor level is a steel structure, with a Pond type roof over the foundry, and a flat roof over the service building, which houses the offices, pattern storage, a completely equipped pattern-shop, washrooms, shipping room and various other necessary adjuncts to a continuous foundry.

Two Whiting No. 7 cupolas are installed with 72-in. shells, provided with double linings to reduce the diameters. These cupolas are planned to melt about 30 tons per day. At present they are used on alternate days. Continuous pouring is to be the rule, either using one cupola in the morning and the other in the afternoon, or, after using one throughout the morning, blanking it with coke and blocking the tuyeres until time to start it up again in the afternoon. So far they have not started continuous melting, but are making a rather long heat each afternoon.

As screen type charging doors are found to last longer than the brick-lined type, the former are fitted. The cupola legs are on the level of the molding floor, and the drop falls through that floor into a room below, where it is quenched and then put through a Sly water-barrel to recover any iron or coke it may contain. The Roots blowers are mounted on a mezzanine floor immediately over the charging floor.

It will not be necessary to install a third cupola, for which the plant was designed, until the daily melt reaches 60 tons. That figure is the limit of the present cupolas, and is beyond the demand of the molding plant as now installed, but gradual extension will, it is anticipated, bring the capacity to that figure at no distant date.

The general contractors were the Foundation Co., the plumbing contractors the Stamberger Co. and the electrical contractors the Livingston Co. The sand handling equipment was designed by the engineers, the H. M. Lane Co., Detroit, who designed and laid out the entire plant. The sand handling machinery was furnished by the Lamson Co. Sash was furnished by David Lupton's Sons Co. The heating and sprinkling systems were installed by the owner.

LOWER EXPORT RATES

Interstate Commerce Commission Grants Petition of Eastern Railroads

WASHINGTON, Aug. 30.—In an effort to place the iron and steel industry of the country in a position to compete for business in foreign markets, the Interstate Commerce Commission last Thursday authorized the railroads east of the Mississippi river to re-establish export rates on iron and steel on five days' notice. These rates are slightly more than 20 per cent less than the rates now in effect. Applications for authority to re-establish export rates lower than the domestic rates were filed for the Central Freight Association lines by one agent. The Eastern lines acted individually. The applications were received and acted upon the same day. They are to become effective Thursday of the present week.

The railroads acted upon the representations made to them by the iron and steel industry about 15 days ago. They repeated to the commission the arguments made to them by the iron and steel makers, chief of which was that the industry is faced now by the conditions that confronted it in pre-war days. That is to say, the European nations that were devoting all their energies to the making of war have taken up their peace time efforts in commercial lines and Americans, to meet them in the common foreign markets, must have the benefit of rates to the ports lower than those given upon domestic business.

At the time of the conference in New York, the railroad traffic executives said that, in their opinion, iron and steel was not being held up by the freight rates to the ports but rather by the inability of foreign purchasers to finance orders they might be inclined to give to American producers. The railroad interests said they were inclined, however, to try the experiment of restoring export rates from 20 to 25 per cent less than the domestic rates, which now, almost without exception, are the full fifth class basis.

Under the tariffs, the rate on manufactured iron and steel from Chicago to New York will be 47.5c. instead of 63c., and the rate from Pittsburgh to New York will be 28.5c. The rate applicable on both export and domestic at present is 38c.

Export rates on iron and steel were abolished before the United States entered the war because Europe was clamoring so persistently for iron and steel from American mills that there was no commercial necessity for the railroads making any concession to the sellers. The latter were without competition. All iron and steel was under control of the governments at war and the neutrals were given only such as the warring nations had to give up in exchange for foodstuffs.

The disappearance of that control and the fact that the nations that were at war have devoted the output of their steel mills to purposes other than war, constituted the chief reasons for the restoration of export rates.

These tariffs, according to their terms, will expire Sept. 1, 1922. The filing agents made their preparations for the restoration of export rates with a view to having them become effective Sept. 1, so that the export rates, when filed will be intended to apply for one year at least. The chances are that they will remain indefinitely and tend to go lower.

Bids will be opened Oct. 19 at the office of the Obras Sanitarias de la Nacion, Buenos Aires, Argentine Republic, for 7000 tons of cast-iron pipe.

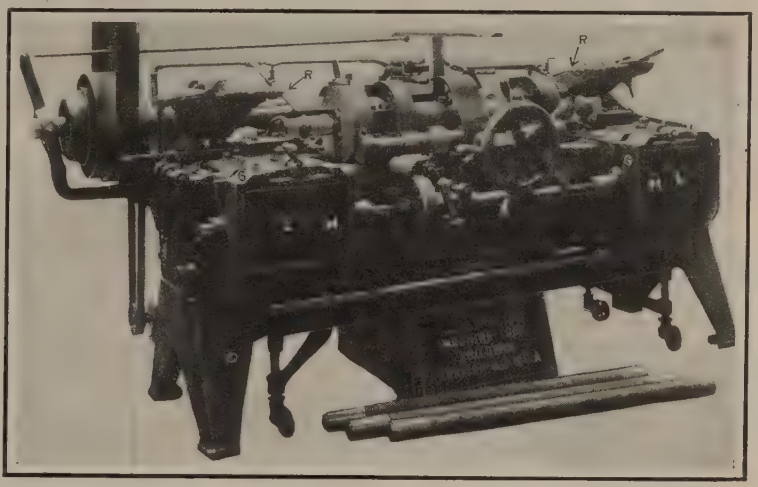
Axle Shaft Turning Machine

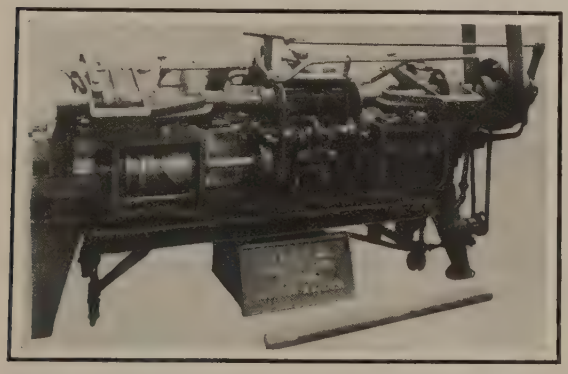
An interesting development in special purpose machinery is represented by the semi-automatic turning machine recently designed and built by the T. M. C. Mfg. Co., Harrison, N. J., for the Timken-Detroit Axle Co. The machine is shown in the accompanying illustrations and is used for machining automobile and truck axles of the "full floating" type.

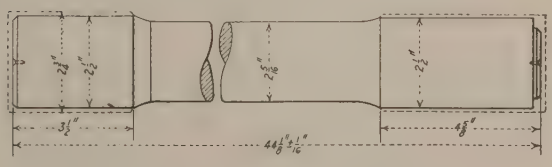
The shafts machined are of nickel or chrome nickel steel, the forgings being formed either by upsetting the ends of rolled bars in a bulldozer, or by the Baehr continuous die rolling process, operated by the Witherow Steel Co., Pittsburgh. The forgings are heat treated before machining. The machine takes the forgings, as shown on the line drawing, and squares the ends to length; turns down each end to the correct diameter; forms the bevel at one end and the check at the other. Each end is centered true before the shaft is removed from the machine, the centering being necessary for the further operations of finish grinding the diameter of the ends and hobbing of the splines required on the large diameters.

The forging to be machined is placed in the hollow spindle of the machine, leaving both ends projecting. It is held by two scroll chucks close to the portions to be turned and is located by a positioning stop which is brought up to place by a lever. The stop when not in use folds down out of the way. The chucks are operated together by the hand wheel acting through a differential which allows of the chucks being brought down equally tight on each end of the shaft irrespective of any variation in diameter of the bar under the two sets of jaws. There are four slides, the first pair carrying the tools which turn the diameters; the second pair face the ends to length and put in the check and bevel edges. Slides G and H (indicated in the illustration) make two and three movements across the work respectively during each cycle of the machine, the tools being advanced the amount of the cut to be taken before each passage of the tool is begun. The slides G are moved along the bed by cams L, which engage with cam rollers in the bed, each slide carrying a cross slide, K, controlled by cams M. Variations of diameter are taken care of by screw adjustments on each cross slide.

When the forging is clamped in position a trip lever starts the cam-operating shafts and the four tools move simultaneously over the work. When the cycle is completed the tools come to rest clear of the shaft. The operator then swings down the center drilling spindles, R, and sinks the centers, the shaft revolving meanwhile. The finished shaft is then ejected by an extension of the positioning bar which pushes the shaft far enough out of the chucks to be lifted out. A gear box provides three spindle speeds and three feed speeds to take care of various diameter shafts. The hollow main spindle is made telescopic and the slides at one end of the machine are adjustable to accommodate shafts of from 36 to 48 in. and diameters from 1¾ to 2¾ in. The drive is by a single belt and clutch pulley. The cutting tools are either circular formed tools or may be solid rectangular tools as desired. The time per shaft varies from 4 to 10 min. according to the diameter and cutting quality of the heat treated forgings.







Axle Forgings of the Dimensions Shown in the Line Cut Below Are Placed in the Machine Which Squares the Ends to Length; Turns Down Each End to Correct Diameter; Forms the Bevel at One End and the Check at the Other. The slides and cams and the center drilling spindles are indicated by letters in the view above. The rear view, at the left, shows further details of the slides and the arrangement of the gear box

Ore, Coke and Plate Rate Declared Unjust

WASHINGTON, Aug. 30.—A finding of undue prejudice, with an order to remove it before Dec. 1, has been made by the Interstate Commerce Commission in the case of the United Iron Works, Inc., against the Atchison, Topeka & Santa Fe and other railroads. The holding of the commission was that the railroads unduly prejudiced Iola and Independence, Kan., as to rate on iron ore, coke and steel plates. Specifically the finding was that none of the rates under attack by the complainant, which has plants at Iola, Independence and Pittsburg, Kan., and Joplin, Springfield and Aurora, Mo., for the manufacture of machinery of various kinds was unreasonable but unduly prejudicial to Iola and Independence to the extent that the rates to Iola on pig iron, coke and iron and steel plates from Chicago, and pig iron from Duluth, exceeded or may exceed the rates to Girard, Kan., a more distant point; and to Independence to the extent that they exceeded or may exceed by more than 30c. on coke from Chicago and by the same amount per gross ton on pig iron from Chicago and Duluth the rates contemporaneously maintained to Girard.

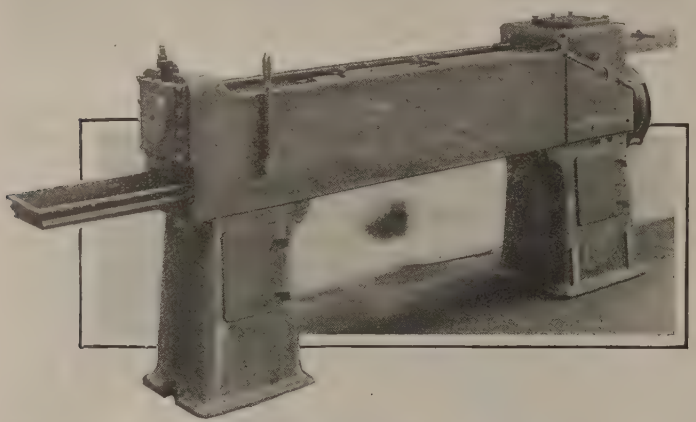
In a fourth section order, the commission denied relief on shipments of pig iron and coke from Chicago and Duluth to Girard, Kan., and directed the carriers to line up their rates, in conformity with the decision on the formal complaint, not later than Dec. 1.

The Macdonald Wire Goods Co., Drummondville, Quebec, Canada, is in the market for over 1,000,000 ft. of No. 12 and No. 6 galvanized wire cloth.

New Heavy-Duty Broaching Machine

A heavy-duty broaching machine having a cutting stroke of 15 ft. per min., and a return stroke of 55 ft. per min., is being placed on the market by the Velco Mfg. Co., Greenfield, Mass.

In this machine the broach holder is attached to a solid steel head which is supported throughout its travel by bronze-gibbed bearings sliding on steel ways. Power is applied to a rack which meshes with a pinion mounted on a heavy shaft having long bearings on either side of the pinion. The rack is of special steel, and the pinion of hardened steel and cut from the solid. The rack and pinion are designed to mesh exactly on the pitch line and the broach is attached so that the pull is directly on the pitch line of the rack. Vertical adjustments are made at the face plate. A gear stub tooth designed by the Fellows Gear Shaper Co., is used in the rack and driving pinion.



Rack and Pinion Are Designed to Mesh Exactly on the Pitch Line. The broach is attached so that the pull is directly on the pitch line of the rack

The teeth of the rack are on the under side and the rack supported in proper mesh with the driving pinion by means of rollers on the sides of the pinion and guide bars fastened on the side of the rack. In this way rolling contact on the pitch line is secured. The radial thrust of the driving pinion against the rack is taken by three hardened rollers, adjustable for wear. The pinion shaft is driven by a phosphor-bronze worm wheel and a hardened steel worm, running in oil, the worm shaft having ball-thrust and radial bearings. All other important bearings are bronze-bushed and ring-oiled.

Rapid return is accomplished by an internal gear cut on the worm wheel and driving the return gear shaft, the return motion being applied through the driving pinion. There are no high-speed gears, the fastest gear speed used having a surface speed of 60 ft. per min. The clutch is not operated during the cutting stroke, acting only as a positive coupling. No friction clutches are employed and all parts are protected from shock due to a positive clutch under load. In operating, the belt is first shifted to the loose pulley, thus relieving the load from the clutches. Further movement of the shifting lever applies a friction brake to the driving pulley and withdraws the positive clutch, still further movement of the lever engaging the reverse clutch, shifting the driving belt to the tight pulley and reversing the machine.

Automatic adjustable stops are provided and also non-removable emergency stops. A single lever conveniently placed controls every motion of the machine, control being further simplified by having the direction in which the operating lever is moved the same as that in which the rack will travel. The machine has but one speed and no countershaft is necessary. Cooling fluid is supplied by a gear-driven pump of adequate capacity. Three point suspension is a feature and all adjustments have been simplified and the entire mechanism made easily accessible.

The maximum pulling effort requires 15 hp., although all ordinary broaching operations may be handled with a 10 hp. motor. The machine is furnished in belt and motor drive, there being no change in construction necessary for either style. It is placed on the market as the Velco No. 4 production type broaching machine.

To Discuss Uniform Cost Methods

At the second international cost conference under the auspices of the National Association of Cost Accountants, to be held in Cleveland on Sept. 14, 15 and 16, one session—on Thursday morning, Sept. 15—is to be devoted to a discussion of uniform cost methods as used by the trade associations.

This subject has received a great deal of attention during the past few months as a result of the various investigations which have been made of the activities of the trade associations. There is a great deal of popular misapprehension as to the purposes and methods of uniform costing. It will be the object of this session to discuss all phases of the subject. Trade associations which have had actual experience with uniform methods will be officially represented. The Federal Trade Commission, it is expected, will also have an official representative present. It is hoped that as a result of this discussion some of the uncertainty as to how far it is legally possible to go in the matter of uniform accounting methods will be removed.

It appears that more than one hundred trade associations have made some progress along the line of uniform cost methods. No previous attempt has been made on such a large scale actually to get at the results which may be obtained from these systems.

Among other subjects of the cost conference are the following:

Executive Uses of a Cost System.

The Distribution of Overhead Under Abnormal Conditions.

Cost Systems as a Means of Preventing Waste.

Uniform Methods and Standardized Costs.

Interest as an Element of Cost.

The national headquarters of the association are located in the Bush Terminal Sales Building, 130 West Forty-second Street, New York.

Improvement in Demand for Refractories

PITTSBURGH, Aug. 29.—Business in refractories in the Pittsburgh district is somewhat quieter than it was recently, but in practically all other districts, especially those in which are located sheet and tin plate mills, the report about business is one of improvement. There is no tendency on the part of the blast furnace and steel plant interests to anticipate their requirements, even in Ohio, where business is comparatively good. Only actual requirements are being bought, but buyers are so insistent on early delivery as to indicate that their stocks are getting pretty low.

Prices are holding fairly steady at the levels established a few weeks ago. Suggestions are heard of price concessions here and there, but as a rule the reduction offered from regular quotations is extremely slight. The claim is common that there is no money in either fire clay or silica brick at to-day's prices. It is pointed out that freight rates are up 100 per cent as compared with 1914, and that there has been practically the same increase in labor costs. When it is considered that four tons of clay are required to make 1000 brick, it can be readily understood how present freight rates are affecting manufacturing costs.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 42.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		65.00
Chrome Brick:		
Standard size, per net ton		52.00

Steel Makers Heard on Metal Tariff

FERROALLOY DUTIES DISCUSSED AT LENGTH

Ferromanganese Manufacturers Ask Protection for a Newly Established Industry —Some New Classifications Asked and Changes in Wire, Pipe and Wide Strip Duties—Sheffield Tool Steel Companies Make a Statement

BY L. W. MOFFETT

WASHINGTON, Aug. 30.—In direct terms, the position of the independent steel manufacturers of the country relative to the metal schedule of the Fordney tariff bill was made known last week to the Senate Committee on Finance. Representing a prime industry with an enormous capital investment, with much at stake in the enactment of the proper duties on imports, those who appeared spoke forcefully and with knowledge. A strong impression was made upon the committee, even upon those members who were not in sympathy with the claims of the industry. The force of the arguments was not alone in the supporting evidence contained in written statements, but also in the information freely given extemporaneously in answer to the questioning of Senators. So interesting was the recital that the hearing was not completed in the three days originally allotted to the metal schedule. The hearing was not closed until to-day, making seven days in all, though during this period some time was devoted to other schedules. Most of the steel producers, including a number of well-known leaders in the industry, appeared on Thursday.

Except for their vigorous objection to what they consider high duties on raw materials—including manganese ore, ferroalloys, magnesite and graphite—the steel producers had little complaint to make of the rates proposed on their products as a whole. A number of suggestions were made for reclassification, with here and there a slight increase in duties, and a request to transfer barbed wire from the free to the dutiable list, giving it the same duty as plain wire. There was also a suggestion to lower rates, as in some sizes of welded pipe and in certain wire. The moderation of the steel interests elicited from Chairman Penrose the statement that not only had they made modest requests but that the schedule on steel products carried lower rates than any other in the bill. The attitude of the steel men was that the industry has reached a new point of expansion in the development of export business. And with this in mind the steel men showed that they do not want to erect any undue barriers, their idea of protection being such as would cover the difference in labor cost.

The producers of manganese, ferroalloys, magnesite and graphite were fully alive to the fact that the rates proposed on these products were the storm center. The committee was made fully cognizant of this fact and is apparently giving much study to the issue. Senator Smoot perhaps showed more interest than any other member of the committee on this point. In commenting on proposed duties on manganese ore, he said there would be "no legislation on the 5 to 30 per cent grades." Whether accurate or not, the interpretation placed on this remark was that ore of a lower manganese content than 30 per cent would not be made dutiable.

Sheffield Steel Men Heard

To-day the committee heard a delegation from the Chamber of Commerce of Sheffield, England, with regard to high-speed steel rates. Arrangement for hearing these interests was made with the committee by the State Department at the request of the British embassy in Washington, to which the Sheffield men transmitted a request that the hearing be arranged. While it is said to be unprecedented for a foreign delegation to appear as interested individuals at a hearing concerning tariff legislation in this country, the committee has pointed out that the Sheffield men came as private citizens and not as representatives of the British government, and also that it is not unusual for foreign delegations to appear before committees of Congress regarding other matters. The Sheffield delegation consists of Arthur Balfour, of Arthur Balfour & Co.; S. J. Robinson, of William Jessop & Sons; Peter Macgregor, of Sanderson Bros. & Newbould, and J. C. Ward, of Edgar Allen & Co.

The committee will suspend tariff hearings to-morrow and go to work in executive session on the tax bill, which is to have precedence over the tariff bill and will be reported to the Senate on Sept. 21, when Congress reconvenes.

Steel Makers Oppose Duties on Raw Materials

Making observations on the entire metal schedule as well as on the whole tariff bill, Chairman John A. Topping of the Republic Iron & Steel Co. spoke for the independent steel companies and was kept before the committee for more than an hour. He was questioned closely and proved his ability to meet sharp examination, being able to give offhand a wide range of figures and facts. On several occasions he had mild tilts with Senator LaFollette of Wisconsin, who put questions that it was either impossible to answer or that related to matters not to be divulged.

Senator LaFollette had prepared a set of questions which he said he would mail to the steel trade witnesses as well as to others, adding that of course it remained with them whether they gave answers. Like others who testified on the metal schedule, Mr. Topping said he would answer those questions that could be properly answered, but would reserve the right not to answer those he considered were not proper. Senator Penrose interposed to say that response to some of Senator La Follette's questions would be equivalent to making an income tax return, information which the Treasury Department is bound not to make public. Senator LaFollette said he would state on the floor of the Senate when the tariff bill is up for debate what questions witnesses had declined to answer and would make use of replies given but would not reveal the names of those making response to such questions as deal with capital investments, costs of production, dividends paid, profits made on given products, salaries paid officers, etc. The greater part of the information no doubt will be supplied to him, and much of it was given by Mr. Topping as to the Republic company by submitting its regular public reports.

Taking up the outstanding features of the metal schedule, as suggested by Chairman Penrose, Mr. Topping said that rates it carried are quite low and steel

producers, consider it a bill to obtain revenue rather than to afford protection, but that manufacturers, are inclined to accept the schedule, because tied in with it are such features as American valuation, anti-dumping, bounty and reciprocity.

His attitude toward duties on raw products was soon made clear. The duties proposed on such products as manganese ore, ferromanganese, zinc, magnesite and fluorspar, would result he said in an annual increase of $23,805,000 to independent producers in the cost of making soft steel. This, he stated, cannot be paid if the industry is to meet foreign competition and expand.

(Mr. Topping's statement appears on a later page.)

"Your idea is that rates on ferroalloys are too high if steel rates are not increased?" suggested Senator Smoot.

"Yes," replied Mr. Topping, "this schedule is lower than that in the Payne-Aldrich bill, even with the American valuation plan applying." He said steel makers were, however, sustaining the Fordney bill and the American valuation plan, generally, but objected to the duties proposed on raw materials.

Steel Companies' Losses To-day

Current prices of steel were said by Mr. Topping to be $5 a ton lower than the cost of production.

When asked by Senator LaFollette as to the finances of the Republic company, Mr. Topping said it had accumulated a surplus of $38,000,000 in a period of more than 20 years but that this is being dissipated rapidly. Senator LaFollette seemed to be irritated because Mr. Topping could not tell him the amount of the original capital invested in the units which were taken over and consolidated. Answering further questions by Senator LaFollette, Mr. Topping said that he doubted that any steel company would show an earning power comparable with bank and trust companies. He added that he did not believe it would be over 8 per cent.

"Steel duties in the Payne-Aldrich act," said Mr. Topping, "averaged about one-half of those in the Dingley law, while those in the Fordney bill are less than those in the Payne-Aldrich measure."

"Rates in the steel schedule," said Senator Penrose, "are more moderate than in any other schedule and the requests of steel men have been modest."

Mr. Topping said the average ad valorem rate in the Fordney bill is 15 per cent.

Senator McLean inquired as to the number of men engaged in the alloy industry to which Mr. Topping stated he could not say specifically but that "it is a mere bagatelle, lost in the crowd and forgotten when compared with the steel industry," and that comparatively its capital investment is small.

Independents Will Make Alloys

"We think domestic producers of alloys will live on much less," said Mr. Topping. "We are asking for duties of 15 to 20 per cent. They are asking for duties of 35 to 215 per cent. If it is necessary we will put in electric furnaces and produce our own alloys. We shall do this if the duties are too high."

He estimated that proposed duties on ferrosilicon would cost $3,000,000 and on manganese $8,000,000 annually in producing soft steel. "We could form a co-operative company and put on blast furnace capacity to make ferromanganese and will do it before we pay exorbitant prices. We could import the manganese ore and still be ahead $17 a ton after paying the ore duty."

Asked by Senator Penrose about employment and operating conditions in the steel industry, Mr. Topping said nominally it engages about 1,500,000 men from the mines to the finished products but today the number is about 300,000 and operations range from 25 to 30 per cent. Mr. Topping stated that at no time since he became connected with the steel industry in 1878 was there a depression comparable with that now existing. He said that the Republic company is feeding men out of its commissary in Alabama to keep them from starvation. The company at full operation employs 15,000 men, and is now employing 3000.

Senator Simmons asked as to the cause of the depression. Mr. Topping said that it is due to the cost of fabricating, transportation, and labor and of building materials such as brick, cement, etc. These costs are so high that a builder could not afford to put up a building in Washington, for instance, even if the steel needed were given away and whose cost was said to be only 12 per cent of the total. The steel trade, he said, is paying labor today 53 per cent more than in 1913 while steel prices have declined greatly since January, 1921. The steel maker, it was pointed out, buys far less labor and transportation with a dollar than in 1913, but when increased costs are considered is selling at practically pre-war prices.

Some Reductions Suggested

President James A. Campbell of the Youngstown Sheet & Tube Co., appearing as a representative of his company and several other independents, especially makers of steel pipe, tubing and wire products, recommended reductions in some duties and increases in others, as shown in his brief printed below. The distinction made in the wire paragraphs as proposed were declared by Mr. Campbell to penalize one class of users for the benefit of others and this was called "class legislation." He said he was sure that the committee could be justly criticized if it permitted the paragraphs to stand as they now are.

Mr. Campbell agreed with Mr. Topping in protesting against duties on raw materials, including fluorspar, manganese ore, ferromanganese, magnesite, pig tin, zinc and alloys. He stated that American producers do not require this abnormal protection and if there are any cases where they do, the interests are so small and can produce such a small percentage of the material required that their needs should not be permitted to impose this tax on all steel consumers. He said he hoped the duties would be greatly reduced.

"Profits" on Barbed Wire

"What are your profits per ton on barbed wire?" inquired Senator LaFollette.

"Oh, I think we lose about $5 per ton," responded Mr. Campbell dryly, whereon quiet laughter swept over the room.

"What would be the consequence if we built rates so high as to shut out imports?" asked Senator Walsh of Massachusetts.

"That would build a tariff wall and ruin the country, creating industrial depression and fictitious values, and the depression would continue until there would be a breaking down of industry." Mr. Campbell said, however, he favored protection on finished products sufficient to maintain the American standard of living for workmen. He vigorously assailed the transportation and Adamson acts and said both had broken down and should be wiped off the books. Both acts were declared to be holding business by the throat. It was added that buying power, especially that of the farmer, has shrunk, and that high transportation and labor costs are at the bottom of it. Not until purchasing power has been restored to a normal basis, can there be an adequate revival of business, but if the farmer and manufacturer were brought to the same level, it was added, the sprag would be removed from the wheels of industry and in 90 days it would start up in good shape.

Midvale and Bethlehem Protest

President A. C. Dinkey, of the Midvale Steel & Ordnance Co., said the proposed duty on ferromanga-

nese would add 30c. to the cost per ton of soft steel ingots. The effect, he pointed out, would be to increase costs at a time when the industry is expecting foreign countries to absorb from 15 to 20 per cent of the production. He asked that manganese ore be made duty free with a compensating duty on ferromanganese, $2.50 per ton being suggested, to cover the difference in the labor cost in England and the United States. The Midvale company, he said, normally employs 40,000 men but to-day is employing only 11,000.

The free list for manganese ore and a nominal duty on alloys to protect the domestic industry were suggested by C. A. Buck, vice-president Bethlehem Steel Co. He strongly opposed the duties proposed on chrome, manganese, ferromanganese, tungsten and ferrosilicon. The proposed duty on ferromanganese, he said, would amount to $39 a ton, while before the war it was bought at $35 to $40 a ton. He said he would like to see a nominal duty on ferromanganese and to have magnesite made free of duty.

Separate Classification for Bars

A separate classification for common merchant bars and a slight increase in duties, also an advance from 7/20c. per lb. to 4/10c. per lb. on structural steel were suggested by Vice-President Willis L. King, of the Jones & Laughlin Steel Co. The chief cost to-day is transportation. The cost at present of assembling raw materials for finished products and shipping from Pittsburgh to New York was $10 a ton more, he said, than before the war. Mr. King said proposed rates on raw materials are beyond reason and, besides adding to the cost to the consumers, would seriously affect foreign trade. The Jones & Laughlin Steel Co. normally employs 25,000 to 26,000 men, Mr. King said, but at present is not operating at more than 25 per cent of capacity and employing 5,000 to 6,000 men.

President Severn P. Ker of the Sharon Steel Hoop Co., speaking for independent makers, suggested reclassification and increase in rates in hoops, bands, strips and cotton ties, as stated more fully below.

Dr. J. A. Mathews, president Crucible Steel Co. of America, suggested a number of changes in the bill, suggesting free manganese, or not over 10 per cent duty, reduction of the tungsten duties, which would increase the cost of high-speed steel by 20 to 25c. per lb., also proper distinctions between products in paragraph 304, covering ingots, billets, bars, forgings, etc.

Tin Plates and Sheets

Speaking for the Association of Tin Plate Manufacturers, President E. R. Crawford of the McKeesport Tin Plate Co. said that while tin plate makers can get along with the proposed rate of 1 1/10c. per lb. on tin plate, taggers tin and terne plate, after conditions have become normal, they would like to have a duty of 1 2/10c. fixed. Mention was made of the fact that tin plate manufacturers are open to competition on account of low ocean freight rates. He said that while these manufacturers had not complained of the proposed duty of 2c. per lb. on pig tin, they thought it was not justified and would be better stricken out, though perhaps the Government favors the duty as a source of revenue. Mr. Crawford protested against the duties proposed on raw materials, including fluorspar, magnesite and ferromanganese.

W. H. Abbott, of the Wheeling Steel Corporation, representing independent sheet makers, said that while the duties on sheets in the Fordney bill are adequate generally, they are not entirely so for mills located along the Atlantic seaboard. Labor costs of domestic production were said to constitute 80 per cent of the total cost, direct and indirect, and to have increased 72 per cent from 1912 to 1921. He pointed out also the low wages paid in Europe as well as the ocean freight rates, which make mills along the Atlantic seaboard open to sharp competition.

Pig Iron and Scrap

John W. Logan, secretary Alan Wood Iron & Steel Co., Philadelphia, asked for a duty on pig iron of $2.50 (instead of $1.25), the same as in the Payne-Aldrich act, and that a differential of $1.50 less be fixed on scrap. In the Fordney bill both products take a duty of $1.25 per ton. Mr. Logan pointed out the importance of transportation as a factor in pig iron cost. He said that today pig iron is selling at $19 to $20 a ton and of the cost 70 per cent is represented by transportation of raw products, amounting to six tons required to make a ton of pig iron. He added: "Our costs are higher, due to the longer hauls and higher transportation charges on our raw materials. Low water transportation rates facilitate delivery of European iron and steel to Eastern seaboard markets; the ocean freight being frequently less than the cost of hauling from even Pittsburgh to the same position. On account of its character and adaptability as ship ballast, pig iron is often carried across the Atlantic for comparatively trivial rates."

Protest was made by Mr. Logan against the rates carried on calcined magnesite, fluorspar and ferromanganese:

> Leaving to other steel companies who have appeared, or expect to appear, before your committee with respect to duties on calcined magnesite, fluorspar and ferromanganese, the presentation of specific arguments and recommendations, we desire to record our protest against the rates proposed as being very much too high. We are not opposed to any reasonable protective duties on our raw material, but the suggested duties on the three materials above referred to are so unprecedented that we feel we must protest. They are entirely out of line with the duties on various forms of finished steel contained in this bill, which duties we believe to be just and reasonable.

William Dette of Crocker Bros., New York, importers of ferromanganese, recommended a duty of not more than $1 per ton on ores containing 45 per cent manganese or over, and $2.50 per ton on ferromanganese. The latter, it also was said, being a blast furnace product, should be classified with pig iron and spiegeleisen. In speaking of manganese ore, Mr. Dette said:

> Manganese ores have always been admitted free. The domestic supplies are limited, inferior in quality and far from consuming points. Even under the stimulus of war necessity and high prices domestic production furnished only a small part of our total needs and that only by a sacrifice in quality of the smelted product. It is safe to say that the steel trade must depend for all time on foreign ores or foreign ferromanganese for at least 90 per cent of its requirements.

In urging that ferromanganese be classified with pig iron, Mr. Dette stated that the former is not a ferroalloy in the sense of other alloys in paragraph 302, which are made either by the electric furnace or the Thermit process, and which are added to special steels for properties conferred by the metal, such as tungsten, chrome, etc. Ferromanganese is a product of the blast furnace and is made the same as pig iron and merely requires more fuel and more limestone for fluxing and is cast in a bed and broken into lumps instead of being cast in pigs. The price of ferromanganese at present, it was said, is about $65, and on that basis the proposed duty of 2-1/5c. per lb. is equivalent to $39 or $40 per gross ton, or 80 per cent of the pre-war price and 60 per cent of the existing price. He argued that interests of the independent steel makers require the restraining influence of foreign competition "to prevent a repetition of the unreasonable prices which pre-

vailed when this competition was temporarily reduced. The rates in the present bill are not only high but are not proportionate. At the rate of $11.20 per ton on ore the tax on ore to make one ton of ferromanganese is $24.64, while the finished product [ferromanganese] is taxed $39.42."

President Campbell on Wire and Pipe

J. A. Campbell, president the Youngstown Sheet & Tube Co., Youngstown, Ohio, filed a brief in behalf of his company and also as the representative of other independent steel companies; especially those making steel pipe, tubing and wire products. He said:

"With reference to schedule 3, paragraph 328, pertaining to butt welded and lap welded pipe, I beg to say that the duty proposed of ¾c. per lb. is greater than is necessary to protect this interest; and, therefore, I would recommend that the duty on butt welded and lap welded iron and steel tubes, in sizes from 1 in. to 6 in. inclusive, be made 6/10c. per lb. instead of ¾c.; and that sizes of butt welded pipe, from ⅜ in. to ¾ in. inclusive, and also lap welded pipe larger than 6 in. carry a duty of ¾c. per lb. as proposed. I suggest this change to your committee, for the reason that the smaller sizes of butt welded pipe and the larger sizes of lap welded pipe carry a greater labor cost than what we call the 'base sizes,' from 1 in. to 6 in. inclusive. These sizes on which I propose a lower duty are the common sizes of pipe, and the tonnage is considerably greater than the smaller sizes and larger sizes mentioned. I think the proposed duty on sizes smaller than ⅜ in. is justified, on account of the small production per man and high labor cost.

"With reference to coated conduit for electrical conductors, referred to in this paragraph, I would say that we are large manufacturers of this product, and that 25 per cent ad valorem is ample protection.

Duty on Wire Rods

"With reference to paragraph 315, pertaining to wire rods, the duty proposed in the bill of 3/10c. per lb., or $6.72 per gross ton, is sufficient, and I do not think it should be increased or decreased.

"In discussing paragraph 316, pertaining to black and galvanized iron and steel wire, I am also obliged to discuss paragraph 317, pertaining to galvanized wire used for fence, galvanized wire fencing, and wire for baling purposes.

"In paragraph 317, you propose a duty of ½c. per lb. on galvanized wire used for fencing purposes and for making into wire fencing and wire used for baling purposes; while in paragraph 316 you propose a duty on this same wire when used for other purposes of ¾c. per lb. It seems to me that the committee in framing this paragraph has overlooked the fact that it penalizes one class of users of this material for the benefit of others who use it for fencing and baling purposes only, and that this is 'class legislation'; and I am quite sure you could be justly criticized for making this distinction. Therefore, I recommend that you reduce the duty proposed in paragraph 316 from ¾c. per lb. to 6/10c. per lb., with the addition you now propose of 2/10c. per lb. for coated wire for all purposes; and that paragraph 317 be stricken out. There certainly can be no good reason offered by anybody why any class of users should be given preference over any other class; and while the duty I propose is smaller, perhaps, than it should be, it will safeguard to a certain extent the users of wire covered in paragraph 317 against unduly high prices, and will still afford sufficient protection to the interests affected by paragraph 316.

Labor Cost to Be Considered

"Referring to paragraph 331, pertaining to nails and spikes made from iron and steel wire, I beg to call your attention to the fact that this proposes 4/10c. per lb. on nails, which carry a labor cost $12 per ton higher than wire; and as it is my understanding that you wish to protect the labor employed in producing these nails to the same extent that you would protect labor producing the wire from which they are made, it naturally occurs to me that the committee framing this bill did not have sufficient information on this subject, and, therefore, has not provided sufficient duty to protect the labor engaged in the manufacture of nails. If this is the principle by which your committee is to be guided, then wire nails should carry a higher duty than plain wire, for the simple reason that the labor cost in producing this product is considerably greater, as above stated. With this fact in mind I would, therefore, recommend and strongly urge that paragraph 331 should be changed so as to provide a duty of ¾c. per lb. instead of 4/10c. per lb. on the common sizes of nails and spikes, and other sizes in proportion.

"I wish to call your attention to another wire product, viz.: barbed wire, both plain and galvanized, which is on the free list, schedule 15, paragraph 1679. I cannot understand the purpose of the ways and means committee in proposing that barbed wire be put on the free list. The cost of wire that enters into the manufacture of barbed wire is fully as great as that of wire for fencing or other purposes. Labor in making this wire and in manufacturing it into the finished product, barbed wire, is certainly entitled to the same protection as the labor employed in making wire for other purposes; and it would be rank discrimination to treat it other than on the same basis. If the manufacturer of barbed wire is compelled to meet foreign competition without any protection, he will be forced to reduce labor that enters into the manufacture of this wire to the very minimum, and may be put out of business entirely. I do not believe that this is the idea of the ways and means committee or the Senate Finance Committee, and if it is, I certainly hope that it is not the idea of Congress as a whole; and that this item of barbed wire will be put on the dutiable list and treated the same as other wire products.

Protect All Interests

"It is my impression that in framing this tariff bill it was the intention of the House Ways and Means Committee to protect all American interests—the farmer, invested capital, and especially the laboring people. I appreciate the difficulty that confronted the ways and means committee in framing a bill that will do exact justice to all the interests concerned. All interests are selfish; especially those that ask you to do things that would be an injustice to others. For that reason you should secure the facts and do what is best for the people as a whole, rather than to give undue protection to any one interest at the expense of many.

"Many producers in different lines may have high costs, due to antiquated factories or methods, or to disadvantage in their geographical location; but if there are such, their interests should not be considered to the detriment of the country generally.

High Duties on Raw Materials

"While I am not supposed to discuss duties other than those on pipe and wire, I desire to emphasize, if possible, what Mr. Topping has said with reference to duties on raw materials.

"The proposed duties on fluorspar, manganese ore, ferromanganese, magnesite, pig tin, zinc, and alloys will put considerable tax on the steel industry, which the consumer must pay. Mr. Topping has explained that American producers do not require this abnormal protection, and if there are any cases where they do, the interests are so small and can produce such a small percentage of the material required that their needs should not be permitted to impose this tax on all steel consumers. The duties proposed on these articles are all too great in my opinion, especially those on fluorspar, manganese ore, ferromanganese and magnesite, and I trust they will be greatly reduced by your committee.

"It should be understood that in recommending lower duties on some tubular and wire products than those proposed in this bill, I do so believing that the entire bill will finally provide for a moderate duty on all

classes of merchandise. If this bill, as a whole, is so framed that the result of its passage would be to increase the cost of living and labor, in that event we need higher duties than those I have suggested.

"As Mr. Topping states, we will be obliged to export 20 per cent of our steel if we are to keep our mines and mills in operation and give continuous employment to our workmen, and anything that adds to our costs will make this more difficult and also increase the selling price to our domestic consumers.

General Observations

"In this connection I would like to make a few observations on the tariff generally in the hope that practical ideas and experiences may be of service to your committee.

"Conditions are abnormal throughout the world and the quicker readjustments are effected, the better for everybody; so it seems to me that your tariff bill, when completed, should be based on what we may think are normal conditions and values, rather than on conditions that obtain at present. If it has the effect of speeding readjustments to lower values on a more stable basis, it will be of great benefit. Wages and materials in other countries must increase or wages and materials in the United States must decrease before values are stabilized. Both will happen; wages and materials will be lower in the United States and higher abroad. A reasonable tariff bill will bring this about quickly; a tariff too high will prolong this readjustment and in the meantime the country will suffer.

"I believe in the American standard of living and desire to see it maintained, but I am not so much concerned about the rate of wages paid as about what the wage earner has left after paying the cost of living by this standard. Duties that are too high will raise values, increase the cost of living, stop exports, cause unemployment, and finally cause industrial depression. You are expected to frame a tariff bill that will maintain the American standard of living and yet permit us to export our products to the markets of the world. This cannot be accomplished by a bill that will materially increase the cost of production."

Various Changes in Metal Schedule Urged

John H. Brewster, New York, filed a brief asking for the maintenance of differentials on crucible and electric steel on one hand and bessemer and open hearth steel on the other in the paragraphs dealing with ingots and semi-finished products and the one dealing with wire rods.

Nelson Franklin, Denver, representing the Rare Metals Ore Co., appeared before the committee to sustain the proposed rate of 45c. per pound on the metallic tungsten content provided for tungsten ore or concentrates, but claimed a higher duty would be justified.

Wallace L. Pond, Nicholson File Co., Providence, R. I., manufacturer of files and rasps, asked for an increase of duties over the Fordney bill rates, ranging from 25c. to 77½c. per dozen. He referred to the skilled and high priced labor required to make these products. Certain classes of files, largely the smaller and more finely cut, are being imported from various European countries in considerable quantities. He recommended rates of 40c. per dozen on sizes 2½ in. and under, 75c. per dozen on 2½ in. and not over 4½ in.; $1 per dozen on sizes over 4½ in. and under 7 in., and $1.20 per dozen on 7 in. and over.

Attorney Harold H. Burton, of Cleveland, representing the inventor, Dr. Aladar Pacz, and the producers of alpax and new silicon-aluminum alloys, urged that paragraph 302 be amended to continue free of duty silicon with 5 per cent or less of iron. He pointed out that this grade of silicon is separate from ferrosilicon used in commercial quantities in the general practice, but is used in the manufacture of alpax, which is being developed by the General Aluminum & Brass Mfg. Co., Detroit, owner of the alpax sand casting license. This new alloy substitutes silicon for copper and aluminum in the manufacture of castings. It was stated further that the manufacture of the new product is an infant industry undertaking to compete with commercial aluminum, and in some cases with products of copper, brass, cast iron or even steel. It requires for its manufacture silicon metal containing 5 or less per cent of iron and it affords the only known commercial use for that grade of silicon. It is hoped that the required grade of silicon can be produced in this country at less than 22c. per lb. and if this comes about it was argued that the tariff should be less than 8c. per lb., which is proposed on 90 per cent or more ferrosilicon. Mr. Burton stated that the new alloy is being used in the United States, particularly in the casting of automobile parts.

A Plea for Chrome Ore

Dan Sutherland, representing mining interests in the West and in Alaska, asked that chrome ore be made dutiable at 60c. per unit of metallic content, or $30 per ton when 50 per cent oxide and $25 per ton on the ore when 40 per cent oxide. He expressed the opinion that there are ample chrome ore deposits to supply the requirements of American steel interests. He made the point that domestic chrome ore is produced by American labor, while that mined in Caledonia is produced by convict labor and that of Africa by Kaffir labor; also that manganese ore is in the same class with chrome in that manganese ore has never been sought extensively but would be, if sufficient value were placed on it.

J. W. Hoffman, for the American Brass and Copper Statistical Exchange, New York, asked for a reclassification of the brass, copper and bronze paragraph, 378, and filed a brief carrying the proposed changes, the plan of which is to grade the duties more in accordance with the cost of production and the value of the semi-finished and finished articles. The rates asked for are not easily comparable with those existing because they are based on a rearranged classification. He said that wages in the industry in the United States are from 90 to 120 per cent higher than in England. Wages in Germany were said to be from 60 to 80 marks per day.

Egbert Moxham, the Conley Foil Co., New York, speaking for tin foil manufacturers of the United States, opposed the Fordney schedules on tin and lead. He said the latter carries approximately 50 per cent protection under American valuation and that the duty of 2c. per lb. on tin, an imported metal, is too high, asking that tin be left on the free list. If the above suggestions are not adopted, he said, the rates on tin foil should be increased.

Changes Sought on Aluminum

Laurence M. Brile, president of Brile & Ratner, New York, urged that aluminum coils be included in paragraph 374 of the Fordney bill, carrying a duty of 5c. on aluminum scrap and 7c. on aluminum plates, etc., but protested against the duties themselves. The concern represented by Mr. Brile is an importer of crude and finished aluminum from Switzerland and contends that the rates in the bill are prohibitive.

Senator Penrose said that three foreign corporations, English, French and Norwegian, control a large part of the aluminum output of Europe, according to a report made to the committee, and if protection is not given domestic producers the consumers in this country would be at the mercy of foreign manufacturers.

Harris E. Galpin, Muskegon, Mich., speaking for the National Aluminum Foundries Association, protested against increases over the Underwood-Simmons rates on crude and finished aluminum. The respective duties in the present law are 2c. and 3½c. per lb., which the Fordney bill raises to 5c. and 9c. respectively.

Protection for Zinc

Eugene Wolff, representing the American Zinc Institute, said the condition of the zinc industry in the United States has grown worse due to importations. He said the zinc ore duty in the Fordney bill is made

permanent, while the products are given two years' protection at the specified rates, which are to be lowered after that time. He asked for rates as follows: Ore up to 10 per cent, free; 10 to 20 per cent, 1½c.; 20 to 25 per cent, 2c.; zinc dust, 3¾c.; slab zinc, 2¾c.; sheets, 3¾c.; coated sheets, 3¾c.; old and worn out, 2¾c.

Arguments on the same paragraph and of similar nature were made by Otto Ruhl, Joplin, Mo., who said that during the war large quantities of zinc ore came into the United States from Mexico and have come in later and that the domestic industry has been seriously affected, although it was conceded that this is partly due to the general industrial depression.

F. C. Wallower, also from the Joplin district, made arguments similar to those of Messrs. Wolff and Ruhl.

A. C. Dinkey Opposes Manganese Duties

A. C. Dinkey, president Midvale Steel & Ordnance Co., submitted the following statement relative to manganese:

With respect to manganese ore and ferromanganese, the outstanding facts are:

(1) That the use of manganese is absolutely necessary in the production of steel.

(2) That in only three districts in the world are there deposits of sufficient size to support the production of ore on anything like a scale commensurate with the needs of the steel industry; viz., India, Russia and Brazil.

(3) That within the borders of the United States no prospect has been found, even under the spur of war necessity, which it is reasonable to suppose will support a mining operation on an economic basis, either as to quantity, quality or cost.

(4) That ore from India, Russia and Brazil can be laid down at Atlantic ports for about $12 per ton. Approximately this sum must be paid for railroad freight alone from such small manganese ore mines as there are in the United States to the chief domestic consuming point of such ore.

(5) That the foreign steel industry (England, Germany, France and Belgium) draws its supply of manganese ore from these same far-off fields, costs to them being about the same as to steel producers in the United States. The present House bill would add about 30c. per ton to the cost of all steel ingots produced in the United States. The folly of doing this while expecting the neutral markets of the world to absorb from 15 to 20 per cent of the finished steel output of this country, on a competitive basis, is apparent.

(6) That the United States Steel Corporation would be less disadvantaged than all other steel producers in this country. The Steel Corporation makes its own ferromanganese almost entirely out of imported manganese ore; all other domestic steel producers generally buy their ferromanganese, either because they do not use ferromanganese in sufficient quantities to justify a blast furnace operation or because they do not have the necessary facilities.

The much higher duty proposed for ferromanganese than for manganese ore would have this effect: Every ton of ferromanganese used by the Steel Corporation would cost it, in duties, $23.65 per ton (i.e., the duties on ore). All other domestic steel producers would pay $39.42 per ton in duties (i.e., the duty on ferromanganese). We ask for free ore and a small tariff on ferromanganese—not more than $2.50 per ton, the same as in the Payne-Aldrich bill.

To-day the steel manufacturers of foreign countries and all manufacturers of this country are on substantially the same footing with respect to their supplies of manganese ore. Why, then, handicap manufacturers of the United States in favor of their competitors in England and Germany?

A compilation of supporting data prepared by the Midvale Steel & Ordnance Co. is filed herewith. [Extracts from this statement appeared in THE IRON AGE of Aug. 4, page 288.]

Vice-President King Proposes New Bar Classification

Willis L. King, vice-president Jones & Laughlin Steel Co., Pittsburgh, said that the company is a large manufacturer of steel products in many forms, the more important of which are steel bars, structural shapes, plates, wire products, pipe, tubes, and tin plate, and is, therefore, vitally interested in securing adequate protection in the proposed new tariff, not only for the steel industry and its workmen, but for all other American products which can be produced in Europe and elsewhere more cheaply.

"In the main," said Mr. King, "we agree with the general statement of John A. Topping on both finished and raw materials. On a comparative basis of labor and other costs here and abroad, the duties on common steel products fixed in the House Bill 7456, are inadequate, but we appreciate that changes must occur as the world progresses toward normalcy, and that the tariff should anticipate these changes. Knowing the difficulty in securing accurate information as to foreign labor costs, efficiency, and other conditions, and the uncertainty of the future, we are not able, even if disposed, to dispute your prognosis of the future as it may appear in this bill.

Increased Cost of Transportation

"The chief element of cost to the American manufacturer is the increased charge for transportation. Generally speaking, it has more than doubled since the tariff of 1909; but you will, perhaps, better understand the effect on our costs by the specific statement that the cost of assembling the raw material per ton of steel in Pittsburgh, and shipping the steel to New York, where we must meet foreign competition, is $10 per ton more than before the war. This is a cost which we can not control, but are, of course, hopeful of relief, and it can not come too soon for the general good.

"Our appearance here is not to criticise but to call attention to the classification of two, or perhaps three of the finished steel products which has been handed down from previous tariffs, and which we believe can be greatly improved with but slight increase in the duties.

Bars Classed with Other Products

"In fixing the duty on steel bars in the House bill under discussion, paragraph 304, their importance and probability of importation have not been recognized, largely, I think, because they are classed with about 17 other articles or products having no relation in cost or importance, ranging from steel ingots, die blocks, and gun barrel molds to certain alloys. This same classification appears in previous tariff bills, but it covers too much to cover it well. The lower priced brackets are too low for bars, but possibly entirely adequate for the other articles, and the higher priced brackets entirely unnecessary for bars. As to the importance of steel bars, the tonnage is greater than any other single steel product, and the selling price is lower than any other steel product. They are likely to be imported, not only because of their general use, but because they are not usually subject to chemical or physical specifications, can be easily transported in vessels, and more readily sold because of their wide market. Certainly they are important enough to have a separate paragraph in the tariff bill and I hope this suggestion will appeal to you.

"If the American valuation plan is retained, it is not likely that any steel bars will be imported under the first or lowest bracket in paragraph 304, namely, when valued not over 1c. per lb., 2/10c. per lb. duty; but in the second bracket, reading, valued over 1c. per lb. and not over 1½c. per lb., 3/10c. per lb., imports

are entirely possible, and would result in the reduction of American labor to a point below the accepted standard living conditions and comfort, which we earnestly hope will never become necessary. I would, therefore, recommend for your consideration a change in the classification, and slight increase in the duty on common merchant steel bars to read as follows:

Valued not over 1c. per lb. . . . . 3/10c. per lb. duty
Valued over 1c. and not over 1½c. per lb. . . 4/10c. per lb. duty
Valued over 1½c. per lb. to 2½c. per lb. . . . 5/10c. per lb. duty

Structural Material

"Beams, channels, angles, etc., commonly known as structural material, in paragraph 312 of House Bill 7456, are made dutiable at a flat rate of 7/20c. per lb. Structural material is a large and important tonnage but not as likely to be imported as bars, because of the rigid specifications as to quality, length, etc., necessary for large buildings, but based on competitive costs here and abroad, both present and prospective, the duty of 7/20c. per lb. flat is not adequate. In some previous tariffs, structural materials carried a sliding scale based on the price and there is no logical reason now why they should not carry a sliding scale such as I have suggested for steel bars, but if your committee decides in favor of a flat duty I suggest that it be increased 1/20c. per lb. over paragraph 312, making the duty 4/10c. per lb.

"I do not know whether anyone has been designated to speak to you on steel plates, but the duties specified in paragraph 307 is, in our opinion, fairly adequate. The sliding scale protects manufacturers from foreign competition on a low market but gives the Government higher revenue on a strong market, and would seem to be a principle fair alike to the American industries and the Government. Any increases I have asked or suggested are based on the adoption of the American valuation plan in the new tariff bill.

Duties on Raw Materials Too High

"In closing, I beg your indulgence for a few words regarding raw materials as specified in the House bill under discussion. The rates on these materials are beyond reason, and beside adding materially to the cost of domestic consumers, will have a most serious effect on our foreign trade. The framers of provisions on raw materials doubtless had in mind the desirability of increased revenue for the Government; but in my opinion, it would be poor business policy for the Government to exact a few hundred thousand dollars at the Customs in exchange for many millions of dollars of foreign trade, on which the Government would receive taxes on its manufacture and transportation. The encouragement of steel exports is hardly less important than home protection under present and prospective conditions. The excess war made tonnage cannot be disposed of at home, and the duties fixed in the House bill will undoubtedly prevent the free flow of exports. We are informed that foreign governments, especially Germany, are fully alive to the importance of their export trade, and are making concessions in freight and taxes to their manufacturers, and it is our hope that, in the tariff under discussion, no handicap will be placed upon us."

President Crawford Speaks for Tin Plate Companies

E. R. Crawford, president McKeesport Tin Plate Co., for himself and E. T. Weir, president Weirton Steel Co., representing all the independent tin plate manufacturers of the United States, presented a brief on tin plate, terne plate and taggers tin. He named the independent tin plate manufacturers in the United States as follows:

Weirton Steel Co., Weirton, W. Va.
McKeesport Tin Plate Co., McKeesport, Pa.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
American Steel Co., Pittsburgh, Pa.
Washington Tin Plate Co., Washington, Pa.
Standard Tin Plate Co., Canonsburg, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
N. & G. Taylor Co., Philadelphia, Pa.
Trumbull Steel Co., Warren, Ohio.
Carnahan Sheet & Tin Plate Co., Canton, Ohio.
National Stamping & Enameling Co., Granite City, Ill.

"On Aug. 8, 1921," said Mr. Crawford, "we addressed a letter to Hon. Boise Penrose, chairman, Finance Committee, U. S. Senate, briefly stating our views in relation to the situation with the tin plate manufacturers of the United States and their attitude towards the revision of the tariff and the proposed rate of duty on tin plate, as well as certain rates of duty proposed on raw materials, which are used in the manufacture of tin plate.

Payne-Aldrich Duty Favored

"When the tariff bill was under consideration in the House, we requested the ways and means committee to fix the rate of duty on tin plate at 1.2c. per lb., which was the rate provided in the Payne-Aldrich bill, and which was a substantial reduction on the rate provided in the Dingley bill.

"The Underwood tariff bill now in force provides a duty of 15 per cent ad valorem, which is entirely inadequate, under the present unsettled conditions, taking into consideration the abnormal low rates of wages prevailing in Germany, Belgium and England, as well as the unsettled exchange situation, and exposes this important industry to ruinous competition in all of our seaboard markets where the great bulk of the tin plate manufactured in this country is consumed; the Atlantic and Pacific seaboards are easily accessible to foreign manufacturers, at low ocean freight rates.

"Tin plates are all manufactured in the interior of this country and bear a very heavy freight rate from point of manufacture to seaboard markets. Under the circumstances, we feel that we are entitled to restoration of the Payne-Aldrich rate of 1.2c. per lb. on tin plate, terne plate and taggers plate. The Fordney bill, however, provides a rate of 1.1c. per lb. in paragraph 310.

The Duty on Pig Tin

"After due and careful consideration, the tin plate manufacturers have reached the conclusion that with economies in manufacture which they hope to accomplish as conditions approach a more normal level, they will be able to get along with the proposed rate of 1.1c. per lb. and maintain their position in the home market against foreign competition, despite the fact that the Fordney bill has placed a duty of 2c. per lb. on pig tin, as provided in paragraph 386. There is very considerable opposition to this proposed duty for the reason that there are no commercial tin-bearing ore deposits in this country, and the two tin smelters situated on the Atlantic seaboard produce pig tin from imported tin ores. They sell their product on a parity with the landed cost of imported tin, and there is no prospect of compensating advantage by reason of expected competition from domestic sources, which would eventually reduce price of this commodity to a basis which would be competitive with imported tin.

Revenue Measure Only

"The tin plate industry is the largest consumer of pig tin in this country, but the tin plate manufacturers realize that the proposed duty may be considered a revenue measure, and for this reason they are not disposed to enter strenuous objection to the proposed duty of 2c. per lb. on pig tin, but leave it to the committee to satisfy itself that the smelting companies in this country are entitled to this protection, or that your committee is justified in leaving this duty as a purely revenue measure only.

"The tin plate industry in this country consumes 2,500,000 tons of steel per annum, and employs in direct labor in its own plants, approximately 40,000 workmen, who obtain the highest rate of wages of any workmen employed in the steel industry in this country.

"As large consumers of steel, which we purchase from the steel manufacturers, we are indirectly, but very deeply, interested in the schedule of duty proposed on steel products, which constitute our raw material. The rates proposed in the general metal sched-

ule are extremely moderate, and in our opinion, may be considered to be drawn on a revenue basis, rather than on a basis of protection. The rates on practically all items in the steel schedule are lower than those of the Payne-Aldrich bill, and are on an average of about 50 per cent of the rates in the Dingley bill. We have noted, however, that the Fordney bill proposes extremely high rates of duty on raw materials such as magnesite, fluorspar, manganese ore, ferromanganese and ferroalloys, which are essential and necessary in the manufacture of steel. These proposed rates of duty will unnecessarily increase the cost of our raw materials and will be an increased burden to manufacturers of tin plate and other similar commodities who are using large quantities of semi-finished steel.

"We wish to call the attention of the committee to this situation, particularly because we feel that the proposed rates of duty on these raw materials should be stricken out or modified to a strictly revenue basis, as in most cases they are not competitive, and hence the tariff becomes a tax, without any compensating advantages.

Valuation Plan Indorsed

"We wish also to go on record with your committee that the independent tin plate manufacturers of the United States are unanimously in favor of the proposed American valuation plan, and we would deplore any modification of that plan which would fix the assessment of duty on valuation prevailing in foreign countries, whose depreciated currencies are subject to violent fluctuation in exchange value, as compared with the standard value of the United States gold dollar."

Special Alloy Steels and the Tariff

Dr. J. A. Mathews, president Crucible Steel Co. of America, addressed the committee as a member of the tariff committee of the crucible steel manufacturers of the country and made a number of suggestions for changes in the proposed bill. He said in part:

"It is a pleasure to know that in the pending tariff legislation the return to the sound principle of American valuations is contemplated, thus getting back to a feature of the original tariff bill signed by George Washington in 1789. Under this principle, manufacturers are assured of whatever rates are finally adopted, and not left in uncertainty as to the proportion of those rates actually applying, due to under-valuation and uncertain values, as has been the case under previous bills. The Government will be able to collect more revenue, and imports will be made on the basis of equal or superior quality and not upon the basis of unequal valuations. It is my belief that the Tariff Commission can now function in a more truly scientific fashion than has been possible in the past, and that Congress can arrive with a greater degree of certainty at equitable rates. After a short experience with the American valuation plan it is my judgment that the administrative features will be easier than under the present system."

Doctor Mathews at this point compared the crucible steel industry with other departments on much the same lines as when he appeared before the Ways and Means Committee in January, as reported in THE IRON AGE, January 20, 1921, pp. 197 and 198.

Manganese and Tungsten

Taking up paragraph 302 of the new bill, Dr. Mathews said in part: "In this paragraph very heavy duties are imposed upon the ores and raw materials which are an essential part in the manufacture of tool and alloy steels. This is a radical departure from the traditional policy of cheap raw materials for manufacturers, coupled with suitable protection on finished articles the manufacture of which involves much labor.

"It is difficult to understand why manganese ore and tungsten ore should suddenly require protection in an amount of something over 100 per cent of their pre-war values. No great deposits of these ores have been discovered. We shall have to go abroad for our principal sources to the great deposits in foreign lands.

"Manganese may be considered as a steel-making necessity, and compared with it all other alloying materials mentioned in this paragraph may be termed luxuries. The proposed duty of 1 cent per pound on metallic manganese in ores "containing in excess of 30 per cent" is in itself an admission of the low quality of our domestic ores. This material should be restored to the free list, or possibly protected to the extent of 10 per cent as a revenue measure.

"The proposed rate of duty on tungsten ores and concentrates is about 250 per cent of the present selling price, or 125 per cent of the average pre-war selling price. Our company is a very large buyer of tungsten ores. In the years before the war over one-half of this material was of domestic origin. During the war period, when the prices were so high and the difficulties of obtaining foreign shipments were so great, we had to rely more and more upon foreign sources, and for the past three years we have bought no domestic ores. The demand for tungsten during the war was so great that many were induced to work tungsten properties which were of little value, and it is poor economics to continue the operation of such properties by reason of an exorbitant rate of duty, particularly since they cannot under any circumstances take care of the country's normal needs. The rates for both tungsten and manganese seem to be predicated upon the extremely high costs during the war period rather than upon the basis of operation in normal times.

"In the case of molybdenum ore we have a little different situation. Of all the alloying materials used in the steel industry molybdenum seems to be the only one of which we possess an adequate domestic supply. The use of this metal is a new development in steel metallurgy and the production of molybdenum is an infant industry which, we believe, is entitled to some protection. We feel that the rate proposed of 75c. per unit is too high and should be changed to not over $10 per ton.

"The rates proposed on the ferroalloys made from these three ores are in the nature of compensatory duties made necessary by the extremely high rates imposed upon the ores themselves. If the rates on the ores are reduced, as they certainly should be, then these rates on the ferroalloys should be correspondingly reduced. The rates on the other ferroalloys are needlessly high, and seem to be based upon wartime conditions, and not on any normal basis of costs. If the present rate of duty is retained on tungsten ore and ferrotungsten, it will raise the cost of high speed tool steel from 20 to 25c. per lb. and the selling price by somewhat greater amount.

Need of Classification

"The fundamental defect in paragraph 304, and in several others, is the lack of orderly classification of steel products. The need for more scientific classification has been pointed out by the United States Tariff Commission, and in a brief which the writer submitted to the Ways and Means Committee Jan. 10, 1921 [THE IRON AGE, Jan. 20] he proposed a classification which Doctor Page, of the Tariff Commission, stated was the best attempt in this line that he had seen. Paragraph 304 includes ingots, billets, bars, and forgings, These represent great differences with respect to the ratio of raw material to labor. In the fine steel industry it is possible by the application of labor to convert five cents worth of raw steel in the ingot into 75c. worth of needle wire, or $1.50 worth of safety razor blades, or $10 worth of hair spring wire. It is the highly finished forms of steel representing the expenditure of much labor on a small amount of raw material that are seriously affected by importations from abroad, where labor is so much lower than it is here. About 70 per cent of the duties collected on iron and steel products are on products which are imported in competition with the tool steel industry.

"Instead of adopting an ascending rate of duties on products representing an increased amount of labor, this paragraph contains specific duties, the highest

rate of protection being given to the tonnage products, which have almost no competition from abroad, and the lowest duty is given to the highest priced steels which represent in some cases 85 to 90 per cent labor. If you will examine this schedule you will see that a steel valued at 1½c. is protected to the extent of 33-1/3 per cent, while a steel valued at just under 40c. is given 15 per cent protection, and all steels over 40c. are allowed 20 per cent.

An Important Amendment Suggested

"The defect in the rates in paragraph 304 as applied to high grade steels can be in large measure corrected without complete revision if in line 7 of paragraph 305 you will insert the words "carbon, or" before the word "nickel." Line 7 would then read "containing more than six-tenths of 1 per centum of carbon, or nickel," etc. It so happens that nearly all of the crucible or fine steels are high carbon products running well above six-tenths of one per cent, while the large tonnage industry is in very large part made up of steels running much below six-tenths of one per cent; therefore, if the carbon should be included along with the alloying metals the industry based largely upon the production of high carbon steels would secure the additional protection which it deserves and needs.

"The last portion of this paragraph, beginning at the end of line 13, should be amended so that the additional cumulative duty should apply to the entire molybdenum or tungsten content. Having defined in the earlier portions of this paragraph the lower limit of alloy which shall constitute an alloy steel for duty purposes, there is no reason for setting a different rate at which the assessment of additional cumulative duty shall begin in the case of molybdenum and tungsten. The provision as it now stands will permit the entry of a great many steels containing, in fact, less than 1½ per cent of these elements.

"The additional cumulative duties proposed are of course based upon the exorbitant rates of duty proposed on molybdenum and tungsten ores and metals. If these rates are reduced, as they certainly should be, then of course the additional cumulative duties should also be reduced, and if not reduced it will very seriously injure all the manufacturers of high-speed steel and all of the manufacturers of small tools, such as twist drills, cutters, etc., made from high-speed steel.

"It should further be pointed out that this additional cumulative duty is the same in amount as the cumulative duties placed upon molybdenum metal and ferromolybdenum, tungsten metal and ferrotungsten. It does not take into consideration at all the fact that there is a loss of some 20 to 25 per cent in the use of these metals and ferroalloys in the process of conversion into finished steel. The amount of this loss has been confirmed by the investigations of the Tariff Commission. Therefore, we are not only deprived of the additional cumulative duty on the first 1½ per cent of molybdenum or tungsten contained, but also upon the entire conversion loss in the use of these metals. If the rates are to be retained as they now appear on the ores and alloys, the additional cumulative duty should be increased by 25 per cent, and it should apply to the entire tungsten or molybdeunm content.

"The same applies to paragraphs 307 and 308 as in paragraph 304, namely, that the higher the value of the steel, the lower is its rate of duty. This defect would be in large measure corrected in so far as it applies to the manufacture of tool steel if the amendment proposed in paragraph 305, line 7, is adopted.

"Paragraphs 315 and 316 cover satisfactorily ordinary commercial rods, wire, and cold rolled strip. They do not adequately protect the manufacturer of highly finished specialties in this line, as, for instance, polished drill rods, watch part steel, safety razor steel, either tempered or untempered, tape line steel, pen steel, needle wire and similar products which are turned out by specialty mills and involve a great deal of skilled hand labor. If the amendment proposed in paragraph 305, line 7, is adopted, this would in a measure take care of these highly specialized products."

Wide Strips and Cotton Ties Not Adequately Protected

Severn P. Ker, president Sharon Steel Hoop Co., presented the following on behalf of the independent steel manufacturers:

I would call your attention to the inconsistency of paragraph 313 and its inadequacy as a protective measure. Hoops, bands and strips are rolled from billets and slabs and are commonly rolled in this country up to 16 in. in width as a result of developments in the last few years of wide strip mills. There are several mills that roll up to 18 in. in width. I think, therefore, that hoops, bands and strips should be described to be steel in coils, scrolls, or cut to lengths, 16 in. in width and narrower. Before the advent of these wide strip mills 8 in. probably covered fairly well the production of this class of steel in this country, but with the development of the automotive industry a much wider strip was required and the industry has met that requirement by the expenditure of large sums of money in permanent investments in highly specialized mills capable of rolling, as above stated, up to 18 in. in width. Our own company rolls regularly up to 15 in. in width and down to ⅝ in. wide. We roll in the narrower widths as thin as 23 gage or 0.025 in. thick. In the wide widths we roll:

Up to 8 in.	down to 16 gage, or 0.065 in. thick
Over 8 in. to 12 in.	down to 14 gage, or 0.083 in. thick
Over 12 in. to 15 in.	down to 12 gage, or 0.109 in. thick

The rates of duty on this class of material, as written in the bill, are less than are accorded other products not nearly so far advanced in the process of manufacture, and in which the labor cost is not so high. (See paragraph 304 covering, among other things, ingots, blooms, slabs and billets out of which hoops, bands and strips are rolled.)

Duties Not in Proper Relation

The whole of schedule 3, as it relates to iron and steel in its various forms, names rates of duty that are not only very low but the classification is very broad in some paragraphs and not fully descriptive of the product in other paragraphs, notably paragraph 313. The commodities under this paragraph should have a rate of duty at least equal to the extremely low rates provided for commodities not so far advanced in process of manufacture and in which the labor cost is not so great. I think that no one who believes in the theory of protection will argue that the rates in paragraph 304, or indeed any of the other paragraphs covering iron and steel, are high. The protection afforded by tariff acts, on iron and steel commodities, in all bills since the McKinley bill have been subject to material reductions until the act of 1913. The latter practically affords no protection against foreign competition to this great industry, which was saved from a continuation of the depression which set in during the latter part of 1913 and early part of 1914, only because of the world war. During the first half of 1914 mill order books shrank to a point which necessitated the curtailment of operations and resulted in decreased employment, and only began to fill up during the latter part of 1914 to a point that justified full employment, as a result of the European War, and full employment in this country was only continued until the effects of that conflict had passed. It has been, in recent months, at the lowest rate as to percentage of operation and employment, I think, in the history of this country, and we can only look for improvement as the general conditions of business improve and then, in my judgment, only if our home market is protected for the benefit of our home labor and investments.

New Paragraph Suggested

I think it is necessary to rewrite the description of hoops, bands and strips of iron or steel to meet the actual facts of to-day's production by dropping the limit of 8 in. and by extending the limit to 16 in. in

width and then to give this branch of the industry a rate that will be consistent with the rest of the schedule which, as already stated, is extremely moderate and will result in only reasonable protection against foreign competition. I would respectfully suggest, therefore, that paragraph 313 be corrected to read as follows:

Hoop, strip, band and scroll iron or steel, hot rolled, not especially provided for, 16 in. or less in width, ⅝ in. or less in thickness, valued at 1c. and not over 1½c. per lb., 25/100c. per lb.; valued at over 1½c. and not over 2c. per lb., 41/100c. per lb.; valued at over 2c. and not over 3c. per lb., 55/100c. per lb.; valued at over 3c. per lb., 20 per cent ad valorem; provided that all strip, band and scroll iron or steel wider than 16 in. shall be considered sheet iron or steel, and provided further that barrel hoops of iron or steel, and hoop or band iron or hoop or band steel flared, splayed or punched, with or without buckles or fasteners, shall pay no more duty than imposed on the hoop or band iron or steel from which they are made. Bands and strips of iron or steel, whether in long or short lengths, not especially provided for, 20 per cent ad valorem.

Cotton Tie Duty Out of Line

Paragraph 314 covering cotton ties and baling ties is entirely inadequate as a protective measure. Why hoops of iron or steel 15/16 in. wide x 0.035 in. thick, cut to specified lengths of 11 ft. 6 in., put up in counted bundles, enclosing a buckle for each strip in the bundle, and coated or painted, should take a duty less than that imposed upon similar strips or hoops of iron or steel not so put up, I cannot understand. These bundles are put up in standard weight of 45 lb. each and to-day are selling at $1.30 per bundle at maker's mills, Pittsburgh. The rate provided in paragraph 314 of ¼c. per pound is, therefore, less than 10 per cent ad valorem. The per ton value of cotton ties at to-day's market at maker's mill, Pittsburgh, is $57.77 per net ton, which makes the ¼c. protection $5 per net ton. I think that paragraph should have the rate of duty changed from ¼c. per lb. to 25 per cent ad valorem, if it is to protect the American producer of this commodity. In years past, before the rail rates of freight were as high as they are to-day, cotton ties could be delivered from English or German ports to any South Atlantic or Gulf port for a very much less rate of freight than from the mill of any American producer (except as to the mills located at Atlanta, Ga., and Helena, Ala., within the radius of a very short rail haul). There would be no adequate protection to the industry in the rate as written. Cotton ties in the past have frequently been carried from German or English ports to South Atlantic and Gulf ports practically as ballast or at exceedingly low rates of freight, by ships coming to those ports for cotton or other products for the return cargoes, and this practice will undoubtedly prevail again as the business of the world begins to assume normal relations. With our present excessive rail rates the cost of delivery from American mills to consumers would be so high that it is doubtful if the rate as written in the bill will afford any protection to the American producers of this commodity; and while rail rates must be materially reduced, if business is to go forward, it is not easy to believe that for a long time they will be reduced to a rate equivalent to that in effect prior to 1914.

The above rates are suggested as a very modest protection, provided the American valuation clause is retained in the bill, which clause the industry heartily approves and supports. Without the American valuation clause I am of the opinion that in order to afford any adequate protection to the American industry these rates would have to be raised materially. Indeed, I do not see how without the American valuation clause dumping and improper valuations can be avoided.

Cost of Making and Transporting Sheets

N. H. Abbott appeared before the committee as vice-president of the Wheeling Steel Corporation, and also as a designated representative of the following independent manufacturers of sheet steel:

Alan Wood Iron & Steel Co., Philadelphia.
Allegheny Steel Co., Pittsburgh.
American Rolling Mill Co., Middletown, Ohio.
Apollo Steel Co., Apollo, Pa.
Ashland Iron & Mining Co., Ashland, Ky.
Bethlehem Steel Co., Bethlehem, Pa.
Brier Hill Steel Co., Youngstown, Ohio.
Canonsburg Steel & Iron Co., Canonsburg, Pa.
Canton Sheet Steel Co., Canton, Ohio.
Carnahan Tin Plate & Sheet Co., Canton, Ohio.
Chapman Price Steel Co., Indianapolis, Ind.
Eastern Rolling Mill Co., Baltimore.
Falcon Steel Co., Niles, Ohio.
Follansbee Bros. Co., Follansbee, W. Va.
Labelle Iron Works, Steubenville, Ohio.
Mahoning Valley Steel Works, Niles, Ohio.
Mansfield Sheet & Tin Plate Co., Mansfield, Ohio.
Massillon Rolling Mill Co., Massillon, Ohio.
National Enameling & Stamping Co., Granite, City, Ill.
Newport Rolling Mill Co., Newport, Ky.
Newton Steel Co., Newton Falls, Ohio.
Parkersburg Iron & Steel Co., Parkersburg, W. Va.
Reeves Mfg. Co., Dover, Ohio.
Republic Iron & Steel Co., Youngstown, Ohio.
Seneca Iron & Steel Co., Buffalo.
Sharon Steel Hoop Co., Sharon, Pa.
Superior Sheet Steel Co., Canton, Ohio.
Trumbull Steel Co., Warren, Ohio.
United Alloy Co., Stark Division, Canton, Ohio.
Youngstown Sheet & Tube Co., Youngstown, Ohio.
West Penn Steel Co., Brackenridge, Pa.
Whitaker-Glessner Co., Wheeling, W. Va.
Wheeling Steel Corporation, Wheeling, W. Va.

"My brief," said Mr. Abbott, "is restricted to those steel products which are made on jobbing mills or sheet mills only, and to a proposed tariff on imports of similar materials covered by House Bill 7456, schedule 3, paragraphs 307, 308, and 309.

"The sheet steel industry consists of 598 sheet mills and 43 jobbing mills, scattered from the Atlantic seaboard to Wisconsin; the principal production, however, being in the Pittsburgh-Wheeling, Youngstown-Mahoning Valley and Cincinnati-southern Ohio districts. Other large districts of production are Chicago-Milwaukee, St. Louis, Baltimore-Philadelphia-Bethlehem and Buffalo districts.

The combined production of jobbing and sheet mill products was 2,335,000 net tons in 1919 and 3,300,000 net tons in 1920, of which production approximately one-third was galvanized, using approximately 88,000 tons of spelter for that purpose.

"The industry represents a large investment and in 1920 produced 3,300,000 net tons of sheets, employing approximately 42,000 people in the conversion of sheet bars into finished black and galvanized sheets. The wages paid for this conversion—mill labor only—amounted to $80,260,000.

"Comparative tables of statistics of the growth of the industry in recent years are omitted from this brief, because of the abnormal conditions prevailing from 1915 to 1920, inclusive, during which period an unusually large percentage of the capacity of the industry was engaged in making sheets for foreign consumption; as, during that period, the principal foreign competitors were not in position to supply their accustomed percentage of world's consumption.

"Any consideration of a protective tariff as an efficient, practical measure must, at this time, take into consideration the general sub-normal conditions that exist and that, presumably, may be expected to exist for several years in foreign countries; also the effect of low ocean rates from foreign countries against all rail or rail and water rates in this country, from our principal producing districts, to our seaports.

Labor Cost

"Directly and indirectly, not less than 80 per cent of the total cost of producing steel sheets in this country, is the item of labor; but analyzing from the conversion of the sheet bar into the finished common black sheet—not galvanized nor specially finished—the direct labor cost of producing and of repair labor, ranges from 27 per cent to 31 per cent of the total cost of the product. The increase in cost per ton between 1912

and the first quarter of 1921 is shown by the following schedule:

	Actual Average Cost of Labor Producing Common Black and Blue Annealed Steel Sheets, Per Net Ton Year 1912	Actual Average Cost of Labor Producing Common Black and Blue Annealed Steel Sheets, Per Net Ton, First Quarter 1921
Producing labor	$13.28	$22.86
Labor repairs and maintenance	0.43	1.20
Total	$13.71	$24.06

"This is a difference of $10.35, equaling an increase in labor cost over 1912 of 72 per cent. No comparative figures as to similar labor producing costs per ton of product produced, as paid in mills of foreign countries, are available at this time, but a general contrast can be made with Germany, the figures being reduced to United States currency at the now existing rate of exchange, and both figures being as of July 1, 1921, per day.

	Unskilled Workers	Skilled Workers
Germany	$0.88	$1.25
United States	3.00	9.95

(Skilled sheet mill workers in the United States work 5½ days and unskilled 6 days per week.)

"Both English and Belgian rates for similar work are higher than the rates paid in Germany but are very substantially less than the rates paid in the United States.

NOTE.—In connection with the comparison of the wages paid in the United States, as of July 1, it is pointed out that the rates effective at that time were materially less than the average of those existing in 1920. The rate in 1920 for unskilled labor was $5.06½ for a 10-hr. day. The skilled labor rates show a corresponding reduction.

Transportation Costs

"The following comparison is made between the rates from Pittsburgh and comparative ocean rates from the principal shipping ports in England, Germany and Belgium, all per net ton of 2000 lb. Foreign currency rates are reduced to United States currency at now existing rates of exchange.

	From Pittsburgh				
To	All Rail	Rail and Water	From England	From Belgium	From Germany
New York	$7.60	....	$5.40	$4.50	$4.50
New Orleans	10.20	$11.20	5.80	4.60	4.80
San Francisco	33.30	20.17	5.80	5.00	5.40
Seattle	33.30	20.17	10.80	6.60	6.60

"The following is a comparison of difference between the lowest foreign and lowest Pittsburgh rate, per net ton in favor of foreign manufacturers:

To	Pittsburgh Rate	Foreign Rate	Difference
New York	$7.60	$4.50	$3.10
New Orleans	10.20	4.60	5.60
San Francisco	20.17	5.00	15.17
Seattle	20.17	6.60	13.57

"The following comparison shows increase in foreign and domestic transportation rates between 1912 and 1921:

	1912	1921	Increase Per Net Ton
Liverpool to New York	$2.00	$5.40	$3.40
to New Orleans	2.20	5.80	3.60
to San Francisco	5.00	8.80	3.80
to Seattle	7.00	10.80	3.80
(All Rail)			
Pittsburgh to New York	3.20	7.60	4.40
to New Orleans	5.14	10.20	5.06
to San Francisco	19.90	33.30	13.40
to Seattle	19.90	33.30	13.40

"Pittsburgh rail and water combination rates existing in 1912 were not available at the time this brief was written.

"It is apparent that the difference in transportation costs alone would prohibit a buyer on the southern seaboard, and particularly in the Pacific Coast markets, from purchasing at home even though the advantage of quicker service or lowered investments in merchandise stocks would otherwise govern his preference. This difference in transportation costs has existed in the past, but not to the marked extent of today.

"The tariff rates on iron and steel sheets as proposed in House bill 7456, schedule 3, paragraphs 307, 308, 309 provide adequate protection to the industry except to the seaboard territory where transportation costs are so decidedly favorable to foreign manufacturers. This condition may be remedied to a substantial extent by the American valuation plan which is strongly endorsed by the industry.

"The capacity of the sheet steel industry of this country is sufficient to supply the requirements of the United States, as evidenced by any previous year's consumption; and, in addition, to produce a surplus equal to at least 25 per cent of its capacity; also that in the period from 1912 to 1921 the number of mills increased 38 per cent and producing capacity 45 per cent."

Manganese and Magnesite Duties Defended

Speaking for the Lavino Furnace Co., E. W. Marshall, and his own company, Vice-President Radcliffe Romeyn of the American Manganese Mfg. Co., with furnaces at Dunbar, Pa., made a plea for a protective duty on ferromanganese. He said that unless this is granted, the merchant ferromanganese industry will be wiped out of business within six months. The domestic makers, he stated, are satisfied with duties carried in the Fordney bill, or an alternative that would be acceptable would be free manganese ore with either an ad valorem duty of 25 per cent or a specific duty of $15 per gross ton on ferromanganese. This latter figure was arrived at by taking from the duty of $39.42 that would be levied on 80 per cent ferromanganese at the proposed rate of 2-1/5c. per lb., the sum of $24.64 that would be levied on 45 per cent manganese ore at 1c. per pound as proposed, the difference being $14.78. With a $15 duty the domestic maker would escape payment of the $24.64, if the ore duty is eliminated and be granted the same protection as now proposed. At the same time the $15 ferromanganese duty would represent a cost of only $2,250,000 annually to independent steel manufacturers, or 29.9c. per ton increase in the cost of soft steel production. The depressed condition of the industry was cited and the attention of the committee was called to the fact that workmen at Dunbar had voluntarily taken a cut of 22c. per hour in wages in order to continue employment and maintain operations. British competition was assigned as the chief reason for asking protection.

John J. Howard, general manager of the Lavino Furnace Co., after concurring in the arguments of Mr. Romeyn, submitted a brief and made some supplementary remarks. He expressed satisfaction at the action of the House Committee on Ways and Means in giving ferromanganese a classification separate from pig iron and spiegeleisen. Senator Smoot said that it is difficult to make the classification and that he could not understand why ferromanganese manufacture should be given a duty of $15 and spiegeleisen a duty of only $1.25, when both products are made in the blast furnace and contain manganese, though he said he recognized one was much higher than the other in manganese. It was explained to him by Mr. Romeyn, who interposed to clear the point, that standard spiegeleisen runs from 18 to 22 per cent in manganese only, although Senator Smoot insisted it runs as high as 30 per cent, while standard ferromanganese runs to 80 per cent or higher. Spiegeleisen, Mr. Romeyn said, needs no higher protection because there are ample supplies of domestic ore for spiegel manufacture, while foreign ores are necessary for the production of standard ferromanganese.

Mr. Howard said that the domestic makers, if allowed to develop, can produce cheaply enough so that steel makers will not have to buy foreign ferromanganese.

Without making any specific recommendation, George H. Crosby, Duluth, Minn., explorer of minerals,

urged the committee to provide protection for domestic manganese ore. Sharp refutation was made of claims that deposits in the United States are small and isolated and that there is a lack of high grade materials. Stimulation of manganese mining during the war was explained and it was stated that it could be proved that there are 43,000,000 tons of manganiferous ore and over 30,000,000 tons running higher in manganese. To show that the actual tonnage of reserves is greater than has been reported, it was asserted that there are 36,000,000 tons on the Cuyuna range, of 5 to 35 per cent manganese content. The witness said that more than $7,0000,000 has been spent since 1914 in trying to develop manganese mines and that of 39 on the Cuyuna range only two are operating. The belief was expressed that if the industry is protected this country would be capable of producing 75 per cent of the manganese required and would be for many years. The area explored in Minnesota was said to be only one-eighth of the proved merchantable deposits. The ore in reserve inland could be increased to 50,000,000 tons on the Cuyuna range alone, Mr. Crosby said.

Charles W. Potts, of Dearwood, Minn., prospector and miner of manganese ore, made a plea similar to that of Mr. Crosby. He said domestic shipments in 1918 totaled 305,000 tons. Official reports by the Government and States were declared to be out-of-date and reserves to be greater than have been estimated. Mention was made of manganese ore deposits, some as high as 49 per cent, in the Batesville, Ark., district, while others of 31 per cent were called to the attention of the committee. Mr. Potts said he thought there were reserves amounting to 10,000,000 tons, ranging from 40 to 42 per cent in manganese, 20,000,000 tons of ferruginous ore, and 36,000,000 tons of manganiferous ore, and that they will last as long as the iron ore deposits.

American Mining Congress for High Duties on Minerals

That the Finance Committee may give ferromanganese a different classification from that provided in the Fordney bill was indicated by inquiries with this in mind directed to witnesses by Senator Smoot, and the interest he manifested in a recommendation by Herbert Wilson Smith of the American Mining Congress. Mr. Smith pointed out that as the ferro-alloy section is framed it is difficult to make a division between spiegeleisen and ferromanganese and suggested that ferromanganese instead of being classified as "such iron manganese alloys as contain 45 per centum or more of manganese," the content be lowered to the top line of spiegeleisen; or, as Mr. Smith said, 23 per cent of manganese. Mr. Smoot, as he had done previously, insisted that standard spiegeleisen runs up to 30 per cent in manganese, despite the fact that the trade recognizes it as ranging from 18 to 22 per cent. Mr. Smith said at present there is a gap between spiegeleisen and ferromanganese which should be taken up by means of the suggested reclassification. Spiegeleisen, however, in the Fordney bill is described as "an iron manganese alloy containing less than 45 per cent of manganese," or, in other words, is graded up to the point where ferromanganese begins.

Mr. Smith's testimony dealt with 27 minerals and he submitted extensive statistical data on which he based his arguments, some of which were to support suggested revisions and reclassifications. He supported the duty carried on manganese ore, the duties suggested by graphite and zinc producers, also the restoration of the Payne-Aldrich rates of 7c. and 11c. respectively on block and pig aluminum and aluminum sheets and strips. He did not insist on the latter, however, but said the Fordney rates of 5c. and 9c. are as low as the domestic industry can stand. He also recommended that the duty on block tin be increased from 2c. per lb., proposed in the Fordney bill, to 4c. per lb.

Statement of the Northwestern Magnesite Co.

An argument for the proposed duties on magnesite was made by Roy N. Bishop, president and general manager of the Northwestern Magnesite Co., with mines in Stevens County, Washington. He said that while the proposed duty on dead burned magnesite does not now represent the difference between costs of production in the United States and Austria, it is felt that economic conditions in the United States will adjust themselves so that it will be possible to produce more cheaply than has been possible heretofore. He cited the following delivered prices per ton to show the costs in the United States compared with those of Austria:

	Austria	United States	Difference
Chester, Pa. (seaboard)...	$20.00	$46.35	$26.35
Pittsburgh	24.50	43.95	19.45
Harrisburg, Pa.	22.80	46.35	23.55
Johnstown, Pa.	24.30	46.35	22.05
Buffalo, N. Y.....	24.50	43.95	19.45
Youngstown, Ohio	24.60	43.95	19.35
Chicago*	27.20	43.95	19.35
Cleveland	25.60	43.95	18.35

*Magnesite from Austria takes rate by New Orleans of $7.20 to Chicago.

Mr. Bishop said that not a pound of magnesite had been produced by the Northwestern mines in 1921 so that the percentage of domestic supplies is probably back to the pre-war basis of 5 per cent of the total. This was attributed partly to the depression in the steel industry but also to imports from Austria.

The following table was submitted to show the total crude magnesite produced in the United States for the past four years, according to the United States Geological Survey, and also to show the tons of crude magnesite produced by the Northwest Magnesite Co., and the percentage of the total for the United States contributed by that company. It was given to refute claims that this company had a monopoly.

	Total U. S., Tons	Northwest Magnesite Co. Tons	Per Cent
1917.....	316,838	62,737	19.8
1918.....	231,605	81,111	35.0
1919.....	156,226	89,163	57.1
1920.....	303,767	141,817	46.7
Total	1,008,436	374,828	37.2

A schedule was submitted to show that the center of consumption is in the Pittsburgh district and surrounding territory, including Youngstown, Ohio, and Johnstown, Pa., with a yearly consumption of 66,000 tons by 415 open-hearth furnaces having a daily capacity of 26,935 tons of steel. The freight rate on magnesite from Chewelah, Wash., is $20.80 per net ton to Johnstown and $18.40 to Youngstown and Pittsburgh. The rates from the Atlantic seaboard were said to be $4.10 to Johnstown, $4.50 to Pittsburgh, and $5 to Youngstown. The statement was also designed to show that there is not enough business west of the Mississippi to justify operating magnesite mines.

The annual consumption in the latter territory was given as 13,550 tons, or 8.5 per cent of the total consumption of dead burned magnesite in the United States. Domestic production, according to government figures, ranged from 12,443 tons in 1910, or 3.7 per cent of the total consumption, to 316,838 tons in 1917, the peak year, or 89.2 per cent of consumption. Some of the conclusions of Mr. Bishop, who strongly upheld the quality of domestic magnesite, were:

The proposed tariff will only add 3c. to 5c. to the cost of a ton of steel, which may be considered negligible.

Five hundred pounds of steel tools for a mechanic would only have its original cost increased 2c., which may be considered negligible.

Magnesite mines only ask a tariff which will place American mines in competition with Austrian mines. It is therefore fair to assume that the importations will equal 50 per cent of the consumption. The steel manufacturers are asking a tariff so that they may accomplish the same end.

With a competitive tariff, assuming 50 per cent of the magnesite enters from Austria, the United States would furnish about 75,000 tons of dead burned magnesite.

The cost of Austrian magnesite versus American magnesite is based upon the following differences

which justify granting a tariff that will place these two countries upon a competitive basis:

	United States	Austria	Difference
Labor, per day.....	$5.30	$0.30	$5.00
Coal, per ton.....	9.00	5.75	3.25
Freight to Chester....	20.80	4.60	16.20
Freight to Pittsburgh.	18.40	9.10	9.30

Competition must exist at the center of the steel industry (Pittsburgh and vicinity) in order to protect American industry, as only 2.6 per cent of the open-hearth steel capacity in the United States is west of the Mississippi. West of the Mississippi there are 129 copper converters which would require only 2.8 per cent of the dead burned magnesite consumed in the United States.

H. F. Wierum, Valley, Wash., general manager American Mineral Production Co., supported arguments in behalf of the proposed duty of ¾c. per lb. on grain magnesite. He stated that his company has 4,000,000 tons in sight, with a probable reserve of 10,000,000 tons more of mineral for the making of this grade of magnesite and said he thought the Northwestern Magnesite Co. has the same quantity of reserves, while California has in reserve at least 1,000,000 tons of material for making plastic magnesite.

While upholding the proposed duty of 10 per cent on graphite, preference was expressed for a rate of 6c. per pound on flake and 2c. per pound on lump by Floyd Weed, of Birmingham, Ala. His contentions in behalf of the domestic graphite producers were similar to those made by George Sharpe, also of Birmingham, representing producers in Alabama, as published in THE IRON AGE of last week.

Vice-President Buck Presents Views of Bethlehem Steel Co.

A brief was submitted by Vice-President C. A. Buck, Bethlehem Steel Co. regarding certain schedules in the tariff bill. His principal points were made as follows:

"We believe the proposed duties on finished steel products in the metal schedule to be fair and equitable to the steel industry in general provided the American valuation plan is accepted. It is only certain raw materials and certain alloys that are practically raw materials that we wish to call to your attention.

Ferroalloys

"We would recommend that only nominal duties be put on ferroalloys and that the ores from which they are made, be put on the free list. Our reason for these requests are:

"1. Ferroalloys are essentially raw materials, being the first product resulting from the smelting of the various ores, this generally being done in the electric furnace.

"2. The ores of most of the metals in this group do not exist in the United States in commercial quantities. As to this feature reference may be made to some of these elements in detail.

Chromium

"Only low grade chromium ores exist in the United States. These occur in California and their use in the steel industry is practically prohibitive on account of their leanness and their cost when the freight on waste matter in the ores is considered. No rich chrome ores were developed during the exceedingly high war prices. The deposits in California are too low grade to be of importance in peace times but would form a valuable emergency reserve in time of war.

Tungsten

"The case of tungsten is much like that of chromium. In using up our tungsten reserves we are consuming a relatively low grade reserve of very moderate tonnage in competition with rich ores of very large tonnage that occur in Peru, China, the Malay States, etc.

Nickel

"No nickel deposits exist in the United States and a high duty on the crude forms of nickel (metallic nickel and nickel alloys) is a hardship on the steel industry.

Manganese Ore and Ferromanganese

"Manganese is absolutely essential in the steel industry and about 17 lb. of ferromanganese are used for every ton of steel produced. This importance makes the subject worthy of special mention. We are not in favor of a duty on manganese ores, but do object to more than a nominal duty on ferro-manganese.

"Inducements should be made in this tariff for the manufacture of ferro-manganese in this country. This can be done by admitting the ores free of duty and by putting a nominal duty on ferro-manganese. In this way we will offset the advantage Europe now has in the matter of ocean transport on ores from India, Turkey and Brazil to European points. England in normal times enjoys a distinct advantage in ferro-manganese production over the United States. Any tariff on manganese ore will increase this advantage.

Fluorspar

"Fluorspar is an essential material in the steel industry being the only satisfactory flux for open-hearth furnaces. For many years a considerable part of our requirements has been imported, mostly from England.

"The tariff on fluorspar will be a distinct hardship on Eastern steel manufacturers on account of the high freight rates applying from Kentucky and Illinois. We believe the reserves in those states to be ample, but also believe that steel plants located in the east will be a distinct disadvantage as compared with Chicago and Pittsburgh. The freight rates at present are as follows: From Ky.-Ill. field to Chicago, $3.60; to Pittsburgh, $5.60; to Bethlehem, $8.00.

"It is to be noted that the American fluorspar industry will apparently flourish without tariff protection. So many new uses are being developed for high grade spar that the industry has greatly expanded in recent years. Thus while the price of spar in 1920 was four times that of 1890, production was about 18 times the production for 1890. This development occurred while fluorspar was on the free list or while it had only a nominal duty of $1.50 per ton.

Magnesite and Magnesite Brick

"Magnesite is an important refractory used extensively in the steel industry for lining open hearth and other furnaces. It is subjected to a dead burning process before use and is then called dead burned grain magnesite. A large amount is used in this form and a large amount is also used in the form of brick made from this material. The only substitute is a very pure dolomite which while cheaper is not as satisfactory as magnesite. The best magnesite for refractory purposes occurs in Austria and the magnesite industry of the United States has practically been built up on importations from that country. As indicating this development the imports of dead burned magnesite were 30,000 tons in 1904 and increased to 150,000 tons in 1914. Development of domestic magnesite has been recent and only one property located in Washington is known that can supply an important tonnage. California also is a producer, but the quality of the product is such that it is not well adapted to refractory use. In 1920 California produced 82,000 tons and Washington 222,000 tons.

"We are not in favor of the imposition of a duty on magnesite for the following reasons:

"1. An important magnesite brick industry has been built up in the East, depending entirely on Austrian magnesite. This industry comprises many brick plants located in Pennsylvania and Maryland and well adapted to serve the steel industry.

"2. Geographically the Washington deposit is such that it will always furnish a product delivered to

(*Continued on page* 564)

Program for Technical Sessions of Convention of American Steel Treaters

The schedule of papers which are to be presented for discussion at the technical sessions of the American Society for Steel Treating at its third annual convention and exhibition at Indianapolis, Ind., Sept. 19 to 24, follows:

Tool Steel

C. M. Brown, vice-president Colonial Steel Co., Pittsburgh: "Tool Steel Specifications."

W. G. Calkins, metallurgist Detroit Twist Drill Co., Detroit: "Notes on Forged High-Speed Milling Cutters."

A. H. d'Arcambal, metallurgist Pratt & Whitney Co., Hartford, Conn.: "Physical Tests on High-Speed Steel."

A. W. F. Green, metallurgist John Illingworth Steel Co., Philadelphia: "Providing Properly Rolled Tool Steel for the Steel Treater."

L. K. Marshall, metallurgist North East Electric Co., Rochester, N. Y.: "Tool Steel Manipulation."

M. H. Medwedeff, metallurgist, 5014 Weseley Avenue, Howard Park, Baltimore, Md.; "Heat Treatment and Uses of High-Speed Steel."

T. Holland Nelson, steel works manager H. Disston & Sons, Philadelphia: "A Comparison of American and English Methods of Producing High Grade Crucible Steels."

L. R. Seidell, managing director New York Testing Laboratories, New York: "Tool Steel."

A. S. Townsend, chief chemist Cleveland Twist Drill Co., Cleveland: "The Effect of Tungsten Content on the Specific Gravity of High-Speed Steel."

Metallographic Research

R. L. Dowdell, instructor of metallography, University of Minnesota, St. Paul, Minn.: "Reclaiming High Carbon Gears."

J. P. Gill and L. D. Bowman, metallurgist and assistant metallurgist Vanadium Alloy Steel Co., Latrobe, Pa.: "Metallography of High-Speed Steel."

N. B. Hoffman, metallurgist, Colonial Steel Co., Pittsburgh: "Ghost Lines and Grain Elongation in Hot Rolled and Cold Drawn Iron Wire."

F. C. Lau, consulting engineer, 1437 W. Jackson Boulevard, Chicago: "The Effect of Phosphorus in Tool Steel."

Heat Treatment of Steel

D. N. A. Blacet, metallurgist Central Steel Co., Massillon, Ohio: "Modern Methods of Heat Treating."

I. H. Cowdrey, professor of mechanical engineering, Massachusetts Inst. Tech., Cambridge, Mass.: "The Efficiency of Annealing Overstrained Steel."

L. S. Cope, consulting metallurgist, 920 Mary Street, Ann Arbor, Mich.: "Coarse Grained Forgings; Their Detection and Correction."

E. J. Janitzky, metallurgist Illinois Steel Co., South Chicago, Ill.: "A Contribution to the Problem of the Influence of Mass on Heat Treatment."

J. F. Keller, department of forging and heat treating, Lewis Institute, Chicago: "The Whys of Warping."

C. B. Langstroth, metallurgist A. O. Smith, Milwaukee, Wis.: "Heat Treatment of Steel."

H. E. Hayward, metallurgist Link Belt Co., Indianapolis, Ind.: "Malleable Iron."

S. L. Hoyt and G. H. Bierman, metallurgical engineers National Lamp Works, Nela Park, Cleveland: "On the Theory of Hardening Steel."

T. D. Lynch and W. J. Merton, metallurgical engineers material and process engineering department, Westinghouse Electric & Mfg. Co., Pittsburgh: "Tests Showing the Effect of High Temperatures on Malleable Iron."

W. J. Merton, metallurgical engineer, Westinghouse Electric & Mfg. Co.: "A Coiling and Heat Treating Plant for Helical Springs."

W. J. Priestley, superintendent of hot metal division U. S. N. ordnance plant, Charleston, W. Va.: "Fracture Test on Steel to Determine Its Quality."

W. R. Ward, metallurgical engineer, Lyells, Va.: "Miscellaneous Heat Treating."

W. H. White, superintendent of melting shops U. S. N. ordnance plant, Charleston, W. Va.; "Heat Treatment of Steel Castings."

J. A. Gann, metallurgist Dow Chemical Co., Midland, Mich.: "Dowmetal and Its Application."

Carburizing

C. M. Campbell, superintendent Pioneer Alloy Products Co., Cleveland: "Do Alloy Carbonizing Boxes Pay?"

H. H. Harris, president General Alloys Co., Chicago: "Design of Heat Treating Containers."

V. E. Hillman, metallurgist Crompton & Knowles Loom Works, Worcester, Mass.: "The Efficiency of Various Mixtures for Cyanide Hardening and the Rôle of Nitrogen in the Process."

W. I. McInerny, foreman heat treatment armor plate, U. S. N. ordnance plant, Charleston, W. Va.: "Carburizing Heavy Sections."

H. Schagrin, chief chemist, U. S. N. ordnance plant, Charleston, W. Va.: "Carburization with Wood Charcoal."

T. G. Selleck, vice-president Gurney & Selleck, 513 Peoples Gas Building, Chicago: "Carburizing."

P. W. and E. B. Shimer, metallurgical engineers, Easton, Pa.: "Cyanamide in Liquid Case Hardening."

S. C. Spalding, metallurgist Halcomb Steel Co., Syracuse, N. Y.: "Comparison of the Rate of Penetration of Carbon into Various Commercial Steels Used for Case Carburizing."

Management

A. E. Bellis, president Bellis Heat Treating Co., New Haven, Conn.: "Shop Management."

A. A. Blue, metallurgist Duff Mfg. Co., Pittsburgh: "A Successful Bonus System Applied to Heat Treating."

J. Walter Bressler, Philadelphia: "System of Records for Metallurgical Departments."

F. C. Langenburg, metallurgist Watertown Arsenal, Watertown, Mass.: (Title to be supplied later.)

E. W. Pierce, metallurgist Maxwell Motor Car Co., New Castle, Ind.: "Buying Steel on Closer Carbon Limits."

C. F. Smart, assistant chief metallurgist, Ingalls-Shepard division Wyman-Gordon Co., Harvey, Ill.: "Steel Is Steel."

W. P. Woodside, superintendent of materials Studebaker Corporation, Detroit: "Organizing Research to Pay Dividends."

W. P. Wood, professor of chemical engineering, University of Michigan, Ann Arbor: "A University Course in Metallurgical Engineering."

H. F. Wood and F. G. Millard, chief metallurgist and superintendent of finishing department Ingalls-Shepard division, Wyman-Gordon Co., Harvey, Ill.: "Production Efficiency in the Heat Treatment of Drop Forgings."

M. H. Medwedeff, metallurgist, 5014 Weseley Avenue, Howard Park, Baltimore, Md.: "Metallurgy in the Modern Shop."

Alloy Steel

H. J. French, physicist Bureau of Standards, Washington, D. C.: "Tensile Properties of Some Structural Steels at High Temperatures."

M. A. Grossman, metallurgist Electric Alloy Steel Co., Youngstown, Ohio: "The Toughness of Alloy Steels as Affected by Their Heat Treatment."

C. M. Johnson, director of research Park Works Crucible Steel Co. of America, Pittsburgh: "Some Alloy Steels of High Elastic Limit, Their Microstructure and Heat Treatment."

G. C. McCormick, assistant metallurgist Crompton & Knowles Loom Works, Worcester, Mass.: "A Discussion of Uranium and Allied Elements."

H. Styri, chief S. K. F. Research Laboratories, Philadelphia: "Heat Treatment of Chrome Steel for Ball Bearings."

J. S. Vannick, metallurgist research laboratory, Department of Agriculture, Washington, D. C.: "Mechanical Properties of Chrome Vanadium Steels."

Properties of Carbon and Alloy Steels

R. M. Bird, metallurgist Bethlehem Steel Co., Bethlehem, Pa.: "Standardization of Methods Leading to Comparative Properties of Alloy Steels."

A. M. Cox, assistant metallurgist R. D. Nutthall Co., Pittsburgh: "Abrasive Qualities of Plain Carbon and Alloy Steel."

H. J. French and W. G. Johnson, physicist and assistant physicist Bureau of Standards, Washington, D. C.: "Effect of Heat Treatment on Mechanical Properties of 1 Per Cent Carbon Steel."

H. A. Holz, president Holz & Co., New York: "Recent Researches on the Elastic Limit."

L. W. Wild, president Wild Barfield Co., London, England: "Influence of Heat Treatment on the Magnetic Properties of Steel."

H. J. French, physicist Bureau of Standards, Washington, D. C.: "Effect of Heat Treatment on Mechanical Properties of Carbon Molybdenum and Chrome Molybdenum Steels."

Heat Treating Equipment

W. H. Bristol, president Bristol Co., Waterbury, Conn.: "Automatic Compensation for Variation of Cold Ends of Thermo-Electric Pyrometers."

E. D. Campbell, professor of chemistry University of Michigan, Ann Arbor: "Some Brinell Hardness Measurements on Small Specimens."

George Keller, sales manager Brown Instrument Co., Philadelphia: (Title to be supplied later.)

R. W. Newcomb, manager Charles Englehard, Inc., New York: "A New Type Automatic Temperature Regulator; Its Application to Heat Treating Furnaces."

T. Y. Olsen, vice-president Tinius Olsen Testing Machine Co., Philadelphia: "Determination of Stiffness of Wire on Sheet Metal."

S. P. Rockwell, metallurgist Whitney Mfg. Co., Hartford, Conn.: "Testing of Metals for Hardness."

C. Upthegrove, professor of chemical engineering University of Michigan, Ann Arbor, Mich.: "Note on the Small Brinell Machine."

Furnaces

T. F. Bailey, vice-president Electric Furnace Co., Alliance, Ohio: "Electric Furnaces for Heat Treating with Automatic Control."

G. R. Brophy, metallurgical engineer industrial furnace Department General Electric Co., Schenectady, N. Y.: "Calite; A New Heat Resisting Alloy."

E. F. Davis, sales manager Celite Products Co., New York: "Construction of Furnace Doors, Lining and Bases."

F. J. Evans, sales engineer Surface Combustion Co., Springfield, Mass.: "High Pressure Gas and Its Application to Industrial Furnaces."

J. T. Gower, Armstrong Cork & Insulation Co., Pittsburgh: "Reducing Conduction and Radiation Heat Loss."

C. L. Ipsen, designing engineer, General Electric Co., Schenectady, N. Y.: "The Electric Furnace as It Affects Overall Costs of Heat Treated Parts."

P. J. Lafore, industrial engineer Boston Consolidated Gas Co., Boston: "The Use of Gas Fired Furnaces for Heat Treating."

G. M. Little, resident engineering division, Westinghouse Electric & Mfg. Co., Pittsburgh: "An Electrically Heated Forging and Heat Treating Furnace."

W. E. McGahey, foreman heat treating large guns, U. S. N. ordnance plant, Charleston, W. Va.: "Heat Treatment of Large Forgings by Oil, Gas, and Electricity."

A. F. Mitchell, superintendent heat treating U. S. N. ordnance plant, Charleston, W. Va.: "A Comparison of Conditions Entering into the Operation of Oil and Natural Gas Fired Furnaces."

J. Weaver Smith, industrial engineer Citizens Gas Co., Indianapolis, Ind.: "Gas Accessories for the Heat Treating Room."

R. E. Talley, chief engineer Geo. J. Hagen Co., Pittsburgh: "Operating Data on Electric Furnaces."

Miscellaneous Topics

A. E. White, University of Michigan, and J. S. Vannick, Bureau of Standards: "Note on Occurrence of Oxides and Nitrides in Boiler Tube Steel."

F. H. Helrigel, metallurgist Motor Products Co., Detroit: "The Heat Treatment of Copper and Brass."

American Pig Iron Association

BUFFALO, Aug. 25.—At the meeting of the American Pig Iron Association held at the Hotel Statler this morning, representatives of more than 20 producers reported a better buying movement. Unanimous reports of increased shipping and larger inquiry in August than any month this year, were heard. The railroad situation was discussed. Likelihood of a strike did not appear to alarm the representatives. President Friend of the association presided. Generally the producers felt that the worst of the depression has passed. None of the interests represented claimed to be selling on any other basis than immediate delivery. The session was brief and in the afternoon the majority of the visitors went to the Orchard Park Golf Club.

Some Increase in Foundry Operation

In their review of the pig iron market, Rogers, Brown & Co., Cincinnati, discuss the situation in the various divisions of the foundry industry:

"The revival in buying during the past two or three weeks east of the Rockies has caused much discussion as to the increase in melt. The steel plants are doing better. For the most part, there is very little improvement in the general gray iron foundry melt. Here and there a foundry reports a real revival and many are taking off a few more heats per week. The accumulation of these increases is not impressive, but is moving in the right direction. There is more demand for malleable castings, with a corresponding increase in malleable pig iron consumption. In the West this is largely due to railroad repair and some little automobile work. The radiator companies and sanitary ware manufacturers are running well. Agricultural implements builders are not showing any improvement. Piano plate foundries are doing better, preparing for the holiday trade. Mine car, mining and oil well machinery manufacturers have been growing quieter during the past 60 days, although now a few who cater to the oil drillers are picking up some business. Undoubtedly the greatest increase in melt during the past few weeks has been noted in the stove industry. Reports from all sections of the country are unanimous on this. A large part of the stoves are being shipped out as completed, while some are stocked for the cold weather demand. From this synopsis it is apparent that pig iron melt is growing heavier."

COMING MEETINGS

September

Iron and Steel Institute (Great Britain). Sept. 5 to 10. Autumn meeting, Paris, France.

National Exposition of Chemical Industries. Sept. 12. Eighth Coast Artillery Armory, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 12 to 19. Fall convention, Wilkes-Barre, Pa. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

National Association of Brass Manufacturers. Sept. 14 and 15. Fall convention, Cleveland. Secretary, W. M. Webster, 139 North Clark Street, Chicago.

National Association of Cost Accountants. Sept. 14 to 16. Fall convention, Cleveland Hotel, Cleveland. Session on morning of Sept. 15 on cost methods of trade associations. Offices of association at 130 West Forty-second Street, New York.

American Society for Steel Treating. Sept. 19 to 24. Annual convention and exhibition, Manufacturers Building, State Fair Grounds, Indianapolis. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

American Electrochemical Society, Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Indianapolis.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

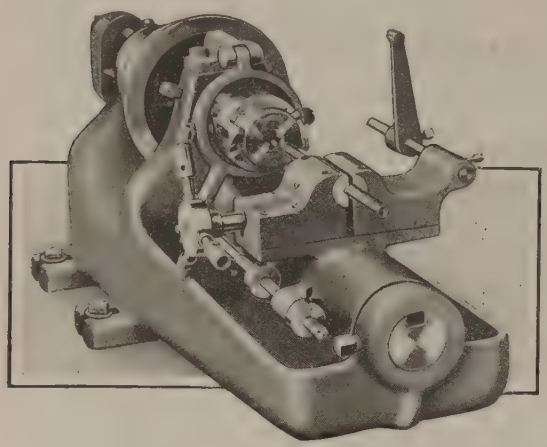
The suit of Capt. Alexander McDougall, shipbuilder, against the Oliver Iron Mining Co., to recover a large amount of royalties alleged to be due on account of infringement on patents on an ore washer, has been decided in favor of the defendant. Captain McDougall may appeal the case to the higher courts.

Building permits issued in Chicago during the first 23 days of August exceeded the number issued for any similar period since 1914. The permits issued numbered 747 and the value involved was nearly $8,700,000.

New Bench Threading Machine

A new bench threading machine for material 1/16, 3/32, 3/16 and 5/16 in. in diameter and cutting 3¼ in. maximum length with one setting, 18 in. with re-settings, has been recently added to the line of the Geometric Tool Co., New Haven, Conn.

The bed is a single casting carrying a spindle mounted on bronze bearings of liberal size. The spindle has three speeds, 653, 333 and 180 r.p.m. and is provided with a Geometric self-opening rotary diehead with



The Carriage Is Guided by a Bronze Key Engaging a Keyway on the Shaft

a yoke lever and trip rod, the operation of which is governed by adjustable stops. The carriage travels on a round shaft and is guided by a bronze key engaging a keyway on the shaft, adjustment being provided for maintaining the proper fit of the carriage on the shaft. This construction of the carriage allows maximum space for removal of chips from the bed. As shown in the illustration, a two jawed chuck is mounted on the carriage which is operated by the handwheel. The adjustable swinging stop on the opposite side of the chuck provides for accurate setting of the work for a pre-determined length of thread. Collets, expanding arbors and special holders can be furnished if desired.

Different sets of chasers are required to cover the threading range of the machine. As in other threading machines made by this company the chasers are removed by tripping the diehead and pulling out the stop plunger, permitting removal from the slots. In replacing, the numbers on the chasers and those on the slots are intended to correspond.

A geared pump driven from the spindle forces oil from the reservoir in the bed through the spindle and against the work. The machine weighs 90 lb. and the bench space occupied is 9½ x 29 in. Mounted on a pedestal the floor space occupied is 16 x 19 in. A 1½ in. driving belt is used, the countershaft pulleys being 3⅞ x 1¾ in., and speed of countershaft 245 r.p.m.

Belgium as a Machine-Tool Market

There are at present only four important plants in Belgium manufacturing machine tools, according to the *Ironmonger* (London), which publishes the following:

Two of these are in Brussels, one in Liège, and one in Bruges. One of the Brussels plants specializes on lathes of 14 to 40-in. dimensions, while the other, which is now increasing its installations to a capacity of 1000 to 1200 a year, builds lathes, milling machines and pneumatic hammers. The Bruges plant, apart from refrigerating machinery, turns out several models of boring mills, which are considered equal to any similar makes produced outside the United States.

The principal export markets for Belgian machine-tools are France, Great Britain and Italy. Machine-tool dealers state that before the war 70 per cent of all machine tools imported into Belgium were of German origin. For reconstruction purposes after the armistice, however, American machine tools of all classes were sold in Belgium in large numbers.

While there are in Belgium numerous small shops producing brass valves, the native product is not able to compete with the standardized American article. German competition is particularly active in measuring tools and on small carbon steel articles. In the latter branch German manufacturers undersell American products in the local market by over 80 per cent. It is the local practice to use carbon steel up to ½ in. diameters, and above that dimension to employ high-speed steel. German supremacy in micrometers is almost as exclusive as in drills. A German product, not of extremely high finish, but of entirely accurate construction, is sold in Brussels for 31.20 fr., while the price asked for the corresponding American micrometer is 96 fr.

For Officers of Purchasing Agents' Association

The nominating committee of the National Association of Purchasing Agents has named for re-election the entire board as it now stands. The officers thus renominated include: W. L. Chandler, Dodge Sales & Engineering Co., Mishawaka, Ind., president; S. F. Woodbury, Willamette Iron & Steel Works, Portland, Ore., fourth vice-president; D. E. Ferguson, H. K. Porter Co., Pittsburgh, fifth vice-president; W. J. Gamble, Vulcan Steam Forging Co., Buffalo, treasurer, and L. F. Boffey, 19 Park Place, New York, secretary.

The annual meeting of the association will be held in the Claypool Hotel at Indianapolis, Oct. 10 to 13.

The executive committee of the association at a two-day executive session at Denver passed a resolution advocating centralization of city, county, state and federal purchasing. The resolution states that a saving ranging from 10 to 25 per cent would be effected.

Solid Adjustment Tap

A new threading tool, a solid adjustment tap, has been placed on the market by the Geometric Tool Co., New Haven, Conn. It is intended as an intermediary between an adjustable collapsing and a solid tap, for

Each Size Takes Chasers for a Range of Diameters

use where a machine has no means of closing a collapsible tap or for some other reason does not permit the use of a tap of that type.

While not equipped with the collapsing device the tap is said to have all the advantages of a collapsing tap, and being adjustable, the correct size is always maintained. Each size of tap accommodates chasers for a range of diameters, which are readily removed for grinding. When it is finally necessary to renew the chasers, the new ones can be inserted without renewing the entire tap.

As a memorial to the late Col. Raynal C. Bolling, general solicitor United States Steel Corporation, who was killed in the World War, in March, 1918, his brother-in-law, Dr. J. C. Phillips, Wenham, Mass., has established the Bolling Memorial Redwood Grove on the south fork of the Eel River, in Humboldt County, Cal. A memorial tablet to Colonel Bolling has been placed near the highway at the entrance of the grove. A bronze statue of Colonel Bolling, recently completed by E. C. Potter, the sculptor, is soon to be placed on the Havemeyer School grounds, Greenwich, Conn., as a memorial gift to the town by a number of the colonel's friends.

FEWER ACTIVE MILLS

Sheet and Tube Plants in Mahoning Valley Show Decreased Operations

YOUNGSTOWN, OHIO, Aug. 30.—Indicating slower buying is the reduced finishing mill operating rate in the Mahoning Valley, particularly in sheet and tube mills. Of the 105 sheet mills in the Valley, 45 started on Monday, six less than the previous week, while seven pipe furnaces were fired, as compared with 11 the week before. Of the 66 open-hearth furnaces, 32 are charged this week, as compared with 38 the previous week. But one of the three Bessemer departments in this district, that of the Youngstown Sheet & Tube Co., is active.

Following a three weeks' run, during which accumulated orders were worked off, the Mahoning Valley Steel Co. suspended its sheet plant at Niles this week.

Sheet mills are being operated as follows: Youngstown Sheet & Tube Co., nine; Newton Steel Co., 10; Republic Iron & Steel Co., seven; Brier Hill Steel Co., 10; Sharon Steel Hoop Co., five, and Trumbull Steel Co., four.

The Sheet & Tube Co. is operating four tube mills and the Republic company three.

The Trumbull company is operating 13 tin mills.

Finishing capacity of the Carnegie Steel Co. in this district is engaged to the extent of 35 to 40 per cent.

In the Shenango Valley, the most conspicuous change is in the action of the American Sheet & Tin Plate Co. in operating, for the first time in several months, 20 of its 30 hot mills at the Shenango Works in New Castle on a regular schedule of 16 turns a week.

The volume of new orders combined with releases against former purchases is such as to insure maintenance of production at 60 per cent by the Truscon Steel Co., fabricating interest of Youngstown, Ohio. Road builders and construction interests are absorbing the bulk of the tonnage produced by the company. Current buying is featured by absence of large orders.

Improvement at Milwaukee

MILWAUKEE, WIS., Aug. 29.—The resumption of production by numerous large and small plants in the metalworking industries of Milwaukee and Wisconsin during the past week to ten days has given the general business of this district an aspect which is more favorable than at any time since early spring.

Plant Operations

The New England motor industry outlook is brighter than it has been before in some time. The Stevens-Duryea Co.'s Chicopee, Mass., plant last week resumed full time operations with 500 on the payroll. The company at that time announced a material reduction in prices for its product. The Rolls-Royce of America, Inc., Springfield plant, according to present plans, will reopen Sept. 6. Whether all employees will be taken back at once or a start be made with reduced forces and then gradually increased depends to a large degree on the ability of automobile body builders to furnish the company with finished products. The plant was obliged to close due to the inability of the body builders to furnish bodies built to Rolls-Royce specifications. Announcement is made that the Driggs Ordnance & Mfg. Corporation, New Haven, Conn., will soon begin the manufacture of light automobiles and automobile parts. Progress is being made by the Waltham Motors Co., Waltham, Mass., toward the resumption of automobile production at the former Metz plant. The Hendee Mfg. Co., Springfield, Mass., motorcycles, is operating its tool department full time in preparation for production of spring models.

The Illinois Steel Co., on Tuesday, Aug. 23, reemployed about 800 men out of the total who were laid off April 1 when operations of the Bay View mills at Milwaukee were suspended because of the decline of demand. The blast furnaces so far are not affected by the reinstatement of working forces. Four rolling units are now in operation. The number of men back at work represents about 65 per cent of the normal force.

The Malleable Iron Range Co., Beaver Dam, Wis., on Aug. 26 resumed production in its gray iron foundry department and the malleable foundry may be reopened within a short time in view of the steady improvement in business. Both foundries have been idle since the early part of the year.

The Gurney Refrigerator Co., Fond du Lac, Wis., which closed down July 1, recalled its entire force of 200 employees for resumption of work on Aug. 22.

Manufacturers of farm implements, farm equipment, dairy machinery and supplies, and other agricultural tools, in many sections of Wisconsin, are either broadening the scope of their operations, or reinstating forces in the case of shops which have been idle for from one to four months.

The Union Pacific Railroad shops at North Platte, Neb., have resumed operations, returning about 45 per cent of the old employees to work. The shops had been idle for seven months.

The Powell Pressed Steel Co., Hubbard, Ohio, has resumed operations on a small scale, following a protracted suspension.

British Steel Exports Very Low in July —Imports Increasing

British steel exports in July, this year, excluding iron ore and including scrap, were only 64,001 gross tons as compared with 183,373 tons per month for the first quarter and 368,481 tons in July, 1920, or the heaviest in that year. The average per month in 1913 was 420,757 tons. The July outgo is much less than even the 1919 monthly average and smaller than any month in the war years. Imports in July were 103,561 tons, which contrast with 88,083 tons in June, and with 186,040 tons per month in the first quarter. The 1913 imports were 195,264 tons per month and in 1920 they were 128,685 tons per month. The following table shows comparative data:

British Steel Exports and Imports

Gross Tons	Exports	Imports
Aver. per mo. first quarter 1921	183,373	186,040
April, 1921	161,508	111,536
May, 1921	101,202	89,348
June, 1921	66,301	88,083
July, 1921	64,001	103,561
Aver. per mo. second quarter 1921	109,670	96,320
Aver. per mo. 1919	188,519	50,801
Aver. per mo. 1920	274,881	128,685
Aver. per mo. 1913	420,757	195,264

The trend of some of the principal exports is shown by the following data in gross tons:

Principal British Exports

	Average per Month 1913	Average per Month 1920	July, 1920	July, 1921
Pig iron	78,771	38,505	49,205	7,777
Steel rails	41,676	11,213	23,963	1,581
Steel plates	11,162	16,571	22,787	2,680
Galvanized sheets	63,506	34,244	51,214	2,691
Steel bars	20,921	30,322	48,818	2,702
Tin plates	41,208	29,418	32,616	8,827
Black plates	5,679	3,026	2,225	500
Steel sheets	....	....	12,607	779

Iron ore imports in July were only 14,857 tons as compared with 541,742 tons per month in 1920. In July, 1920, they were 641,975 tons. The total for the first seven months was 1,299,023 tons, as compared with 4,101,483 tons in the first seven months in 1920.

Manganese ore imports were only 4789 tons in July against 37,717 tons per month in 1920 and 50,098 tons per month in 1913. The total to Aug. 1, this year, was 146,827 tons against 225,589 tons for the same seven months last year.

Oil well supplies, accessories and tools, including drilling outfits, are wanted in the Argentine Republic, according to the United States commercial attaché in Buenos Aires. Manufacturers are asked to send two copies of their catalogs to the Bureau of Foreign and Domestic Commerce, Washington, for transmission to the Direccion General de Petroleo. One inquiry covers 12 pipe-cutting machines of various sizes.

HOPES NOT REALIZED

Little New Business in the Valleys—Controversy as to Price of Basic Pig Iron

YOUNGSTOWN, OHIO, Aug. 30.—Relatively small unfilled tonnage of district iron and steel makers is being rapidly worked off, with some additions to stock material, while incoming business is hesitant and insufficient in volume to maintain operations at the rate which prevailed the first three weeks in August. The hoped for revival in buying this fall will likely fall short of expectations and there is considerable pessimism in the trade, especially in view of low current prices as compared with costs.

A controversy has arisen with respect to the actual price of basic pig iron, which some steel works interests maintain they have advanced to $20, from $18. Several large consumers, on the contrary, insist that the $18 price is still current and that iron is purchasable at the lower figure. One substantial buyer states that iron has been bought at $18 since the reported advance by certain Valley makers. This interest points out the inconsistency of a higher iron market in view of recessions in prices of important finished products, such as sheets.

The Reduction in Sheets

Reductions in prices of sheets met by the leading interest have established the market at 2.25c. for blue annealed, 2.75c for No. 28 gage black and 3.75c for No. 28 galvanized. Some galvanized tonnage has been offered at 3.70c., it is understood. The relatively low price of galvanized is partially due to the fact that spelter has sagged to 4.15c per lb., a level that it has not reached in a number of years.

All sheet business, for the present, is confined to small tonnages, though business is coming from more diversified groups than formerly. In both sheets and pipe, jobbers are active factors in the market. Interest in galvanized sheets shows more life, owing to seasonal requirements from Southern buyers. Full finished sheet buying is still holding up, virtually all of the demand coming from the automobile trade. Weakening in the price of No. 22 gage auto body stock is noted, following declines in other grades, and some interests are now quoting 4.45c on the material mentioned, as compared with 4.70c, the quotation which prevailed for a considerable period.

Plates Still Weak

Plates continue to be the weak spot of the market in this territory, with one mill of the leading independent working off light gages. Other plate mills in this territory operate spasmodically on skelp, while the Youngstown Sheet & Tube Co. has been out of the plate market for an indefinite period. The price range is from 1.70c. to 1.75c. The only recent order of consequence involved in excess of 600 tons was placed in a nearby district.

Demand for wire products has been more sustained than for some other finished commodities, and prices have been firm at $2.50 for wire and $2.75 for nails. Some wire rod tonnage has been moving at $42.

Hot strip demand continues one of the brightest spots on the market, maintaining production of the leading maker at 60 per cent. Cold strip is also being rolled, all of the output going to automobile builders, and chiefly to the Ford Motor Co. The price is fairly established at 2.25c. for hot strip and 4c. for cold rolled.

Standard pipe is in fair demand from jobbing quarters. Increased uses of pipe in the smaller sizes are being reflected in the diversity of inquiry. Lap weld is largely listless, though some tonnage is being rolled for export to oil interests in Mexico.

The sheet bar market is more firmly established at $30, since the cut in sheet prices. About the only tonnage moving is against contracts, and going to non-integrated makers of sheets.

Whether it is a sustained movement or not, old material is still firm. A recent sale of heavy melting involving 1000 to 1500 tons was closed at $14. A sheet maker operating open-hearth furnaces has taken a small tonnage of hydraulically compressed scrap at $11, though dealers maintain that $12 more fully represents the market. While consumers' stocks are generally lower due to recent enlarged operating activity, they are still far from depletion. Scrap is generally being offered less freely, as it is being made in smaller quantities.

BUSINESS IN PITTSBURGH

Replies to Questionnaire Indicate That a Hopeful Feeling Prevails

The Trade and Industrial Bureau of the Chamber of Commerce of Pittsburgh, with an idea of determining the state of business in the Pittsburgh district, recently distributed 1000 questionnaires into various trade channels containing the following questions:

How does present volume compare with April? (A questionnaire was sent out last spring.)
Are inquiries more numerous?
Do you receive a larger percentage of orders from inquiries than you did during the last quarter?
How are collections?
What in your opinion are the prospects for increased business in the next six months?
How does the present number of employees compare with April?
Do you believe we have made the turn?

In a summary of the replies, *Pittsburgh First*, organ of the Chamber of Commerce, says:

"According to answers business is not very good. That is the net summary of what business has been during July and August. As to what is in store, that is a different question. Many are frankly convinced that we have made the turn and that business will grow better during the autumn. A minority report that they do not expect anything like a real resumption of business until spring. Analyzed, the answers show the effect on different industries and lines of merchandising. Some industries are faring better than others. A few even have as many employees as they had several months ago—and this in spite of the wave of unemployment. Several show such wide variance in their outlook on future business conditions that there is no way to strike a happy medium. It all depends on whose ox is gored, apparently. Wholesale lumber may react the same as retail lumber, in the main, but the two are far different from wholesale groceries, from chemical manufacturing, from the making of iron and steel, or from the sale of automobiles. The coal industry, which has long been dormant, shows renewed activity as September approaches, but coal men deny anything more than the usual fall spurt.

"One of the most outstanding points made by the answers is that on the whole collections are satisfactory. In a number of lines they are reported slow, but the majority report them either 'fair' or 'good.' Coming at a time when many business firms are or have been refusing to take advantage of discount for cash, this seems to indicate that money is loosening up.

"A report by one industry or one concern might not indicate much as to general conditions, but when 1000 answers are grouped, the composite report is important. As an indication of what Pittsburgh business thinks of business to-day and to-morrow, the result is eminently satisfactory. There is no reason for premature optimism; so many concerns are marking time. But there is real cause for optimism in the attitude of the majority of concerns toward the immediate future. With scarcely an exception the belief is expressed that 'we have made the turn,' that the bottom has been reached and that an upward trend may be expected. A few profess to believe that only in finance has the turn been made; that the labor situation still is to be solved. But others, basing their statements on wage cuts in many lines of industry during the last few

months, ignore the fact that thousands are still out of work, declaring that the readjustment is now possible and will not much longer be delayed."

New Cylindrical Plug and Thread Gages

The cylindrical plug reversible end gages and the reversible end thread gages shown in the accompanying illustrations are recent additions to the line of the Pratt & Whitney Co., Hartford.

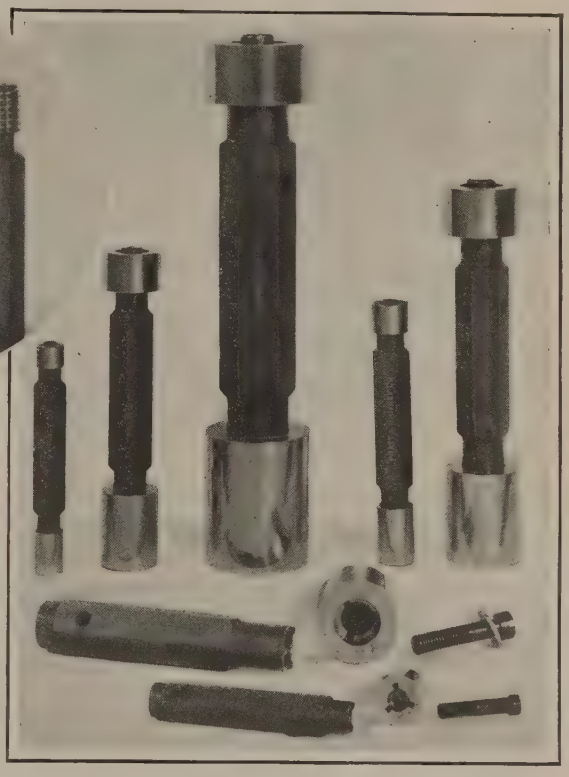
The cylindrical plugs are machine lapped by a modification of the Hoke process which is said to produce a finely finished surface entirely free from circular grooves. It is further claimed that the gages are round and of uniform size from end to end; the measuring machine, fluid gage or amplifying machine showing no errors in these respects. The use of carefully selected alloy steel together with exceptional finish seems to justify the belief that the gages will maintain their accuracy for an unusual length of time. The "go" ends are held to a very small *plus* tolerance from the marked size, to allow for wear. The "no go" ends are held to a still smaller *minus* tolerance, as they are subject to little wear and must accept work which is exactly up to the allowable limit. Blanks are well seasoned before lapping and sizes are marked on the gage end instead of on the handle.

Plugs Are Machine Lapped by Modification of the Hoke Process. View to left shows the two forms of chip groove used in thread gages shown above

The handles are of hexagon stock, giving ample space for marking tool and operation numbers. The method of fastening the ends to the handle is unique. Three prongs on the handle, of 90 deg. included angle, engage three grooves of 75 deg. included angle in the gage ends. By means of a single screw through the gage the wedge-like prongs are forced into the grooves, providing a self-centering tripod support which, it is said, can neither rock nor shake to destroy the sensitiveness of the feel. No locking screws, keys or pins are necessary, the rigidity being practically that of a solid gage. The sizes available are 5/16 to 2 in. Cylindrical gages smaller than ⅜ in., lapped by the same method are in preparation and also sizes larger than 2 in., made hollow for lightness, with the same reversible features.

The reversible thread gages are from the same alloy steel blanks as the cylindrical plugs in all sizes above ½ in. "No go" and "go" ends are interchangeable with the cylindrical plugs and either length can be used according to the preference for long or short threads. For fine pitches the short gages are recommended. Rigidity between gage and handle, insuring sensitiveness of touch, is said to be fully accomplished by the tripod support, previously described.

In the accompanying illustration, beginning at the left the first two gages are the standard type, single and double end. The third gage is a "protected master," which cannot be screwed into a hole, thus impairing its accuracy, being used as a standard for checking thread plug gages, transferring by wires in the measuring machine or micrometer, etc. The fourth is a setting plug which is used for setting thread gage templets. The threaded end is made to duplicate the thread in the templet, while the plain end is used for checking the root diameter. The remaining gage is a non-reversible type, being used for sizes ½ in. and smaller and for larger sizes where the reversible feature is not desired. The handle is of cold-rolled hexagon steel and the gage end of alloy steel. The two parts are driven together on a slight taper and cannot work loose nor shake. A feature of the reversible thread gages is the chip groove provided for carrying dirt and chips ahead of the gage when entering the hole. Two forms



are used, as shown in the separate illustration, the one at the right having the first thread removed to form a pilot of root diameter. This is intended to assist in entering the gage when applied to running work or when the gage is held in a reversing speed lathe and the work fed on it, while running.

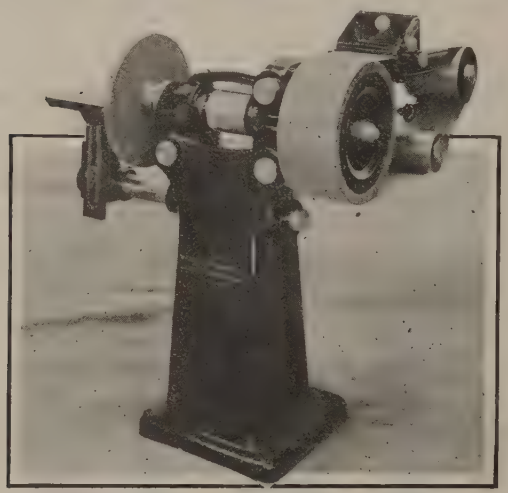
Bids on Hangar to Be Received Sept. 15

WASHINGTON, Aug. 30.—Steel producers and fabricators are greatly interested in bids to be opened Sept. 15 and being asked by the construction division of the War Department for a hangar, gas holder, power house and roadway at Belleville, Ill., as stated briefly in the St. Louis market report in THE IRON AGE, Aug. 25. The hangar will involve 4000 to 5000 tons of steel, mostly shapes, with a good sized tonnage of corrugated sheets and a small quantity plates and bars. The exact number of bays is to be determined upon the price asked for the work, which construction division contemplates letting to a general contractor, who will erect the complete plant. The gas holder will require a fair tonnage of plates. The general contractor is to sublet awards to steel producers, fabricators, etc. The hangar will be next to the largest in the United States, the latter being owned by the Navy at Lakehurst, N. J. It is proposed that the Army hangar, if the price is within the appropriation of $1,000,000, will be 810 ft. long with a 150-ft. arch.

Utility Grinding and Polishing Machine

A utility machine, designated as type R, combining several types of grinding and polishing machines has been recently brought out by the Production Machine Co., Greenfield, Mass. It is principally for disk grinding, polishing and belt surfacing but can also be converted into a buffing machine with double spindle and a single or double wheel tool or a light snagging grinder. It is arranged so that three operators can work simultaneously without interfering with one another.

As shown in the accompanying illustration, one end of the spindle is equipped with a double-faced disk for disk grinding, the other end carrying a patented leather cushion wheel, which is 14 x 6 in. and carries a 6 in. x 7 ft. endless abrasive belt having a surface speed of



The Wheel with Belt Is Used for a Variety of Polishing

4764 ft. per min. The wheel with belt can be used for a variety of polishing. The belt is kept under proper tension by a swinging idler and a quick adjustment for tracking the belt is provided. The spindle is mounted in Timken roller bearings that are packed in grease and sealed from dust and runs at 1300 r.p.m. Adjustment for wear is provided by a simple threaded sleeve and nut.

A table, 6½ x 14 in., is also furnished for surfacing, as well as an adjustable gage to handle articles with straight and beveled edges on the surfacing table, so hinged that it may quickly be swung over to the back of the machine when it is necessary to change the abrasive belt. The idler arm is arranged with a latch so that it may be lifted off the belt and held in place while changing the belt. The disk grinder is 15 in. diameter, and is double faced and reversible. A plain table, 9¾ x 8 in., is supplied, which has a rocking seat to provide for bevel work also adjustment vertically and a circular adjustment on the holding post. Four posts are provided, two in the front and one on each side of the machine, adapting it for the application of a variety of fixtures.

The floor space occupied is 37½ x 36 in. and the height, 46 in. The machine is belt driven, requiring 3 hp. and the driving pulley is 4½ x 4½ in. The base and head are one casting, providing rigid support for the spindle and bearings.

Employment in St. Louis District

ST. LOUIS, Aug. 30.—The Eighth Federal Reserve Bank has received replies from questionnaires addressed to 173 leading employers of labor in 21 of the largest cities of that district, with a normal complement of 90,047 workers, asking for employment data developed that the number of employees of the reporting interests decreased 23,649 or 26.6 per cent between the dates July 1, 1920, and July 1, 1921. On July 1, 1920, the number was 954, or 1.05 per cent under normal, and on July 1, 1921, the total was 24,603 or 27.4 per cent under normal. Wages, figured on a semi-monthly basis, decreased $1,016,592, or 23.5 per cent between July 1, 1920, and the same date this year. The district comprises Indiana, Kentucky, Tennessee, Mississippi, Arkansas, eastern Missouri and southern Illinois.

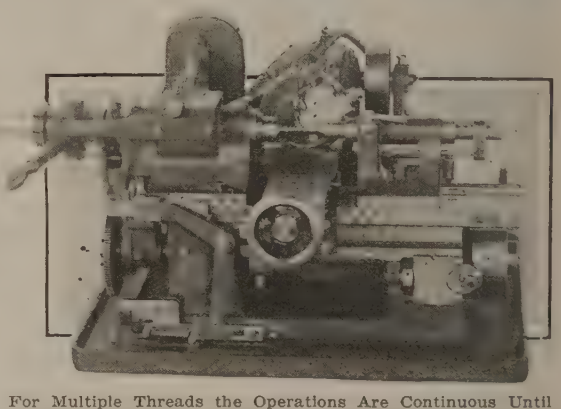
Automatic Thread Milling Machine

An automatic thread milling machine intended for manufacturing purposes and designed to be equipped for a variety of work has been placed on the market by the Waltham Machine Works, Waltham, Mass. Its automatic features not only increase production per machine, but for some kinds of work permit one operator to handle two or more machines.

In operating, the work is first placed in position, either on centers or in the chucking device. The machine is then started by a lever at the left. Further operations, which include the movements of feeding the cutter to the work, the milling of the thread, the withdrawal of the cutter after the required length has been milled, the returning to the starting point, and the stopping of the machine, are automatic. For multiple threads the operations are continuous until all threads have been milled.

The length of the thread is the same as the amount of rise of the cam controlling the workslide, while its pitch is determined by the relation between the gearing from the workhead to the cam shaft and the lead of the work slide cam. Indexing for multiple threads is obtained by a fractional proportion in the gearing, possibility of error being eliminated inasmuch as the workhead continuously revolves in the same direction and there is no backlash to produce inaccurate spacing. The extreme travel of the workslide is 2 in. Threads of this length or shorter may be milled but adjustments are provided so that this milling can be done either close to the work spindle or in any position not more than 6 in. distant.

The approximate location of the cutter slide in relation to the workhead is obtained by moving the cutter



For Multiple Threads the Operations Are Continuous Until All Threads Have Been Milled. By a slight change of design helical gears can be cut

slide support along the tongued ways, while the exact location is obtained by adjusting the work slide cam attached to a slide on the front of the machine. With the exception of the oil pump the whole mechanism is driven by a single belt. The machine can be installed either on a bench or a cabinet base. The cutter spindle and its drive are of the same design and size as used on the company's thread milling machines. The cutter head is provided with an angular adjustment of 45 deg. each side of the horizontal. The workhead is driven by means of a geared connection and universal joint. It is of hardened steel, has a spring collet and is provided with a lever closing attachment.

The machine can be stopped automatically at the end of one revolution of the cam shaft or after any predetermined number of revolutions. The machine shown in the illustration is particularly adapted for cutting multiple threaded worms such as used in phonographs, electric fans, vacuum sweepers, etc. By a slight change in design it can be made to cut helical gears. For brass work the all-gear drive is omitted and a special high-speed belt-driven cutter head provided.

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ESTABLISHED 1855

THE IRON AGE

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Progress in Steel Making

As the steel industry has no occasion to add new capacity at this time and is unlikely to have occasion for several years, it is interesting to speculate what it will do by way of making progress. It is inconceivable that it should stand still, for it has capital, brains, energy, a future and a sanguine temperament.

While there have been great improvements in processes and equipment throughout the history of the steel industry, the most impressive progress has been in the ability to get out tonnage. The capacity in ingots doubled approximately from 1900 to 1910 and again from 1910 to 1920. Prior to about 1900 the steel industry grew, partly through replacement of wrought iron, and the doublings were more rapid, approximately from 1881 to 1886, five years, from 1886 to 1892, six years and from 1892 to 1900, eight years. From 1880 to 1910 pig iron production increased almost precisely by the rate of a doubling every ten years, on an average. From 1910 to 1920 the rule of doubling did not operate, partly because the requirements of iron foundries did not maintain the necessary pace.

For some years it has been a common saying that the steel industry would now have to "go in" for quality, and as often the requirements in common ordinary steel have grown so rapidly as to prevent the finer grades from making an important percentage showing. Perhaps, however, the application of engineering to the filling of man's requirements has now reached a point where the big things, simply on account of their bigness, will require special steels as the little things have often done hitherto. The proportion of weight of structure to load to be carried has been increasing, making it more and more important to minimize the weight of structure.

There is nothing like comprehensive information as to the proportion of steel made in the past few years that was really "special" in character, but the tonnage reported as "alloy steel" is somewhat suggestive. Of the total reported production of steel ingots and castings, "alloy steel" was 2.54 per cent in 1912 and 3.94 per cent in 1920. Such proportions are certainly low. The competition between heat treating and alloying is already rather keen.

It is interesting to speculate whether the steel producers will be disposed in the next few years to try to improve their position by carrying their products to a greater degree of finish. In the past this tendency has appeared to an extent, and there has also been a tendency to "diversify" products by adding to the number of ordinary rolling mill products made. The one may be referred to as "vertical" expansion and the other as "horizontal" expansion, just as in financial mergers there has been "vertical integration" and "horizontal integration."

One large steel producer or another makes bolts and nuts, turn buckles, spikes, cold-finished steel bars, freight cars, ships, rivets, guns and steel derricks and drilling rigs. Other steel makers have been disposed to avoid such vertical expansion, partly because they feared they would be getting into a sort of retail business and partly because they regarded such expansion as in the nature of competition with their natural customers. However, we have passed into a period in which competition by efficiency will be the rule and in which even small orders will be desirable.

Prices and Pig Iron Output

The recent moderate improvement in demand for pig iron and the checking of the downward tendency in prices have caused some furnace operators to consider carefully what prices it will be necessary to obtain to justify the blowing in of merchant stacks. Certainly the country cannot continue indefinitely at the extremely low rate of pig iron production which has been recorded for several months. A daily output of less than 5000 tons by merchant stacks is pitifully small for this great country. It is, of course, a fact that steel companies have been an important factor in the pig iron market, not only in disposing of stocks of steel-making irons, but also in manufacturing foundry grades; but with the gradual reduction of stocks at steel works and with pig iron production at these plants down to 23,000 tons per

day, there is a limit to their control of the pig iron market.

In January, 1913, basic iron was selling at about $16, Mahoning or Shenango Valley. According to the estimate of one important company, producers would now need to ask $26 in order to have the price bear the same relation to cost as $16 had to cost in 1913. It is agreed that the $18 price for basic, which has recently prevailed, will not justify the blowing in of any furnaces, nor will somewhat higher prices, say $19 or $20, on foundry irons. Manufacturers of basic iron estimate that if freight rates on their raw materials were reduced 20 per cent, if Connellsville coke could be obtained at $2.75 and if the price of iron ore could be reduced about 75 cents, basic pig iron could be produced in the Valleys at about $20. It is not likely, however, that freight rates will be reduced in the near future, or that ore prices will be marked down. Hence it will hardly be possible this year to manufacture pig iron, and come out even, at a price at all attractive to melters.

Idle furnaces are not likely to be blown in unless their owners can see a prospect of making a fair profit. Finishing mills often find it desirable to maintain their organizations and keep their customers satisfied, even when, by so doing, losses are constantly recorded. Operators of blast furnaces do not feel the same necessity of maintaining organizations or catering to their customers, and when furnaces are once out they seldom resume unless business justifies. The prospect of materially increasing the production of merchant pig iron this year, therefore, is not encouraging.

Alloy Iron Castings

Recent metallurgical developments point to the growing importance of alloy iron castings for industrial use. The unusual properties which a nickel content of 5 per cent bestows on iron castings was discussed in THE IRON AGE one week ago. Electrical resistance castings containing 4 to 5 per cent nickel, have not only marked electrical properties, but the castings can be "twisted into various shapes, taking a permanent set without breaking." On other pages of this issue the results of German experiments on iron castings containing nickel and cobalt are given, showing that a nickel content of about 1 per cent bestows valuable properties, the cobalt however playing no rôle as an alloy.

Attention has been called recently to the influence of a small percentage of nickel and chromium in chilled cast iron wheels, and this may take on more importance. A large motor corporation is now making iron castings in the cupola, having a nickel content of 1 to 1.5 per cent. The nickel is introduced into the charge as shot nickel in the cavity of rejected pistons. The castings so obtained are harder and wear better than the ordinary gray iron castings.

The use of Mayari pig iron in the making of certain grades of castings is not new. Such nickel-chrome iron castings have proved satisfactory for rolls and for conditions where wearing quality is a factor. It appears that the mixture of this native alloy pig iron with other iron for certain motor castings has proved satisfactory because of sounder metal and a comparatively longer life. Extensive experiments are now being made in order to learn all the possible uses to which this particular class of alloy iron castings can be put. Valuable information should result.

These facts point to the place which alloy iron castings are likely to take in the future. While some of these castings can be produced in the cupola, the electric furnace is necessary in cases where the alloy content is high or a high temperature is required for pouring. It is safe to expect that, with the aid of the electric melting furnace and possibly the application of heat treatment, other metals besides nickel and chromium may be added to cast iron with good results and that alloy iron castings may establish themselves alongside alloy steel castings.

Scrap Prices and Supplies

Were it not that dirt is an expensive thing to have when it is necessary to pay a railroad to haul it away, it might be said that some grades of iron and steel scrap are now "as cheap as dirt." Steel turnings have been sold in Detroit at as low as 50 cents per ton, the seller being required to load on cars, but if the producer had found no purchaser he would have had to pay a railroad to dispose of the material. In either case, however, the scrap would not be paying for its disposal.

Such scrap is at a double discount, a time discount and a place discount. With the great increase in freight rates on scrap the place discount on all scrap is much greater than formerly. The time discount is much greater on turnings than on heavy melting steel, since the turnings rust very rapidly. The average dealer will not stock turnings, while he will stock heavy melting steel. Indeed, most dealers began stocking the latter when it cost $5 a ton more than it has cost recently.

There used to be interested discussion as to whether the supply of scrap would continue to be sufficient for an economical operation of the open-hearth steel industry. Without scrap, or with a small proportion of scrap, there would be a double increase in the cost of making steel, from the higher average cost of the material used and from a lengthening in the time necessary to finish a heat. Year after year, however, the steel industry seemed to get along nicely. Prior to 1904 the production of basic pig iron was about 45 per cent of the production of basic open-hearth steel ingots and castings, pointing to a scrap use of about 55 per cent. Then pig iron rose steadily, to a maximum of about 60 per cent in 1909 and 1910, indicating about 40 per cent for scrap. The trend has since been upward for scrap, since 1920 showed 53.3 per cent as much basic pig iron made as basic steel. The showing is not altogether conclusive, for there was an extra supply of scrap on account of the war, but on the other hand stocks of basic pig iron undoubtedly accumulated, to at least a small extent, toward the close of the year. Still, it seems fair to conclude that without these influences the basic steel of 1920 would have been made with a larger percentage of scrap and a

smaller percentage of pig iron than was the case ten years earlier, although the tonnage output had more than doubled.

What of the future? We are coming into new conditions. For the nearby future there is likely to be a shortage of scrap at the time when production of steel increases sharply. That is generally the case at such a time. An increase in industrial activity brings a demand for steel before it dumps much scrap into the situation, while little scrap accumulates in a period of low industrial activity, because the consumption of steel is confined largely to channels that are not good scrap producers. The steel works individually may feel that they have insurance against a shortage, in the piles of scrap the dealers have been accumulating, but too many steel works may have their eyes on the same pile.

In the long run, two factors are likely to operate to help maintain the supply of scrap relative to requirements. There is always, of course, the works scrap and the industrial scrap, a practically fixed percentage of the steel that is being made. As to old material, its outcome depends on two factors—the length of time steel stays in service and the production at the time it went into service. As industry develops, the time in service is likely to shorten rather than lengthen, while as the steel industry will increase in tonnage less rapidly in future than it has in the past there is aid in that respect. Assuming convenient figures merely to make the argument simple, if the steel constituting the bulk of the returns in scrap form stays in service 20 years and production of steel doubles in ten years, thus making a quadrupling in 20 years, the outcome of old material would be in relation to one-fourth current steel production; but if the doubling of steel requires 20 years the relation is one-half instead of one-fourth. Both the influences named are subject to change and their relation in the future is a matter of no little interest.

An impressive exhibit of the low level to which world demand for iron and steel has fallen is furnished by the July export statistics for Great Britain and the United States. Details of the former appear elsewhere, while facts regarding the latter were analyzed in last week's issue. British July exports totaled only 64,000 gross tons, a smaller movement than at any time of which there is definite record. American exports fell to 86,500 tons in July, which is also smaller than in many years and is in sharp contrast with the record of over 400,000 tons per month only last year. In 1913 the combined iron and steel exports of the two countries were about 655,000 tons per month; in July, this year, they were 150,500 tons, or less than one-fourth as much. Even the combined exports of France and Belgium in 1913, 177,000 tons per month, exceeded the record last July of the American and British industries. If July marked the low record in steel and pig iron output, as now seems likely, it is probable that August will show a slight improvement in the steel exports of both countries.

Wage Reductions a Buying Factor

Manufacturers in some industries are making inquiries for new equipment, looking to the time when their products will be again in active demand. Especially is this so of equipment requiring a considerable time to build, which is often the case with machinery the design of which departs from standard lines. Inquiries for metal-working machinery, excepting of very special character, are not being made to the same extent as for textile machinery, for example, and equipment for producing the thousand and one things entering into the daily life of the people.

The would-be purchaser is keenly alive to the matter of price, and not least in his investigations of the market comes the question whether the machinery builder has cut adequately the wages of his workers. Not all plants have reduced wages. Some firms which have only a few men on their payrolls have taken no action in the matter, putting it off until they shall begin to hire men again. In other cases, quite exceptional however, shops are busy and managers have considered it their best policy to let the payroll remain without change. On the other hand, the managements of some relatively busy shops have made the same reductions as their less busy neighbors, beginning with company officers and going down the line, realizing that prices must come down if new business is to be booked now or later, and that cost of production must fall correspondingly.

In any case, the prospective customer is watching the price lists of the equipment manufacturers, and taking into account, before placing orders, whether the manufacturer has done what he should in reducing costs. Consequently pointed inquiry is common enough, a familiar question being: "What have you done in the reduction of your labor cost?"

Wages of Iron Workers Reduced

YOUNGSTOWN, O., Aug. 30.—Average sales price on shipments of bar iron from mid-Western mills in July and August was 1.85c. per lb., as disclosed at the bi-monthly examination of sales sheets Aug. 29 between representatives of the Western Bar Iron Association and the Amalgamated Association of Iron, Steel and Tin Workers. The average price two months ago was 2.30c.

For the September-October period, the boiling rate will be $9.12 per ton, as compared with $11.38 the previous two months. Wages of bar iron finishers will be reduced 19 per cent by the settlement.

Under the new annual wage agreement, the puddling rate is $1.14 per ton lower at the 1.50c. card, which accounts for part of the reduction. The current boiling rate compares with $18.76 paid the first two months of this year.

Examination of sales sheets to determine the tonnage rates to be paid sheet and tin plate workers in September and October will take place about Sept. 10. Inasmuch as the last settlement was made on the basis of 3.85c. per lb. for No. 28 gage black sheets and $5.75 per base box for tin-plate, a considerable reduction in the tonnage rates will take place. Common sheets are now generally quoted at 2.75c., while tin plate is being sold by the principal district maker on a basis of $5.25.

The Standard Steel Car Co., New Castle, Pa., will resume operations at once, officials report, on a basis of 50 to 60 per cent.

CONSTRUCTIVE AIMS

President Harding's Conference Will Avoid Discussion of Irrelevant Topics

WASHINGTON, Aug. 30.—No contentious questions as to open or closed shop or conditions of work are to be permitted to enter into discussions at the national conference on unemployment to be held in Washington soon at the call of President Harding. This statement was made yesterday by Secretary of Commerce Hoover who expects to submit detailed plans for the meeting within a week or 10 days to the President. The conference is not to be the battleground of organizations of either employers or employees, it was declared, but will relate to the need of the assurance of a definite program as to business and workingmen and it is hoped to develop constructive plans through unity of action. Secretary Hoover is now at work selecting the personnel, which it is contemplated to hold down to 15 or 25 men representative of groups of employers geographically and by industries and employees. Secretary of Labor Davis is co-operating in the selection of the labor delegates. It is hoped to begin the conference by the middle of September or a little later. The iron and steel trade, being the largest industry in the country, has the greatest number of unemployed, and it is understood will be given due representation at the conference.

Many good suggestions as to relieving the labor situation have been made to Secretary Hoover, but all of the actual plans to revive industry and reinstate employment will not be developed until the conference is held. Some suggestions made relate to the matter of intermittent and irregular employment in certain industries and also to a plan for road improvement and building operations where these are seasonal and are to be permanent in character, the idea being to avoid any artificial undertakings. It is believed that the question of transportation costs will share prominently in the discussion, many industrial interests considering that the high freight rates are one of the underlying causes of unemployment, and that associated with it are high wages still being paid in some lines of work. Secretary Hoover, however, resents the terms "liquidation of labor," whatever may be done regarding wages, holding that labor is a human equation and not a matter of values in dollars and cents.

The results of the conference are likely to be used by the Administration as a part of its legislative program looking to economic readjustment, which Congress has been criticized by the business world for delaying. An instance is its failure before recessing to act upon the railroad funding bill whose enactment has been looked to as a means of restoring 500,000 men to work. But it is not, of course, intended to wait for legislation to improve employment conditions. A quicker improvement than that is hoped for, although legislation probably will be necessary to develop the complete program that is in prospect.

Weirton Operations Increased

WEIRTON, W. VA., Aug. 29.—The Weirton Steel Co., with plants here and in Clarksburg, W. Va., and Steubenville, Ohio, has reached the highest rate of operation in several months. In addition to the 26 tin plate mills at the plant here, the company has seven of the 12 mills at the Steubenville works under power, making a total of 33 of the 50 mills at the three plants in operation, or 66 2/3 per cent. To provide the sheet bars for the Steubenville tin plate mills, it was necessary to put on an additional open-hearth furnace at Weirton, making a total of six of the seven there now in operation. The company is operating its strip mills here at about 35 per cent of capacity. The company, which hitherto has been a seller of pig iron, has temporarily withdrawn for that market, as current production of about 600 tons daily is all needed at present and the management is anxious to accumulate a reserve stock against later requirements. Moreover, it is considerably more remunerative for the company to charge hot metal than to sell cold iron at current prices.

Amalgamated Enjoined

WHEELING, W. VA., Aug. 27.—Temporary injunction against the Amalgamated Association of Iron, Steel and Tin Workers, was granted the Wheeling Steel & Iron Co. by Judge R. M. Addlemen in Circuit court today. The injunction restrains the union men from picketing in the vicinity of the plants now closed because of a strike. The steel workers, however, are allowed to further their strike against the petitioner's mills. The order restrains the defendants against unlawful interference with the plaintiff's employees, picketing, force, intimidation, or unlawful persuasion, directed against the plaintiff or its employees with a view toward interfering with the operation of the plaintiff's mills, and against blockading, congregating at or near the entrance to the mills.

Industrial Chemistry Meeting at Paris

The Society of Industrial Chemistry of France will hold a meeting Oct. 9 to 12, inclusive, at the Conservatoire des Arts et Metiers, Paris, and in the same building will be held a chemical exposition under the patronage of the Minister of Commerce of France. Among the subjects to be considered at the chemical congress are: Coking industry, oils, distillation of wood and the by-products, metallurgy and electrometallurgy, electrochemistry, etc.

Swedish Prices Lower

STOCKHOLM, SWEDEN, Aug. 7.—The Swedish Iron Federation has revised prices for August. All prices are in Swedish kronen per metric ton, f.o.b. maker's yard. The dollar quotations are per gross ton, f.o.b. Swedish port:

	Kr.	
Export pig iron, 0.015 per cent sulphur, max.	145-150	$34.75-$ 35.77
Billets, annealed, over 0.45 per cent C.	400-500	86.88- 107.32
Wire rods, over 0.45 per cent C.	450-550	97.10- 117.55
Rolled open-hearth steel bars, base price	260-280	58.26- 62.35
Rolled Lancashire iron, base price	350	70.53

The hot mills and all intermediate departments at the Farrell, Pa., works of the American Sheet & Tin Plate Co. were placed in operation Aug. 29. About 700 men will be afforded employment.

The Iron Age and Its Readers

A good example of the use of THE IRON AGE as a medium through which one reader may help other readers and advance the "state of the art" in their common field was afforded Aug. 18 by the article by V. W. Aubel on what amounts to a new use of the cupola in metallurgy. The author was prompted to submit to THE IRON AGE an article he wrote some time ago after reading a brief editorial in our issue of July 11 on sulphur removal in the cupola. In this way attention has been called to the value of the cupola as a refining agent, in addition to its role as a melting medium, and to the place it can have in steel works practice.

This mention of Mr. Aubel's article is made particularly as a suggestion that other readers have experiences that might well be discussed in our columns for the common good.

Iron and Steel Markets

MEETING COMPETITION

No New Price Policy, But Some Fresh Declines

Sheet Reduction General, but Tin Plate Market Not Unsettled—New Plate Inquiry

In the varying reports from different branches of the steel industry the balance is still on the side of betterment in demand, but with no clear indication of progressive improvement ahead. Exhaustion of inventories is more marked as the occasion of buying.

Steel Corporation activities still average a fraction under 30 per cent, with the Carnegie Steel Co. running at a lower rate than in recent weeks, while the Tennessee company, owing to export and other contracts and to the improvement in the South, is at nearly half a full operation.

The competitive aspect of the market has not changed, despite widespread reports attributing a more aggressive policy to the leading producer. Actual transactions show that both the Steel Corporation and the leading independent producers are following their practice of many weeks, making such concessions as are required by new developments.

The one formal price change of the week was the general dropping to 2.75c. instead of 3c. on No. 28 black sheets and to 3.75c. from 4c. on galvanized sheets. Smaller mills first made these prices two or three weeks ago; the larger independents followed and then the Steel Corporation. The unfounded report of a $10 per ton reduction in tin plate, or to $4.75 per box, did not unsettle that market.

The reduction in sheets may have made more general the low quotations appearing from time to time in other products. Bars show less resistance to pressure, and 1.70c. is a common price, with some business in the Central West going as low as 1.60c. In plates and structural shapes also, the exceptional prices of a month ago are now more commonly made.

A measure of the decline in bar iron is the bimonthly wage settlement at Youngstown this week, by which the puddling rate falls from $11.38 per ton to $9.12.

Rail buying for this year is practically over and no interest has developed in rails for next year to call for the naming of a price for 1922. Meanwhile railroads are showing reductions in maintenance costs at the expense of their properties. But they are making a better record in paying what they owe the steel companies.

The volume of fabricated steel work which has been a continuing feature in demand has been large enough to afford tests of price strength. Tonnage contracts have been written at less than the quoted market. Besides additional car repair orders, about 7500 tons of structural work has been closed and 11,000 tons added to what is pending. Mexican oil interests are in the market for 17,000 tons of plates and an Eastern locomotive builder for 3000 tons.

Sales of pig iron in the Cleveland and Philadelphia districts amount to a very fair tonnage, but for the most part there is a subsidence from the active buying of two or three weeks in August. Following the recent activity, furnaces have made an effort to establish higher prices and have succeeded to some extent, as basic has been sold at $19, Valley, or $1 above what has prevailed for some weeks, while small sales of various grades have been made in Chicago at an advance of $1. In Buffalo and eastern Pennsylvania also the market seems somewhat firmer. Reductions in freight rates on ore and limestone within the State of Alabama will enable furnaces most favorably situated to make pig iron at a reduction of about 40c. per ton in costs.

Export trade has been better in some directions. Japan is still a steady buyer of black sheets, which are galvanized there. Japan also has bought considerable amounts of sulphate of ammonia from coke by-product plants.

China is in the market for 20,000 tons of rails after buying 35,000 tons in the past six months. Japan is about to close for 4000 tons. Germany is low bidder on 12,000 tons for Chile. The 10,000 tons lately taken by German rail mills in Java indicate that their price is $35 to $36 at shipping port. The 500 tons of 40-lb. rails they took in Cuba went at $38, delivered.

The extent of the decline in steel prices is indicated by THE IRON AGE composite, which at 2.293c. per lb. for finished steel products is now 36 per cent above the ten-year pre-war average, though it was nearly 55 per cent above this pre-war average only two months ago.

Pittsburgh

PITTSBURGH, Aug. 30.

Reports about business covering the past week are of a slightly less cheerful tenor, but there is nothing to suggest that the lull is anything more than temporary and a natural development in view of the fact that there has been a comparatively steady demand for more than a month. The recent announcement by Judge Gary that the Steel Corporation hereafter would meet competitive market prices was received with keen interest. His words were as follows:

"When the subsidiaries of the Steel Corporation ascertain to a certainty that large and important independents, so-called, are selling at prices materially lower than those which have been heretofore announced, our subsidiaries meet the new prices. They do not precipitate or lead in establishing lower prices, for they are aware that the prices which have prevailed for some time past are lower than the actual cost of production by most if not all of the producers."

The prevailing opinion is that the pronouncement has clarified the situation and that the fact the Steel Corporation now will sell as low as anyone else is likely to exert a restraining influence on promiscuous cutting of prices. This will probably mean less selling to recognized regular customers of the Steel Corporation by independents, because such buyers now will be able to match the lowest prices named by independents with those of the Steel Corporation subsidiaries.

The week has developed more clearly than was apparent recently the real selling prices. Although makers of steel bars here and in the Valley district are making a pretty strong effort to obtain 1.75c., base, Pittsburgh, there are authentic reports as low as 1.60c. has been done, and since the Steel Corporation now is

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Aug. 30, 1921	Aug. 23, 1921	Aug. 2, 1921	Aug. 31, 1920
No. 2X, Philadelphia‡	$20.84	$20.84	$21.35	$53.51
No. 2, Valley furnace†	**21.00**	20.00	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	**21.00**	20.00	18.50	46.00
Basic, del'd, eastern Pa.	19.00	19.00	21.25	50.67
Basic, Valley furnace	**19.00**	18.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	**21.00**	20.00	18.50	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	**21.96**	21.46	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	35.00	58.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. sheet bars, P'gh.	30.00	30.00	32.00	68.00
Forging billets, base, P'gh.	34.00	34.00	35.00	75.00
O.-h. billets, Phila.	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	*40.00*	42.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh.	1.75	1.75	1.85	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.00	2.00	2.10	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	*1.70*	1.75	1.75	3.25
Steel bars, New York	*2.08*	2.13	2.13	4.13
Tank plates, Pittsburgh	*1.70*	1.80	1.80	3.25
Tank plates, New York	*2.08*	2.18	2.18	3.63
Beams, etc., Pittsburgh	*1.75*	1.80	1.85	3.10
Beams, etc., New York	*2.13*	2.18	2.23	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.40	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Aug. 30, 1921 Cents	Aug. 23, 1921 Cents	Aug. 2, 1921 Cents	Aug. 31, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	3.00	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	4.00	9.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.40	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh.	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh.	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$13.75**	$13.00	$12.50	$38.00
Carwheels, Philadelphia	17.00	17.00	16.00	42.00
Heavy steel scrap, P'gh.	13.00	13.00	12.00	30.00
Heavy steel scrap, Phila.	11.50	11.50	11.00	26.50
Heavy steel scrap, Ch'go.	11.00	11.00	10.00	26.00
No. 1 cast, Pittsburgh	16.50	16.50	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.00	13.00	11.50	35.00
No. 1 RR. wrot, Phila.	14.00	14.00	14.00	33.00
No. 1 RR. wrot, Ch'go (net)	11.00	11.00	9.25	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	**$3.00**	$2.75	$2.75	$17.00
Foundry coke, prompt	**4.00**	3.75	3.75	18.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.00	19.00
Electrolytic copper, N. Y.	*11.62½*	11.75	11.75	19.00
Zinc, St. Louis	*4.42½*	4.17½	4.20	8.10
Zinc, New York	*4.62½*	4.67½	4.70	8.45
Lead, St. Louis	4.20	4.25	4.20	8.75
Lead, New York	4.40	4.40	4.40	8.75
Tin, New York	**26.75**	26.12½	26.50	45.75
Antimony (Asiatic), N. Y.	4.50	4.50	4.60	7.00

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Aug. 30, 1921, Finished Steel, 2.293c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Aug. 23, 1921,	2.321c.
July 26, 1921,	2.364c.
Aug. 31, 1920,	3.974c.
10-year pre-war average,	1.684c.

meeting competition the preponderating weight is on the lower figure, because of productive capacity. On plates 1.70c., Pittsburgh, has been done and the going price on structural beams is 1.75c. These tonnage products, in other words, have declined from $1 to $3 per ton from what have been regarded as the market prices. Some very low prices have come to the surface on hot-rolled strips in the past week, sales having been made down to 2c. base, Pittsburgh, and on a large tonnage as low as 1.90c. is reported to have been made.

Single quotations again rule in sheets, all makers now being willing to take business at the low levels named by one or two makers a short time ago.

Reports with regard to plant operations are very irregular. There has been a definite gain in the activities of tin plate mills and the operations of strip mills are on a larger scale than they were recently. Sheet mill operations, on the other hand, taking the industry as a whole, have receded, while wire and pipe plants have been practically stationary. We note no gain in activities of bar, plate or structural mills and open-hearth operations do not exceed 25 per cent capacity. In the latter respect, the past two weeks have been the poorest since the depression set in as far as Carnegie Steel Co. is concerned. The Cambria Steel Co. has put on a blast furnace and in the next week or 10 days the Shenango Furnace Co. and the Hanna Furnace Co. each will put on a furnace. The pig iron market reflects a strong undertone, although a demand of sufficient proportions to carry prices up to producers' ideas still is lacking.

There is no easing in the prices of old material and the prospect of early blowing in of several idle furnaces is having its effect upon fuel prices.

Pig Iron.—All makers of basic iron in this and nearby districts are holding firmly to $20, furnace, but as yet that price has not found basis in actual sales. The same interest which recently bought 2000 tons at $19, Valley Furnace basis, has bought another 1000 tons at the same price at a Western Pennsylvania furnace. Another sale of 1000 tons is noted to a West Virginia melter, but beyond the fact that the iron was bought for less than $20, there are no details. The claim is made than this kind of iron still can be bought at $18, Valley furnaces, but no sales lately have been done as low as that and since Valley makers all are asking $20, and the Valley basis was recognized in the recent sale of 2000 tons, the fairer appraisal of to-day's market on Valley basic iron is $19. The market on foundry iron has definitely reached $21, furnace. The one Valley furnace interest which is offering this grade has turned over at least 600 tons at $21 for No. 2 grade, and that also is the price obtained from a Western Pennsylvania furnace on recent transactions. There is no change in Bessemer iron, which is moving in a small way at $20, Valley furnace. The additional furnace in blast at Cambria Steel Co. brings the total number now active in the territory from Johnstown to Wheeling, to Pittsburgh and the Valleys, to 30 out of a total of 139. Soon after Labor Day the Cherry Valley furnace, Leetonia, Ohio, and No. 3 furnace, Shenango Furnace Co., Sharpsville, Pa., will be blown in.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—Both inquiries and sales are few and small. Prices do not change much but the drift is toward lower levels. The Valley steel maker who a few weeks ago put out an inquiry for 200 to 300 tons of 80 per cent ferromanganese for September and October delivery has been quoted as low as $58 c.i.f. Atlantic seaboard on the English material, this being equivalent to slightly more than $64 delivered. This price is $2 per ton below the recent minimum quotation, and would seem to put American manufacturers out of the running, since the lowest price of any of them is $70 delivered. We note a sale of a fair sized tonnage of 20 per cent spiegeleisen within the range quoted below. Hardly enough inquiries are out for 50 per cent ferrosilicon to determine the actual price. Most makers are publicly quoting $65, furnace, freight allowed, as a minimum, but the most recent business done was at $60 and it is probable that this price could be done again.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent, $68; 78 to 82 per cent British ferromanganese, $58 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered. Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted, f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Very little is going on and prices to a large degree are untested. There are reports that there was an inquiry recently for 400 to 500 tons of 4-in. billets a month, over the remainder of the year, but it does not seem to have been given to more than two companies and one of them was not interested in the business. Sheet makers generally are getting fewer orders than recently and this has been accompanied by a lighter demand for sheet bars. Almost no interest is being shown in slabs. Price given below are as fair an appraisal as can be made on the limited demand.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30 to $31; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Although most makers are not interested in business at less than $42 Pittsburgh, for the base size of soft rods, some business has been placed at $40 and since the appearance of a sizable order undoubtedly would develop this price, we are forced to recognize it as a quotation. No big demands are coming out at present because of the rather limited movement of the products of rods. Prices are given on page 567.

Structural Material.—Bids were opened yesterday by the Allegheny County commissioners for a new bridge over the Allegheny River at Sixteenth Street, Pittsburgh. The Fort Pitt Bridge Co., Pittsburgh, was low bidder for furnishing the steel and placing it, with a bid of $541,822. Other bids ranged up to $822,400, this being by the Independent Bridge Co., Pittsburgh. About 5000 tons of steel will be required for this bridge. The general contract for the eight-story addition to the department store of the Joseph Horne Co. has yet to be let. It is said that a price of $50 fabricated and delivered has been made on the steel for the building. Actual awards with fabricating shops here remain few and small. The McClintic-Marshall Co. has taken a highway bridge for the Pattengill Transportation Co., Cuba, an umbrella shed for the Chesapeake & Ohio Railroad, Wilmington, Ky., and the steel for the castings for dam No. 38 on the Ohio River at Aurora, Ind., all three jobs taking about 175 tons. The American Bridge Co. has taken 300 tons in addition to the original award of 1000 tons for a saw plant at Manistee, Mich. Occasional sales of plain material in small lots are being made at 1.80c., but 1.75c. is the more common quotation. Prices are given on page 567.

Iron and Steel Pipe.—Jobbers are fairly persistent though moderate buyers of standard pipe, but they are not buying very far ahead and while business has been better in August than it was in July or June, it still leaves much to be desired. No important demands are coming out for oil country goods, because so few of the oil companies are doing any drilling and those that are, seem to be well supplied with casing and drill and drive pipe. Inquiries for line pipe also are few and small. There continues to be good observance of the July 7 card on standard pipe, but on oil country and line pipe competition is sharp and prices favor buyers. Discounts are given on page 567.

Iron and Steel Bars.—While an attempt is still being made to hold merchant steel bars at 1.75c., base, only retail quantities have been moved at that figure and competitive conditions have resulted in prices of anywhere from 1.70c. down to 1.60c. Lower prices also are indicated for iron bars in view of the bi-monthly settlement of the bar iron scale at Youngstown, Ohio, yesterday, which resulted in a drop in the puddling rate from $11.38 per ton to $9.12.

We quote steel bars rolled from billets at 1.60c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars rolled from old rails, 1.60c.; renned iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Nuts, Bolts and Rivets.—There is practically no market as far as the makers here are concerned as the prices reached in other important manufacturing centers are so far below costs that makers here refuse to follow. One plant here is closed indefinitely because it had been figured out that to meet competitive prices on nuts and bolts would necessitate buying bars at 1.47c., Pittsburgh. This company made a bid of 1.50c. for bars without uncovering any supplies. The leading maker of small rivets in this district is holding to 65, 10 and 10 per cent off list on the bulk of its business, occasionally giving an additional 2½ and 5 per cent on lots involving more than a carload. It is claimed here that a Chicago district maker quoting a lower price does not make a full line of small rivets. Prices and discounts are given on page 567.

Spikes.—The market on standard spikes leans in the buyers' favor, due to the fact that competition for orders is extremely sharp. Locally $2.50 per 100-lb. base, is minimum, but it is admitted that business has been lost at this figure because of the absorption of freight by makers outside this district. It is reported that there is some deviation from the established price of $2.75 per 100-lb. on splice bars. Prices are given on page 567.

Steel Rails.—Demands for light sections still are few and small and buyers are having no trouble in placing orders for new steel rails at 1.75c. Pittsburgh, for the base sizes. Rerolled rails are holding around 1.60c. mill. Specifications for the standard rails still are rather disappointing, but there are hopes that September will develop some improvement in this respect. Reports that the prices of standard rails were to be cut at an early date find no verification here.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—The market no longer is quotable at above 1.75c., as that quotation not only is maximum, but somewhat extreme. A quotation of 1.70c. has become common lately, and it is reported that a recent inquiry brought a quotation of 1.67½c. The principal inquiry is from tank builders. The railroad equipment manufacturers are not doing much, although the Pressed Steel Car Co. recently secured an order for 53 steel passenger cars for the Tientsin Puko Railroad, China. The Baltimore & Ohio Railroad has put out an inquiry for 1000 box and 1000 hopper bodies.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.70c. to 1.75c. f.o.b. Pittsburgh.

Sheets.—Announcement by the Steel Corporation of its intention to meet competitive prices means the passing of higher prices than 2.75c. base for black, both sheet and tin mill sizes, 3.75c. base for galvanized and 2.25c. base for blue annealed. These prices were made by one independent about two weeks ago and since have been followed by several other independents. Distribution of business is rather uneven among the different companies, and between the American Sheet & Tin Plate Co. and the independent companies. While the American Sheet & Tin Plate Co. reports that last week was the best in orders and specifications in more than four months, and it now is running about 44 per cent of its sheet mills, the experience of the independents has been that orders are lighter and they

have been forced to put down some capacity. It seems to be a case that with prices the same, the Steel Corporation gets the preference. Prices are given on page 567.

Wire Products.—Makers in this and near by districts are having a fair run of small orders for quick shipment. The movement of nails continues to be very much better than that of other products, but buyers in general are slow to abandon the policy of coming into the market only for such tonnages as will meet their immediate requirements. There continues to be talk of price cutting, but it is largely talk in the case of nails and does not amount to more than $1 per ton in wire. Case is cited of a buyer wanting 2000 kegs of nails, who though willing to pay the regular base of $2.75, found it necessary to do considerable shopping to find a mill that could make the shipment as promptly as desired. It is asserted that if makers would guarantee prices against a decline they could fill up their order books, at least over the remainder of the year. The American Steel & Wire Co. now is giving a dating of Nov. 1, against woven wire fence business, thus meeting terms offered by the independents for some little time. The announcement by the Steel Corporation that it would meet competitive market prices is considered likely to be a stabilizing influence in prices of wire products, for the reason that concessions which might be made by independents now will not be a successful means of getting business, as it would be with the corporation quoting a higher price.

We quote wire nails at $2.75, base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Tin Plate.—Newspaper reports that the price of production tin plate had been cut to $4.75 per base box are absolutely without foundation. The price is and has been $5.25 per base box for production plate, with stock items available at $4.75. In announcing the intention of the Steel Corporation to meet competitive prices, Judge Gary made no reference whatever to prices of any product. The real situation in tin plate is that manufacturers whose plants are in operation have had a really good business in tonnages for quick shipment and the needs of container manufacturers are so urgent that they have not questioned the price.

Hoops and Bands.—The market has definitely settled to a base of 2.25c. for these products, for that price has been the base of independent makers for the past few weeks and now is the Steel Corporation price in view of Judge Gary's recent announcement that the corporation hereafter would meet competitive prices. It is not believed that less than 2.25c. has been quoted, although the demand still is of small proportions.

Cotton Ties.—Specifications are coming in satisfactorily and it begins to look as though requirements would be heavier than was indicated a few weeks ago. German competition seems to have been successfully fought off by the reduction of 5c. per bundle made by domestic makers, following the opening of the season. September shipments carry a price of $1.32 per bundle of 45 lb., Pittsburgh, this including the carrying charge of 1c. per bundle per month on the revised opening price.

Hot-Rolled and Cold-Rolled Strips.—The full range of prices on hot-rolled strips is from 1.90c. to 2.40c., base, Pittsburgh. It is reported that the Ford Motor Co. has placed 4000 tons at the lower figure. There is a disposition to question the accuracy of this report in view of the fact that Detroit advices are that this company is figuring on a reduction in its production schedule for September to 50 per cent of that for August, and such a tonnage would considerably exceed its requirements for the coming month. It also is said that material sold at such a price would not be strictly within the specifications of strip steel, and that it probably was rolled on a skelp mill. However, some regular makers of hot-rolled strips recently have been going down to 2.10c. and even 2c. to secure tonnage orders, and others, though nominally quoting a high price, have met these figures where the loss of a customer was involved. On a strictly strip steel basis, the market is quotable from 2.20c. to 2.40c. Where a large tonnage is involved or where strips are competing with plates or sheets, prices range from 1.90c. to 2.10c. Cold-rolled strips are quotable on sales from 3.85c. to 4c., base, Pittsburgh. Business has improved but seemingly at the expense of prices.

Cold-Finished Steel Bars and Shafting.—The market on rolled or drawn steel still is quotable from 2.40c. to 2.50c., base, Pittsburgh. The general asking price is 2.50c. and some business has been done at that figure, but usually on tonnages involving less than a carload. Competitive business usually results in a price of 2.40c. The Cumberland Steel Co. quotes ground shafting at $3 per 100-lb. base, f. o. b. its mill, for carloads, and $3.25 for less carloads.

Coke and Coal.—The appearance of two or three good-sized inquiries for furnace coke, coupled with a stronger market in coal, has developed an advance of about 25c. per ton in this grade of fuel. The American Rolling Mill Co., which is blowing in one of its blast furnaces at Columbus, Ohio, has contracted for 27,000 tons for delivery over the next three months, at $3.10 per net ton, oven, and other inquiries which have been out have developed no prices of less than $3 per net ton, oven. It is probable that within the next few days a contract for 10,000 tons a month over the next three months will be closed at $3. Another inquiry for a round tonnage for last quarter shipment is on the market, against which a price of $3.25 has been named. There seems to be no furnace coke either for spot or future shipment at less than $3.

Old Material.—The market maintains a strong undertone although in some instances buyers have reduced their bids and generally the dealers are having some difficulty in obtaining the prices they ask. But as an offset to this condition, there are some dealers who are short of the market and who are trying to cover in the fear of not being able to do so later, except at a loss. Pittsburgh district steel companies using machine shop turnings are bidding $8 to $8.50 per gross ton, delivered, but the lowest price noted on any actual business has been $8.50 and we regard that as minimum, in view of the fact that one large user stands ready to take on additional tonnages at that price. The lower bids have failed to secure any material of this grade in this district and the indications point to even higher prices in view of the fact that the automotve industry, the principal source of supplies, is beginning to slow up and naturally will have smaller tonnages to offer during the next few weeks. Based on actual sales, we quote turnings at $8.50 to $8.75 per gross ton, delivered Pittsburgh, common freight points. There were several bids by Pittsburgh district interests of $8.50 per ton, or more, delivered, against the turnings offered by Dodge Bros. last Friday. Heavy melting steel has brought $13.50 on one lot of 2000 tons and it is doubtful whether any now could be bought as low as $13. The Baltimore & Ohio will receive bids until noon Sept. 6, for 19 cars and 10,530 gross tons of old material; also for 3000 lb. of high speed steel. The Pennsylvania Railroad, Eastern Region, will open bids, Sept. 1, for 28,500 net tons of old material.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13.00 to $13.50
No. 1 cast cupola size	16.50 to 17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	10.50 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to 9.50
Railroad knuckles and couplers	14.00 to 14.50
Railroad coil and leaf springs	14.00 to 14.50
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron wheels	14.00 to 14.50
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.50 to 8.75
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	10.00 to 10.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	15.00 to 15.25
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.25
No. 1 railroad wrought	12.00 to 13.00

Chicago

CHICAGO, Aug. 30.

Local producers of merchant pig iron have again advanced their prices, this time to $21, base furnace, for foundry, basic and malleable. Although buying has not been heavy at the new quotation, the market is firm.

Demand for steel continues to increase slowly, but most purchases are of small tonnages on which prompt delivery is asked. Sheet prices have definitely receded to a lower level, but the market on bars, plates and structural shapes is still in a state of confusion. It is apparent, however, that the prices announced in July, namely, 1.75c., Pittsburgh, on soft steel bars, and 1.85c., Pittsburgh, on plates and structurals, are now purely nominal in this district, and an early announcement of lower quotations corresponding more closely to actual going prices would not be surprising. On all three products, 1.50c. to 1.60c., Pittsburgh, has been done rather frequently recently and exceptionally attractive business has brought out heavier concessions. A railroad car builder, for example, closed for 2200 tons of plates at a reported price of 1.80c., Chicago. Mill and furnace operations are substantially unchanged.

Pig Iron.—Local producers have again advanced their prices this time to $21, base furnace, for foundry, malleable and basic. Purchases ranging from carload lots to several hundred tons have been made at the new prices, but on the whole buying is not so active as a week or two ago. Some contracts have been closed, however, covering requirements ranging from two months to the rest of the year, and an Illinois melter is inquiring for 1300 tons of foundry for first quarter delivery, as well as for 300 tons for fourth quarter. The furnace of the St. Louis Coke & Chemical Co. at Granite City was banked last week, as forecast in this column, thus further reducing the number of active stacks in the country. A Wisconsin melter has purchased 500 tons of 10 per cent silvery at the ruling Jackson County prices. An inquiry for 500 tons of charcoal iron has been received from an Eastern melter. Buying of foundry coke has expanded measurably and some melters who had been ordering only one carload at a time have placed contracts for from one to two months ahead. A stiffening in beehive prices would not be surprising in view of the fact that operations are at a low ebb and producers declare they will not relight ovens at the present market. Current ruling prices on beehive foundry coke range from $4.25 to $4.50, Connellsville.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00
Northern high phos.	21.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	21.00
Basic	21.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32 82

Ferroalloys.—Ferromanganese is stronger, as is evidenced by a sale of 100 tons at $75, delivered. There has been no activity in spiegeleisen or 50 per cent ferrosilicon.

We quote 78 to 82 per cent ferromanganese, $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The Pere Marquette has awarded repairs on 350 wooden box cars to the International Car Co., Chicago. The Rock Island has deferred action on its inquiries for new cars and car repairs. The award of repairs by the Illinois Central, noted last week, totaled 1950 cars instead of 1400, and the distribution was as follows: Five hundred box and 250 Roger ballast cars to the Pullman company, 400 box cars to the Ryan Car Co., 300 gondola cars to the Haskell & Barker Car Co., and 500 box cars to the American Car & Foundry Co.

Rails and Track Supplies.—Outside of a number of carload orders for track bolts and standard railroad spikes, there has been little new business in track supplies. There have also been some releases against contracts for the same commodities, but on the whole bookings are disappointing. In fact, it is reported that the railroads are borrowing from each other rather than to enter the market for their needs. Light rails are weaker and are now bringing a maximum of 1.75c., mill.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.50c. to 2.75c., Pittsburgh; track bolts with square nuts, 3.50c. to 3.75c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Plates.—A Chicago district car builder has bought 2200 tons of plates from a local mill. The steel for the car repairs let by the Illinois Central last week has not yet been placed and the tonnage will probably not run very heavy, as all of the cars have wooden superstructures. The Chicago, Burlington & Quincy takes public bids on Sept. 2 on 1500 tons of plates and 350 tons of structural shapes. The same road is inquiring for 500 tons of car parts. In the aggregate, inquiry for plates shows little improvement and competition for business has been keen. The so-called official price of 1.85c., Pittsburgh, is now little more than nominal and orders are going at concessions ranging all the way from $4.50 to $7.50 a ton. Owing to the present propensity of buyers to limit their purchases to small tonnages for prompt delivery, the exceptional inquiries of size and desirable specifications are bringing out extraordinary inducements from the mills. Hence on most current orders the ruling market appears to be 2c., Chicago.

The ruling mill quotation is 2c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Structural Material.—With fabricating work diminishing rather than increasing and demand from other sources light, business in plain material is at a low ebb. The mill price of 1.85c., Pittsburgh, which is still adhered to by some makers, is no longer getting any business of consequence in this section. Actual going prices range all the way from 2c. to 1.85c., Chicago, the extreme concessions being named on attractive tonnages. Current fabricating jobs are small with the exception of a 3000-ton airship hangar to be erected at Belleville, Ill., noted in the St. Louis column last week. Recent fabricating awards include:

Logan Square Masonic Temple, Chicago, 320 tons, to A. Bolter's Sons Co.

Hutchinson Lumber Co., one 120-ft. single track through girder span, Oroville, Cal., 120 tons, to American Bridge Co.

South Dakota State Highway Commission, two 198-ft. spans, 163 tons, to Standard Bridge Co., Omaha.

Pennsylvania Tank Line Co., two buildings, Kansas City, Mo., 225 tons, to Kansas City Structural Steel Co.

Pending business includes:

Southside High School, Fort Wayne, Ind., 300 tons.

Courthouse, Rapid City, S. D., 250 tons.

Powerhouse, Gallup American Coal Co., Gallup, N. M., 275 tons.

The mill quotation is 1.85c. to 2c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Bolts and Nuts.—The Ford Motor Co. bought its monthly requirements of bolts and nuts last week. Business in general remains light. Jobbers, railroads and manufacturing consumers still adhere to the cautious policy of buying only for their immediate needs. The price situation is still unsettled, but the discounts named in this paragraph last week appear to be representative.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅝ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—Mill prices on black and galvanized sheets have been reduced to 2.75c. and 3.75c., base Pittsburgh, respectively. The ruling price on blue annealed continues to be 2.25c., Pittsburgh, for No. 10 gage. Warehouse quotations have been marked down to conform with the new mill prices and are appended below. The demand for sheets is of fair proportions, as indicated by the fact that the local independent continues to operate 14 out of 18 hot mills.

Mill quotations are 2.75c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bars.—There has been no material improvement in the demand for mild steel bars and 1.75c., Pittsburgh, is merely a nominal quotation in this district. On most orders 1.50c. to 1.60c., Pittsburgh, is being done, and in some cases as low as 1.42c. has been named. That buyers have permitted their stocks to dwindle almost to the vanishing point is indicated by the increasing number of requests for immediate shipments. In a number of instances, they have failed to find mills which could furnish the material and have been forced to buy out of stocks. Current reinforcing jobs are mostly under 100 tons each, an exception being a factory addition for the Cuneo-Henneberry Co., Chicago, involving 450 tons, which will be furnished by the Inland Steel Co. There is little demand for bar iron and while as low as 1.65c., mill, has been done, the ruling price remains 1.75c., mill. Although some concessions have been made in this market of late, the ruling market on rail carbon steel bars remains 1.75c., mill. The operations of bar iron and hard steel bar mills are still of an intermittent character.

Mill prices are: Mild steel bars, 1.50c. to 1.75c., Pittsburgh, taking a freight of 38c. per 100 lb.; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.70c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Old Material.—The market is quiet and consuming demand is principally from small gray iron and malleable foundries. A second advance in pig iron has tended to strengthen the foundry grades, car wheels having advanced and the other items being on a firmer footing. Generally speaking, consumers are still reluctant to pay the advanced prices and continue to offer to buy at quotations current two or three weeks ago. One iron mill, however, has purchased in excess of 500 tons of No. 1 wrought at $11.50 per net ton. Dealers are not buying so actively as they were, although some short interests are in the market for brake shoes and No. 1 wrought. The largest railroad offering is 10,000 tons advertised by the Baltimore & Ohio. Blind lists have been received from the Erie and the Michigan Central.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$15.00 to $15.50
Relaying rails	27.50 to 30.00
Car wheels	13.75 to 14.25
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.25 to 10.75
Low phos. heavy melting steel	13.50 to 14.00
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	9.50 to 10.00
Pipes and flues	6.50 to 7.00
No. 1 railroad wrought	11.00 to 11.50
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.00 to 12.50
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	12.50 to 13.00
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

Wire Products.—Orders are numerous but lacking in size. Jobbers are buying rather generally, but as yet are not laying in stocks for fall trade. Railroad buying is less in evidence than a week or two ago. Trade from the manufacturing consumers is small. Prices are holding firmly except on cement coated nails, on which there has been some shading of late. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 567.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Cast Iron Pipe.—Detroit has again rejected bids on 1500 tons and will readvertise. Milwaukee will take bids Sept. 9 on 1928 tons of straight pipe, largely 54-in. with a few pieces of 36-in.; 241 tons of lugged pipe and 376 tons of special castings. Cedarburg, Wis., receives tenders to-day on 600 tons of four, six, eight and 10-in.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

New York

NEW YORK, Aug. 30.

Pig Iron.—The buying of the middle August period has subsided, although there is still fair inquiry, including 1500 tons for delivery after Jan. 1. The furnace company referred to last week as having purchased at least 1000 tons has contracted for about double that amount for No. 2X and No. 2 plain for the last quarter. Furnace quotations show little, if any, change. Furnace operators who were selling below cost find it difficult to advance quotations and at least one furnace is expecting to go out about Oct. 1, by which time it is estimated all the iron it has sold will be delivered. The usual furnace quotations for No. 2 plain, eastern Pennsylvania, are $19 to $19.50, while Buffalo furnaces seem to have established the $20 furnace price. Virginia iron is selling at from $22 to $23, furnace, in very limited quantities.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom'l)	28.16 to 29.16

Ferroalloys.—Reports persist of claims by buyers that ferromanganese has been offered lower than the prevailing quotation, but sellers deny that any sales have been made at less than $65, seaboard, for the British alloy and $70, delivered, for the American product. Sales of carload lots are reported and there is an inquiry for 100 tons from a Western New York consumer. The chief item of interest in the spiegeleisen market is an inquiry for 350 tons for early delivery. There is no demand for high grade manganese ore and quotations are unchanged. The 50 per cent ferrosilicon market is exceedingly quiet and prices are firm. Quotations are as follows:

Ferroalloys	
Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton	$65.00
Spiegeleisen, 20 per cent, furnace, per ton	$25.00 to $27.00
Ferrosilicon, 50 per cent, delivered, per ton	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ferrocarbontitanium, 15 to 18 per cent, net ton	$200.00
Ferrocarbontitanium, 15 to 18 per cent, 1 ton to carloads, per ton	$220.00
Ferrocarbontitanium, 15 to 18 per cent, less than 1 ton, per ton f.o.b. Niagara Falls, N. Y.	$250.00
Ores	
Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast Iron Pipe.—Considering the period of the year, business holds up fairly well. There is no new municipal business before the trade. Next month the usual seasonal slump is looked for. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $42.30; 4-in. and 5-in., $47.30; 3-in., $57.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—On the whole, a larger volume of inquiries has marked the week over those of the recent past, but prices do not seem to have stiffened. One instance was found of a seller who booked more business in the last week than in any other week this year, and the month bids fair to be the best of

the year. Demand is of rather a broad nature except in cold finished steel and cold rolled strip steel, which seem still to be in fairly heavy stocks in consumers' hands. As to prices, 1.70c., Pittsburgh, is easily obtainable on large lots of plates, and while bars have been done at 1.65c. in some special cases, there is evidence that 1.70c. is also the going price for bars, although business is still done at 1.75c. Structural shapes are dropping to a parity with plates, and on large structural operations it is probable that 1.75c. is a top figure. At least one buyer of national operations has disregarded Pittsburgh in Chicago purchases, using round figures for that delivery in estimating. Fabricated steel awards of the week include 600 tons for the Sinclair Valentine Co., New York, to the Hinkle Iron Co.; 250 tons for the Methodist Publishing Co., Richmond, Va., to the Richmond Structural Steel Co.; 300 tons for apartments at Elmhurst to Kues Brothers; 1000 tons for the Allerton Housing Corporation, Lexington Avenue and Fifty-seventh Street, to the Paterson Structural Steel Co., which also took 1500 tons for the Henry Schiff apartment, Riverside Drive; 3100 tons for the Bamberger store, Newark, to the Hay Foundry & Iron Works. The Fort Pitt Bridge Co. was low bidder on the 5000-ton Sixteenth Street bridge, Pittsburgh. For the bridge at Aqueduct, N. Y., taking 350 tons, Lathrop, Shea & Henwood Co., Buffalo, is general contractor. Among new projects are a laboratory building for Yale University, 1000 tons, and 700 tons for a hospital at Hackensack, N. J. In car building lines the Baltimore & Ohio is in the market for 1000 hopper car bodies and 1000 box car bodies. The Illinois Central car repair contracts cover 1422 cars and were divided among four companies. The Pressed Steel Car Co. will build 53 passenger cars for the Chinese Government railroads.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.08c.; plates, 2.08c. to 2.13c.; structural shapes, 2.13c. to 2.23c.; bar iron, 2.08c.

Old Material.—When the so-called better tone is analyzed, it appears to be due to conditions between brokers and dealers rather than because of a demand on the part of mills. An example of this was the raising of the buying price of pipe to the extent of 25 cents by a leading New York broker to facilitate his covering on an old contract. One broker has been trying to dispose of 3000 tons of one grade at an attractive figure which would undoubtedly interest mills in normal times. However, no mills have shown interest. The New York Central decided not to sell its 1500 tons of relaying rails, since it holds out for $30 and has not secured bids that high. Heavy melting steel is before the market in two grades, yard steel and rails or equivalent.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Heavy melting steel, rails or equivalent	8.25 to 8.75
Rerolling rails	10.00 to 10.50
Relaying rails, nominal	37.50 to 40.00
Steel car axles	10.00 to 11.00
Iron car axles	16.00 to 17.00
No. 1 railroad wrought	10.50 to 11.00
Wrought iron track	7.50 to 8.75
Forge fire	5.00 to 5.50
No. 1 yard wrought, long	9.00 to 9.50
Light iron	2.00 to 2.50
Cast borings (clean)	5.00 to 5.50
Machine-shop turnings	2.50 to 3.50
Mixed borings and turnings	2.50 to 3.00
Iron and steel pipe (1 in. diam., not under 2 ft. long)	8.00 to 8.50
Stove plate	9.50 to 10.00
Locomotive grate bars	8.50 to 9.25
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Warehouse Business.—With most warehouses in this district, the past month resulted in a slightly larger volume of business than July, which, however, was the poorest month of the year. Prices on practically all items are nominal. Particularly in the wrought iron and steel pipe field is there a tendency to quote competitive prices regardless of the established warehouse schedule. About the only decrease in prices during the past week is noted in black sheets, which are now being sold as low as 4c. per lb. for No. 28 gage. Brass and copper warehouses report business dull and prices unchanged. We quote prices on page 580.

High Speed Steel.—Dullness continues, although some producers report a continuation of the slight increase in activity during the past few weeks. Quotations continue at about 90c. to $1 per lb. for 18 per cent tungsten high speed steel.

Birmingham

BIRMINGHAM, ALA., Aug. 30.

Reductions on ore and limestone to Alabama furnaces effective on or before Oct. 1, as declared by the Alabama Public Service Commission, make a maximum saving of about 40c. to 42c. a ton in the manufacture of pig iron, compared with present cost for the most favorably situated furnaces. In the 25-mile zone, the ore rate is reduced from 50c. to 37c. This makes 39c. on three tons of ore. The reduction on limestone is from 40c. to 37c. This is about 1c. on the amount of stone used to make a ton of iron. Coal and coke rates were not changed. Reduced rates on greater distances are not so great, that on ore in a zone from 25 to 50 miles being reduced from 60c. to 47c. and that on stone from 50c. to 47c. The Sloss-Sheffield and Republic companies benefit most by the reductions.

Pig Iron.—While business was mainly confined to small lots for prompt movement last week, it was marked by a solid front both as to $19 base and the 50c. differentials. The last known deal made under this was for 1700 tons of pipe iron, in which the average base was $18.50 with the usual charge for differentials. This was about Aug. 19. After that, all makers charged $19 flat. Toward end of the week a pipe interest tried several makers on 1500 tons of 2.25 to 3.25 silicon at $19, but the proffer was not accepted. About that time brokers are known to have placed orders for lots at $19 base, one lot of 100 tons of 3.25 to 3.75 silicon bringing $20.50. The inquiry for 40,000 tons for India was received, but little interest was shown in it. Stocks are in bad shape from grade standpoint. One maker has no high silicons and another has no silicon under 3.25. This causes a continuous refusal of orders or changes as to grades. The week was marked by the re-entrance of Cincinnati and St. Louis territory buyers for small lots. St. Louis took 100 tons and Cincinnati took several small lots at uniform base of $19. Apparently the melters were glad to get in at the price paid. Melt of stove foundries and others in the South is increasing and their inclination to cover is more pronounced. Stocks are going down. Preparations to have furnaces ready to go in are under way, but none forecast additional furnace activity before lower rates on ore and limestone go in effect Oct. 1. The reductions in these rates was only 25 per cent in shortest zones, much less in longer hauls. The general tendency of the market is to harden to a higher base.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Finishing Mills.—Finishing steel works are on greater production schedule, the Tennessee company having progressed to one of 65 per cent. The rail mill for two weeks has been on night and day turn, producing 9000 tons compared with the prior production of 6000. New car works has begun turning out 10 standard steel freight cars per diem. Wire drawing mills appear to have attained 35 per cent capacity with wire fencing again on the order books following better feeling in the country. Hoop and tie mills continue operations at normal.

Cast Iron Pipe.—It was a quiet week in high pressure pipe, but the price base remained firm around $35 with numbers of small orders and one shop at 100 per cent capacity. Sanitary pipe is running about the same as for several weeks with a fair demand and

sharp competition on a $40 base for standard and $35 for extra heavy.

Coal and Coke.—Foundry coke is more firm at $6.50, the $6 base seeming to have disappeared owing to the strengthening of the demand. Bunker coal at New Orleans and Mobile is quite active. General trade is much improved.

Old Material.—Cast scrap is moving out of yards in considerable volume owing to increase in shop operations. Heavy melting steel is still weak, but the outlook is improving.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to $11.00
No. 1 steel	9.00 to 10.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Aug. 30.

Pig Iron.—Eastern Pennsylvania $19.50 iron has disappeared from this market, those furnaces quoting adhering to $20 furnace or $24.06 delivered for No. 2 plain and No. 2X. On No. IX iron, prices spread from $20.50 to $21.50. Both Buffalo No. 2 plain and No. 2X are obtainable at $20 furnace or $25.46 delivered common points, but $20.50 furnace or $25.96 delivered on No. 2X was done on car lots this week. Sufficient inquiry to establish a market for Virginia iron is lacking. Alabama iron is offered on a flat basis of $19 furnace for No. 2 plain. One producer is asking foundries to take definite action on iron contracted for, held at furnace. Aside from 100 tons eastern Pennsylvania No. 2X, sold to a Maine foundry at $20 furnace, business reported this week was in car lots of eastern Pennsylvania and Buffalo at prices noted above. New inquiries include 1000 tons, silicon 1.25 to 1.80, 750 tons, silicon 2.75 to 3.25, and 200 tons No. 1X, all from Connecticut consumers; 300 tons charcoal iron from a nearby melter; and numerous car lots, mostly No. 2X and No. 1X. Foundries are bidding low for business. A Massachusetts foundry recently took city water department work at 2½c. per lb. On small castings requiring a fine finish, prices quoted to-day are more than 50 per cent under those named a year ago. A Massachusetts manufacturer is paying 4.6c. per lb. for gray iron castings that cost 15.5c. a year ago. Delivered pig iron prices follow:

East. Penn. sil. 2.25 to 2.75	$24.06 to $25.06
East. Penn. sil. 1.75 to 2.25	24.06 to 24.56
Buffalo sil. 2.25 to 2.75	25.46 to 26.46
Buffalo sil. 1.75 to 2.25	25.46 to 25.96
Virginia sil. 2.25 to 2.75	31.08 to 33.08
Virginia sil. 1.75 to 2.25	30.58 to 32.58
Alabama sil. 2.25 to 2.75	30.16
Alabama sil. 1.75 to 2.25	29.66

Warehouse Business.—Consumption of iron and steel continues to increase, although slowly. Two local warehouses are well supplied, but a majority are pushing mills for deliveries on material ordered earlier in August because stocks are broken. Receipts of nails have materially increased this week and prompt warehouse deliveries are now guaranteed. Most firms quote wire nails at $3.85 base. One, however, quotes $3.65 per keg base. Stove bolts have been cut 10 per cent, and two important manufacturers of vises have reduced prices about as much.

Finished Material.—An order for 900 tons girder and 200 tons standard T rails and 1250 pairs of joints placed by the Boston Elevated Railway Co. with an eastern Pennsylvania mill constitutes the outstanding feature of the finished material market this week. The Copley Square Trust Building, Boston, is taking bids on 250 tons of structural steel and Stone & Webster on 123 tons for a Far Rockaway, L. I., power house project. Local fabricators also are bidding on 480 tons for a Cornell University building. Actual structural tonnages placed since last reports were confined to small individual lots. Such jobs are plentiful and large as well as small fabricators are bidding for work. Structural prices are inclined toward weakness. On one round tonnage offered this week, as low as $61.50 was bid for steel, fabricated and erected. The plate market is soft, 1.75c., Pittsburgh, having been done on sheared. Sheet quotations have been revised to correspond with those made at other centers. Otherwise iron and steel prices hold steady with incoming business as good or slightly better than previously reported.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.75; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron, round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—New England producers of foundry coke continue to quote $10.66 delivered for spot and contract fuel where the local freight rate does not exceed $3.40, and nothing indicates a change within the near future. New business and shipments on contracts are no more than holding their own, consequently oven operations do not increase. Although there is little forward buying, a slight increase in foundry activities is expected following Labor Day. Connellsville foundry cokes are not much of a factor in this market.

Old Material.—A Pennsylvania structural rolling mill this week secured a small tonnage of steel at $11.50 delivered and Bethlehem, Pa., interests bought a little. Generally speaking, however, prices offered by the mills are not sufficiently high to bring out material. One melter raised his bid on pipe from $7.50 to $8.50 without success. Otherwise activity in the old material market centers in No. 1 machinery cast, car lots of which are reported sold this week at $17.50 delivered. Holders want more money, but few foundries are interested, consequently prices do not fluctuate much when an actual sale is made. One dealer sold a small tonnage of No. 2 machinery cast at $12.50 delivered, but this cannot be considered a criterion of the market.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 17.50
Stove plate	16.00 to 17.00
Railroad malleable	15.50 to 16.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$5.50 to $6.50
No. 1 railroad wrought	10.50 to 11.00
No. 1 yard wrought	8.50 to 9.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.50
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.50
Cast iron borings, chemical	3.50 to 4.50
Blast furnace borings and turnings	2.50 to 3.00
Forged scrap and bundled skeleton	5.00 to 5.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.00 to 11.50
Rerolling rails	9.00 to 10.00

Cincinnati

CINCINNATI, Aug. 30.

Pig Iron.—Several good-sized sales were reported during the week, the interest chiefly centering in malleables. A West Virginia car company closed on 1000 tons, and a central Ohio melter took a similar amount. A local melter brought 450 tons of foundry iron and another 100 tons. A Hamilton foundry bought 100 tons of Southern iron and melters outside of this immediate district were responsible for several sales running up to 300 tons. A northern Ohio melter is inquiring for 600 tons of malleable, 100 tons of which is for prompt shipment, and the remaining 500 for the rest of the year. The Louisville & Nashville Railroad will close Tuesday for 400 tons. The American Radiator Co. is inquiring for 400 tons for its north Birmingham plant, and the National Cash Register Co. 100 tons for Dayton. A northern Indiana melter is also in the market for 500 tons of foundry. Prices have not changed with the exception of Chicago district iron, in the past week, those furnaces having advanced to $21 on Thursday. In the South $19 is being firmly held. And in southern Ohio the quotations range from $20 to $20.50. All the sales recorded above were made at the current market, but it is reported that furnaces in districts other than Chicago are considering advancing from $1 to $2 a ton. The Mating Iron & Steel Co. will blow in a furnace at

Ironton on Sept. 15 and one stack of the American Rolling Mill Co. at Columbus will likely be in this week.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—Some fair sized orders for finished material were placed during the week. These included an order for 300 tons of structural shapes taken on the basis of 1.80c. Pittsburgh. An order for 300 tons of reinforcing bars is reported to have gone to an Ohio mill at 1.50c. Pittsburgh. These bars, it is said, will be rolled from new billets. There has been some inquiry for galvanized sheets, but the market for black sheets is slow and weaker. On blue annealed, 2.25c. is the general asking price, and on galvanized 3.75c. is holding fairly well. Quotations of 2.55c. on black sheets, or $4 per ton below the regular market, are reported. On new bars, 1.75c. Pittsburgh is the general asking price and this figure was secured on a lot of 100 tons taken by an independent mill during the week. Some orders for nails and wire products were placed at the regular schedules, and there is apparently no confirmation for the report that nails can be had from mills in Southern Ohio at 2.50c. Pittsburgh. In the structural field, there is very little activity. A municipal powerhouse at Frankfort, Ind., involving 130 tons is up for bids. An umbrella shed for the new Covington, Ky., station, taking 80 tons, has been awarded to the McClintic-Marshall Co. E. M. Sculley, Columbus, Ohio, is low bidder on the Kellogg Avenue, Cincinnati, bridge. This award will likely be made within the next week. Plant operations will not materially change during the week. The American Rolling Mill Co., Middletown, will have 10 mills in operation. The Whitaker-Glessner Co., at Portsmouth, Ohio, will be idle as well as the Andrews Steel Co. and Newport Rolling Mill Co., Newport, Ky. The two latter plants have broken off negotiations with the Amalgamated Association and will hereafter be operated without any agreement.

Warehouse Business.—Some jobbers report a greater number of small orders. The tonnage involved is also showing some increase, but as a rule, manufacturers are buying only for their immediate needs. There have been no further price reductions and jobbers quote:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 5c.; No. 28 galvanized sheets, 5.75c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—There is some activity in the coke market, foundry cokes in carload lots being sought. Occasionally, however, larger tonnages are purchased. Two inquiries for 400 tons each are pending. Prices are practically unchanged, Connellsville furnace being quoted at $2.75 to $3 and foundry at $3.75 to $4.50. Wise County is quoted at $5 to $6 and New River at $7 to $8.50. By-product coke is quoted at $6.50, Connellsville basis.

Old Material.—A central Ohio steel company is reported to have purchased a tonnage of borings and turnings at around $8.50 delivered. There is very little activity, however, the market practically being in the hands of dealers. The B. & O. is offering 11,000 tons. Prices, while firmer, are not quotably changed.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	11.00 to	12.00
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.00 to	11.00
Heavy melting steel	8.50 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.00 to	2.50
Steel turnings	1.00 to	2.00
Railroad cast	11.00 to	12.00
No. 1 machinery	12.00 to	13.00
Burnt scrap	6.50 to	7.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	8.50 to	9.50
Pipes and flues	4.00 to	5.00

Buffalo

BUFFALO, Aug. 30.

Pig Iron.—About 12,000 tons of various grades has been sold here at an average price of $20.50 base grade. Some inquiry from Valley points is engaging one seller and the understanding is that foundry iron is scarce at these places, while it is a known fact that the Buffalo market is weak. There is no change in the situation with reference to future business; contracts are made on 30- and 60-day delivery basis. A number of small foundries have reopened and better operation is noticed in foundries which have been barely active. One producer sold 7000 tons and the lot included one 1000-ton order and several 500-ton lots. Sales of 2500 tons made by a furnace were on a base price of $20 for No. 2 plain. Offerings of desirable tonnages at lower prices were refused. Furnace operation is unchanged and there is no likelihood of any change in the near future. Inquiry of 4500 tons with one furnace is scattered and consists of 25 items.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$21.75
No. 2X foundry, 2.25 to 2.75 sil	20.75
No. 2 plain, 1.75 to 2.25 sil	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—With the exception of bar business, improvement is general and demand is improving. Sheet and pipe orders have improved in a satisfactory manner and in the latter case some carload business appeared; mostly for small sizes as used by steamfitters. The lack of interest by bar buyers is accounted for by the excessive stocks held by jobbers and consumers when drastic price cuts were announced and in consequence these stocks have moved slowly. Sheet business is better, due to growing interest on the part of motor car builders. A desirable local inquiry for an unusual tonnage in bolts and nuts is in the market and the competition for this business consisting of two carloads is more than ordinarily keen. Some belief is expressed that still lower prices will be forthcoming Sept. 1, but the number of small orders shows an increase from week to week. The prevailing bar price is 1.75c. and is steady. A local agency lost a desirable tonnage through its refusal to meet a 1.70c. price, but despite this rumors are current of bar prices as low as 1.60c. An inquiry is out for 150 tons of reinforcing bars for an interest at Carthage, N. Y., and about 350 tons of the same material will be bought by contractors erecting an addition to the plant of the American Hardwall Plaster Co., Utica, N. Y. Wire orders show steady and consistent gain and the mill concentrating on this business reports a normal demand. Tin plate is quiet and price cutting is reported occasionally. The Lackawanna Bridge Co. will fabricate 400 tons for a Niagara Falls high school. In structural mills orders ranging from one to 15 tons are eagerly sought—a contrast to the situation a year ago when business of that character was disregarded.

Warehouse Business.—Sheet prices have been reduced on three grades; on galvanized and black sheets the reductions are $5 a ton and on blue annealed $3 per ton. The volume of business has been steady and while no large tonnages have moved, orders are more frequent and for slightly larger quantities.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.30c.; galvanized steel sheets, No. 28 gage, 5.05c.; black sheets, No. 28 gage, 4.05c.; cold rolled strip steel, 6.40c.

Coke.—Several sizable inquiries not confined to blast furnace interests but commercial users are noted. There is a tendency to cover future needs, but this business is not particularly acceptable to the sellers. All sales are spot.

Old Material.—Three local mills are buying heavy melting steel and paying $13. Dealers look for an advance based on the fact that other points will pay more. A fair demand for hydraulic compressed has

appeared in several offices and feeling generally has taken on a more optimistic turn.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00

St. Louis

ST. LOUIS, Aug. 30.

Pig Iron.—A further improvement is noted in the demand for pig iron. This has been followed by an advance of $1 a ton, and a firm stand by producers to sell only at the market price. Some orders at the old prices have been declined. Inquiries this week include one for 1500 tons for immediate shipment, another for 1300 tons for delivery during the remainder of the year, and another for 300 tons. In addition, one concern has scattering inquiries involving about 2500 tons. Most orders that are being placed are for immediate shipment and buyers are demanding car numbers at once, so that shipments can be traced. The gray iron foundries are nearly all operating, a conservative estimate being 40 to 50 per cent of normal. The St. Louis Coke & Chemical Co., Granite City, banked its furnace on Thursday, with about 9000 tons on yard, most of which is less than 2.25 per cent in silicon.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago, and $5.74 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$23.88
Northern malleable, sil. 1.75 to 2.25	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25	24.74

Coke.—There is more buying of coke, and the market is stronger. Standard Connellsville foundry coke is 50c. higher at $4.50 to $5 per net ton at ovens and Wise county at $6. Local and nearby melters are operating on a larger scale, and such purchases as they make are for immediate shipment with eager calls for delivery at once. There is an improvement in the demand for domestic coke.

Finished Iron and Steel.—There seems to be lessening of interest this week in finished iron and steel. There were no sales to speak of, and the only inquiry of note was for 3000 kegs of track spikes from the Missouri Pacific Railroad for St. Louis delivery. A slight improvement in warehouse business during August as compared to July is reported, the business being mostly in sheets. Warehouse prices of sheets are lower, being the only change in prices.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, $4.50c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, 3.77½c. per 100 lb.; boiler rivets, 3.87½c.; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Old Material.—Activity in old material is near the vanishing point, but the market is in many respects stronger than a week ago, and nearly all grades have advanced 50c. per ton, despite lack of demand displayed by consumers. Rolling mill grades are quiet, and relaying rails have fallen off to a considerable extent. Heavy melting steel is not in demand, although some consumers are willing to take on tonnages at about $1 per ton under the present market. The following railroad lists are before the market this week: Wabash, 150 tons; Minneapolis, St. Paul & Sault Ste. Marie, 200 tons; open lists issued by the Cleveland, Chicago, Cincinnati & St. Louis, closing on Aug. 30, and New York Central, closing Sept. 8.

We quote dealers' prices f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton	
Iron rails	$13.00 to $13.50
Steel rails, re-rolling	12.00 to 12.50
Steel rails, less than 3 ft.	11.00 to 11.50
Relaying rails, standard section	29.00 to 30.00
Cast iron car wheels	12.00 to 12.50
No. 1 heavy railroad melting steel	10.50 to 11.00
No. 1 heavy shoveling steel	9.50 to 10.00
Ordinary shoveling steel	9.00 to 9.50
Frogs, switches and guards, cut apart	10.50 to 11.00
Ordinary bundle sheet	4.00 to 4.50
Per Net Ton	
Heavy axle and tire turnings	5.50 to 6.00
Iron angle bars	11.00 to 11.50
Steel angle bars	9.00 to 9.50
Iron car axles	16.50 to 17.00
Steel car axles	12.50 to 13.00
Wrought iron arch bars and transoms	13.00 to 13.50
No. 1 railroad wrought	10.00 to 10.50
No. 2 railroad wrought	9.50 to 10.00
Railroad springs	10.50 to 11.00
Steel couplers and knuckles	10.50 to 11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to 9.50
No. 1 dealer's forge	6.00 to 6.50
Cast iron borings	5.50 to 6.00
No. 1 busheling	9.50 to 10.00
No. 1 boilers cut in sheets and rings	6.00 to 6.50
No. 1 railroad casts	12.50 to 13.00
Stove plate and light cast	11.50 to 12.00
Railroad malleable	9.50 to 10.00
Agricultural malleable	9.00 to 9.50
Pipes and flues	7.00 to 7.50
Heavy railroad sheet and tank	6.00 to 6.50
Light railroad sheet	3.00 to 3.50
Railroad grate bars	8.50 to 9.00
Machine shop turnings	4.00 to 4.50
Country mixed iron	7.00 to 7.50
Uncut railroad mixed	8.00 to 8.50
Horseshoes	10.50 to 11.00
Railroad brake shoes	8.50 to 9.00

Cleveland

CLEVELAND, Aug. 30.

Iron Ore.—There is no activity in the ore market. A few consumers will probably have to buy some small lots before the close of the season of navigation but are not expected to come in the market before October. In view of the expected reduction in prices next year and probable lower freight rates, these consumers will buy only enough ore to carry them over until the opening of navigation next year. Lake Superior ore on hand at furnaces and Lake Erie docks Aug. 1 was approximately 32,600,000 gross tons as compared with 27,900,000 tons on the same day a year ago. Furnace stocks on Aug. 1 amounted to approximately 23,800,000. The consumption of Lake Superior ore during July was about 1,200,000 tons as compared with 1,470,000 tons during June.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The market was more active during the past week than for some time. One lake furnace interest sold 7000 to 8000 tons of foundry and malleable iron, mostly the former, in lots of from a carload up to 1000 tons. Another Cleveland interest sold 5000 to 6000 tons during the week, including 2000 tons of No. 2 foundry iron for prompt shipment at $20 to an Ohio pipe foundry and 700 tons of gray forge iron at the same price. One Valley furnace which has stiffened up somewhat on prices reports the sale of two lots aggregating 200 tons at $21. Sales reported include 1000 tons of malleable iron taken by a Detroit consumer. The spurt in buying is attributed to the fact that some foundries have run out of iron. There is no indication that the increased activity will keep up, as few inquiries are now pending. The only inquiries of any size reported is one for 250 tons of foundry iron from the Union Radiator Co. and one for 500 tons of malleable iron. The basic iron market is quiet and the price has not yet been established at $20, which is being quoted by several producers. Basic iron held by brokers can be purchased at $19 and probably at $18.50 or lower. Some of the Southern producers are a little firmer on foundry iron and small lot sales were

reported at $19, Birmingham, for 1.75 to 2.25 for silvery iron. The usual differential now named by Southern producers for 2.25 to 2.75 silicon iron is 50 cents. The Hanna Furnace Co. will blow in its Cherry Valley furnace at Leetonia, Ohio, Sept. 7 on basic iron.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.46 to $20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.37
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	36.00 to 36.25

Semi-Finished Steel.—Sheet bars are commonly quoted at $30, Youngstown. Sheet mills are buying only in small lots to take care of orders on their books. While slab prices are not as clearly established as sheet bars, it is understood that a Youngstown mill will quote $29 on slabs, making the usual $1 differential below sheet bars.

Finished Iron and Steel.—Following an improvement in orders noted a week ago, the demand for finished iron and steel fell off during the past week, but the total volume of business during August will show a fair gain over July. Buying is almost wholly in small lots for immediate delivery to replenish stocks. Keen competition has resulted in further price concessions. Steel bars, which for some time resisted efforts of buyers to force prices down, have finally weakened and can now be bought at 1.65c., although some mills are still quoting 1.70c. to 1.75c. Plates, on which competition is sharpest, have further declined, 1.70c. now being the common quotation as compared with 1.75c. a week ago, but a buyer can secure a 1.65c. price on a round lot order. On structural shapes, minimum quotations range from 1.70c. to 1.75c. Hard-steel reinforcing bars are quoted at 1.65c. to 1.70c. Building work shows some improvement. The American Bridge Co. has taken a warehouse at Manistee, Mich., requiring 1000 tons. Cleveland has taken bids for four school buildings requiring 900 tons of structural material and Elyria has taken bids for two school houses requiring 400 tons. The Cuyahoga County Commissioners, Cleveland, have taken bids for a bridge requiring 180 tons, and bids have been taken for the Eagles' office building, Alliance, requiring 300 tons. Inquiry is out for a stadium for the Detroit baseball park requiring 500 tons of structural material and 200 tons of reinforcing bars. Some price shading is reported on plain wire, but nail prices are reported firm.

Sheets.—The demand for sheets has quieted down and prices have weakened. Common quotations low are 2.75c. for black sheets, 2.25c. for blue annealed and 3.75c. for galvanized sheets, these apparently being minimum quotations.

Warehouse Business.—Jobbers have again reduced prices $3 a ton on blue annealed sheets and $5 a ton on galvanized sheets. Other warehouse prices are unchanged.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Coke.—Sales of foundry coke are still limited to car lots. Quotations on standard brands of Connellsville foundry coke range from $4.25 to $4.75 at oven, with most producers asking $4.50.

Bolts, Nuts and Rivets.—Manufacturers report an improvement in small lot orders for bolts and nuts. Consumers, however, are apparently buying only enough to take care of their regular requirements and orders from jobbers are for small lots to round out their stocks. Prices appear to be holding somewhat better than they have been recently. Prices on semi-finished hexagon nuts show some irregularity. The leading local producer is still adhering to 2.50c. for structural rivets and 2.60c. for boiler rivets and reports some carlot sales at these prices. Rivet quotations have appeared as low as 2.25c. for structural and 2.35c. for boiler for desirable orders.

Old Material.—Mills are buying small lots of scrap that they can secure at their prices and in the aggregate consumers have purchased during the past week or two considerable material in heavy melting steel, compressed steel, borings and turnings. Present prices are regarded as low as compared with pig iron prices and some consumers are evidently using more than the usual amount of scrap in their open-hearth furnaces. Dealers also are in the market for scrap for yard stocks. However, the supply is light and the market has a firm undertone. Some dealers believe that should a mill come into the market for a round tonnage of heavy melting steel, the price would jump to $15. Quotations are unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Philadelphia

PHILADELPHIA, Aug. 30.

The price tendency seems to be as follows: Raw materials, such as pig iron and old material, upward, and finished steel, downward. Some furnaces have raised pig iron prices 50c. during the week and another similar advance is contemplated by some after Labor Day. The market is settled at present at either $19.50 or $20 for No. 2 plain, the latter being the more general figure. No sales have been noted at less than $19.50 during the past week. A sizable inquiry for next year delivery has come into the market, though skepticism is expressed as to whether any furnace will quote so far in the future.

Very little business has come forth in finished steel and all who quote nominal prices admit that an attractive tonnage would bring out some vigorous cutting by the mills. Bids will be opened next month for 1000 tons of steel for a theater in Philadelphia. One inquiry calls for 2000 tons of plates to be made into storage tanks for an oil company. The railroads are among the chief buyers for car repair work, but only for small tonnages.

Pig Iron.—Price tendency is still upward, as more furnaces quote $20 for No. 2 plain and less name the $19.50 figure. One furnace which has been an active seller, parting with considerable iron at $18.50 two weeks ago, is now asking $19.50 and seriously contemplates a raise to $20 after Labor Day. Two reasons are advanced for the stiffening of the market: One, because the recent flurry of business has satisfied furnaces for the time being; the second, because sellers are convinced that as much iron will be sold under higher prices as under lower at this time. It is expected that the next two weeks will see less business, as is natural after a flurry like that of the past two weeks. One merchant disposed of 6000 tons of foundry iron last week, one being a sale of a 2000-ton lot, another of a 1000-ton lot, the rest in smaller amounts. There are two current inquiries for 400 tons of No. 1X, each, one from Reading and the other from New Jersey. One inquiry for 1000 to 1500 tons of foundry iron comes from a consumer in northern New Jersey, who recently bought iron for the remainder of the year delivery, this additional inquiry specifying delivery the first quarter of next year. It is not believed that furnaces will quote for so long in the future. No recent sales have been made of basic, though sellers claim that $19, furnace, would be insisted upon. A car of gray forge was sold at $19.50, furnace, the seller admitting that $1 lower might be named on a larger tonnage. Sellers find some relief in the fact that the market has become so stabilized

that there are practically only two market prices: $19.50 and $20 for No. 2 plain and $20 and $20.50 for No. 2X. An Eastern merchant furnace which has been continuously in blast all this year has received since June 15 about twice as many orders as were taken during the entire period from Jan. 1 to June 15, and the tonnage sold since June 15 is three or four times that sold from Jan. 1 to June 15. This furnace has shipped about 4500 tons of iron within the past week and during the past four weeks its shipments have averaged close to 1900 tons a week. In the preceding month, the shipments from the same furnace averaged slightly over 1000 tons a week. These figures illustrate the gain in pig iron buying in the East within the past few weeks.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.75 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.24 to 29.74
Basic deliv. eastern Pa.	19.00
Gray forge	20.00 to 21.00
Malleable	20.00 to 21.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—A sale of 60 tons of British ferromanganese was made Tuesday at $65, Baltimore, which price represents the market for imported material. Domestic producers strive to get $65, furnace, for this material, which means $70 or $75, delivered, depending on the destination. Spiegeleisen is generally quoted at $27. Inquiries and orders are increasing.

Semi-Finished Steel.—Recent sales in small quantities have established the prices of $30 for rerolling billets and $35 for forging quality, Pittsburgh. Sellers state these prices would be shaded in case of attractive tonnages.

Plates.—Though 1.85c., Pittsburgh, is nominally quoted universally, all admit that attractive business would bring out considerably lower figures. One maker names 1.75c. for sales in carloads and 1.85c. for less tonnages. Plates were bought by a railroad at 1.75c., eastern Pennsylvania mill, the practice of disregarding the Pittsburgh base becoming more popular as a means of shading prices. The Philadelphia & Reading bought 200 tons of plates recently and is now inquiring for 135 tons of tank plates. The Petroleum Iron Works is asking for 2000 tons of plates to be made into tanks for the Sinclair Oil Co. Some Southern railroads, including the Chesapeake & Ohio, the Norfolk & Western, the Western Maryland and the Seaboard Air Line, have been asking for car repair material, including plates, the last-named road to open bids on 400 tons of steel during the first week of September. It is estimated that the Stanley Theater in Philadelphia will take 150 tons of plates and that a bridge in Trenton, N. J., will need a fair tonnage.

Structural Material.—There is considerable future business in sight, judging by the data being gathered by architects and builders. The Stanley Theater, Philadelphia, will need about 1000 tons of steel, bids to be opened Sept. 15. The Southard Street bridge at Trenton, N. J., will require 540 tons of steel, bids to be opened Sept. 6. Those who have quoted 1.85c. for shapes have lost the business to competitors willing to make concessions. The practice of quoting f.o.b. eastern Pennsylvania mill is prevalent.

Warehouse Business.—Small price cuts have been made in four items, including iron bars. Inquiries and orders are fairly satisfactory, considering the depressed state of the steel industry.

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage 4.25c.; galvanized sheets, No. 28 gage, 5.25c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4.20c.; squares and hexagons, cold-rolled steel, 4.70c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Bars.—There is not so much softness as in the case of plates and shapes. The openly quoted price is 1.75c., Pittsburgh, though worth-while business would be transacted at 1.70c. There is better demand for reinforcing bars than for plain. The marine terminal at Wilmington, Del., will need 2000 tons of reinforcing bars, it is reported, an inquiry for 210 tons being now in the market. Railroads are the chief buyers for repair puposes.

Sheets.—Actual sales have established 2.25c., Pittsburgh, as a price for blue annealed sheets, with black quoted at 2.75c. A consumer who claimed he could buy the former at 2.15c. was glad to cover at 2.25c. Galvanized sheets are quoted at 3.75c.

Bolts, Nuts and Rivets.—The volume of inquiries is improving, the chief business being from railroads, particularly the Philadelphia & Reading. An attractive tonnage is expected to be asked for the marine terminal at Wilmington, Del.

Old Material.—The present is a restricted market—there are few buyers but rising prices. Though some heavy melting steel was purchased by a steel mill for $11.50, this comparatively low price was the result of the close proximity of the material to the plant. Otherwise higher prices would have been paid. The higher prices being paid by a prominent New York broker have had the effect of making the price tendency upward. The price of bundled sheets was raised 50c. when a company paid $9, delivered. Four hundred and fifty tons of relaying rails was purchased for the marine terminal at Wilmington, Del., for $38.

No. 1 heavy melting steel	$11.50 to $12.50
Scrap rail	11.50 to 12.50
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	14.00 to 15.00
No. 1 yard wrought	12.50 to 13.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Fabricating in Transit Privilege Approved

BIRMINGHAM, ALA., Aug. 30.—The Southeastern Freight Rate Committee to-day approved the fabricating in transit privilege on steel fabricated in Birmingham and other Southeastern points and recommended that all Southeastern carriers at once publish the same. Users of Pittsburgh and Youngstown steel will save $4 to $8 a ton. Chattanooga, Atlanta and other cities also get the privilege. The Louisville & Nashville and Southern railroads recommended this action to the freight rate committee.

Large Plate Tonnages Pending

YOUNGSTOWN, OHIO, Aug. 30.—District makers are figuring on two inquiries for plates aggregating 20,000 tons. Mexican oil interests are seeking 17,000 tons and the Baldwin Locomotive Co. the remainder. It is expected the larger tonnage will test the plate market and establish substantially lower prices than current quotations in case the business is placed.

The Cambria Steel Co. last Friday night turned on the blast at one of its idle blast furnaces at the Franklin works, Johnstown, Pa. This gives the company three active furnaces out of 11. It is stated that the putting on of this furnace was necessary because it was desired to build up the stocks of Bessemer steel. The Bessemer plant and a 48-in. blooming mill went on this week.

Steel Makers Heard in Metal Tariff

(*Continued from page 539*)

eastern steel plants at prohibitive prices. This is due to the high freight costs which will necessarily be charged.

"3. The Washington producer does not need protection to insure prosperity. The fact that the Washington production increased from 715 tons in 1916 to 222,000 tons in 1920 with magnesite on the free list is sufficient proof of the above statement.

"4. A heavy duty on magnesite will certainly tend to force steel makers to use dolomite as a refractory and the use of magnesite will tend to decrease.

"Ferrosilicon is mentioned especially as showing the very high duties proposed on some of the ferroalloys. At present the price of a domestic 50 per cent ferrosilicon is $60 per gross ton at Ohio points. A 50 per cent ferrosilicon means that it contains 50 per cent of silicon, therefore, a gross ton contains 1,120 lb. The duty proposed in the bill is 2½c. per lb. of silicon or for this grade, a duty of $28 per ton is proposed. This is nearly 50 per cent of the present selling price.

Iron and Silica Abundant Everywhere

"The materials entering into ferrosilicon are iron and silica, which are both abundant in all parts of the world. While a moderate duty might be advisable, we believe one that approximates 50 per cent of the selling price is excessive."

General Statement by John A. Topping

CHAIRMAN John A. Topping of the Republic Iron & Steel Co., spoke for the following independent manufacturers of steel:

Republic Iron & Steel Co.
Bethlehem Steel Co.
Midvale Steel & Ordnance Co.
Youngstown Sheet & Tube Co.
Jones & Laughlin Steel Co.
Brier Hill Steel Co.
Pittsburgh Steel Co.
Sharon Steel Hoop Co.
Interstate Iron & Steel Co.
Lackawanna Steel Co.
Gulf States Steel Co.
Inland Steel Co.
Lukens Steel Co.
Wheeling Steel Corporation.
Steel & Tube Co. of America.

Below is given Mr. Topping's statement nearly in full. Accompanying data as to foreign and domestic wages in iron and steel works, and rail and water freights on finished products will be published later.

As to the importance of the interests I represent, it is common knowledge, that the Iron and Steel business is the largest single industry in the world. The census report of the United States for 1914 credits the Steel Industry with a capital investment of nearly $4,300,000,000, with an annual payroll of over $723,000,000, and a total value of products of $3,223,000,000. Since 1914, under the stimulus of war demand the steel ingot capacity of this country was increased from about 40,000,000 tons to 55,000,000 tons, or an increase of about 37 per cent. Calculated on this increase, the present total number of steel employees, under full operations, would closely approximate 1,500,000 people, with an annual payroll of close to $1,000,000,000, based on the 1914 wage rates. This total payroll however, calculated on present wage rates, would bring the total annual wage disbursements to approximately $1,500,000,000, and the total value of products to approximately $3,500,000,000. As a result of this rapid growth in production, which was over-stimulated by war requirements, it is commonly agreed that the present productive capacity of the United States is in excess of its normal requirements. Therefore, if labor is to receive full employment hereafter, it will not only be important for us to maintain home demand at 100 per cent, but to seek an outlet for part of our surplus production in foreign markets. To make such a program possible, it will be necessary to minimize our cost of production in every possible manner, and to do this it will require the fullest co-operation, not only of capital and labor, but of the Government, the railroads and the shipping interests, if we are to hope for any success in foreign fields.

Must Export 20 Per Cent of Steel

During recent years the average export tonnage sold of iron and steel represented about 10 per cent of our total output. I think under conditions at home, it will now be necessary for us to export 20 per cent of our present capacity. These figures, I believe, are conservative, and seem to me to emphasize the importance of making every possible effort, Governmental and otherwise, for the protection of domestic trade, and for the promotion of foreign trade.

The steel manufacturers, when they discussed informally schedule 3 with the sub-committee of the Ways and Means Committee of the House of Representatives, indicated our willingness to accept both a classification and rates of duty under schedule 3 which averaged somewhat below the Payne-Aldrich schedule, but clearly stated that in so doing we must have the Payne-Aldrich free list unimpaired in the new tariff schedule, and must have as a further measure of protection some reasonable provision against dumping and other unfair practice, and also that provision should be made for reciprocity agreements for the encouragement of foreign trade.

We are strongly opposed to a number of paragraphs under several schedules of H. R. 7456, but we are in full accord with many of its general provisions. We are opposed to paragraph 1680 of schedule 15, and ask that this item be stricken out, and that barbed wire be placed where we think it properly belongs under schedule 3 and made dutiable, for the reason that there is no more justification for placing barbed wire on the free list than there would be to put any other finished iron and steel products on the free list.

We are strongly opposed to the provision of schedule 1, paragraph 47, and schedule 2, paragraph 207, also paragraphs 302, 386, 389 and 390 of schedule 3.

Our principal objection to these paragraphs is, that increased taxation is proposed on imports of these raw materials, which will materially increase our cost of production. While the cost per ton of steel, as influenced by the various items required for steel manufacture referred to in the paragraphs mentioned, might appear to be insignificant, yet they bulk large when the cumulative influence of these cost additions is considered as a total. In fact, the total increased cost, if imposed, will seriously weaken our competitive position.

We estimate, in other words, that iron and steel costs, by reason of the proposed tax on our raw materials, will be increased by the sum of approximately $24,000,000 per annum, estimated as follows:

	Annual Requirements	Proposed Tax	Tax Per Annum
Ferrosilicon 57% ad valorem	80,000 tons @	$37.05 per ton	$2 964,000
Fluorspar	300,000 tons @	5.00 per ton	1,500,000
Manganese ore 48%	750,000 tons @	10.75 per ton	8,062,500
Magnesite	150,000 tons @	10.00 per ton	1,500,000
Pig tin	61,949,922 lb. @	.02 per lb.	1,238.998
Zinc (first two yrs.)	426,986,416 lb. @	.02 per lb.	8,539,728
Total tax			$23,805,226

In addition to these items, further cost additions will be made on account of the proposed tax on lead. Considering the amount of lead used for roofing plate in the steel industry, the increase will add substantially to our total cost.

Aside from all questions of cost, these proposed taxes are inequitable, and cannot be supported or justified for the following reasons:

Fluorspar

Schedule 2, paragraph 207, is a mine or quarry product, the domestic supply of which principally comes from southern Illinois and northern Kentucky. This product is likewise an item of substantial importation, being imported largely by the Central Western and

Eastern steel manufacturers. The Illinois and Kentucky product, however, finds a market principally in the Central West, and other points distant from the seaboard. On account of the distance of these mines from the seaboard, and the protection which they enjoy by way of inland rates of freight, they are in no danger of foreign competition; in fact, the fluorspar interests have prospered heretofore under free trade, and there can be no possible reason for taxing the steel producers of the East at the rate of $5 per ton, or as an alternative force Eastern manufacturers to go West to obtain their fluorspar supplies, at an increased freight cost, which in many cases would exceed the amount of the duty proposed.

Magnesite

Magnesite is also a mine product, and is prepared for use by calcining or burning, the process of treatment being similar to that in the preparation of cement rock for use. Magnesite is also largely used in the manufacture of magnesite brick, paragraph 201, schedule 2. As to the fabricated magnesite or brick, the rate on this product should be relative to the duty allowed on other grades of fire brick. There can be no justification, however, for a duty on magnesite of $15 per ton, with a compensatory duty on the brick of $15 per ton, plus 10 per cent ad valorem.

The magnesite industry, like fluorspar, has prospered under free trade. The only known deposits of carbonate of magnesia, which is the rock required for calcining, and which after treatment, is called magnesite, are found in the States of Washington and California. A large business during the war was developed by the quarries in these States, and there can be no question of their ability to meet foreign competition in their natural markets, which would be St. Louis, Chicago, Pueblo and other western points where steel works are located. It would be practically impossible for imported magnesite to successfully compete with the Western producers, on account of the excessive cost for rail carriage from the Atlantic seaboard inland. This freight rate from seaboard to Chicago and St. Louis averages approximately $10 per ton, and to that extent serves as a protective tariff. But, all questions aside, why should quarried burnt rock, which carries a minimum of labor cost, require more protection than mined coal, when coked, which carries a much higher labor cost in its treatment, or why should the output of a magnesite mine be entitled to any more protection than is accorded the output of an iron mine? In fact, with the general products of all of our mines and quarries on the free list, and consistently free of duty heretofore, under Republican tariff legislation, we fail to see any reason why these products should now be made dutiable.

We further claim that a duty on magnesite would be an unfair discrimination against the smaller producers of steel, in favor of the United States Steel Corporation and other manufacturers at Chicago, because these Western steel works would obtain their supplies from Western domestic mines, whereas the Eastern makers of steel would be compelled to import foreign magnesite or pay the equivalent increased cost, in the long haul from the Pacific coast to Atlantic seaboard.

The United States Geographical Survey published, under date of July 27, 1921, a statement of our domestic reserves of magnesite, the aggregate of which was 3,500,000 tons. At the present rate of consumption, this reserve will be exhausted in ten years. As one of the principal owners of this reserve is the Northwest Magnesite Co., the proposed duty will practically give it a monopoly of domestic supply of this important refractory.

Manganese

Manganese, heretofore on the free list, is even more difficult to justify now as a dutiable product. The only explanation given for the change in the schedule on manganese was recently stated on the floor of the House of Representatives, viz., that the proposed duty was for the protection of the miners in Arkansas, Montana, Georgia and Florida, but it was not stated on the floor of the House, why the miners of manganese in these States went out of business when the war ended. The reason was, not because of free trade in manganese, but because there was no market for domestic lean and high-silicon manganese ores, when the richer foreign products of Brazil, India and Russia were again available.

As a war measure, the steel manufacturers used everything and anything which would make steel suitable for Governmental purposes for the prosecution of the war. Our main idea was tonnage and service for war purposes. Cost of production was forgotten in the interest of output, but with the advent of peace economic reason quickly reasserted itself and forced the abandonment of domestic manganese ores, except for such uses as had always been our practice, of using these leaner ores for the production of spiegel. We maintain, that if the ferromanganese producer in this country is to prosper he also must have free manganese ores, or in other words have the same opportunity for obtaining and smelting the richer and cheaper ores found in foreign fields, as are available to his foreign competitor. The American producer of ferromanganese, in our opinion, is at no disadvantage with his English, Belgian and German competitors, because all these manufacturers of ferromanganese depend upon imported ores, principally obtained from India, Russia and Brazil, and the producers of ferromanganese in this country are at no more disadvantage in meeting competition than is the manufacturer of pig iron, whose industry rests largely upon domestic supplies of ore, and largely so at other points of manufacture in other parts of the world.

Ferromanganese, the product of manganese ore, is a blast furnace product, it is manganese in the pig form; in other words, it is only entitled to a relative duty to pig iron, and there can be no justification in placing a duty on ferromanganese, the finished product, relatively greater than that accorded pig iron. If this is done, based on a fair difference in cost above the metallic charge, which is about three and a half times that of pig iron which is rated for duty at $1.25 per ton, the maximum duty justified for ferromanganese would be $4.25 per ton, whereas it is proposed to tax this essential product for steel production at the rate of 2.2c. per lb. for the manganese content, or at the rate of $39.42 per ton.

The burden of this extreme tax on ferromanganese would be borne largely by the smaller steel producers of the United States, because our principal competitor, the United States Steel Corporation, owns its own manganese mines in Brazil, and also owns transportation facilities by water, and partially by land, and it manufactures its own ferromanganese from its own imported ores, because owing to its large consumption, it can afford not only to operate one but several blast furnaces for its requirements, whereas the smaller producer of steel would not consume enough ferromanganese to absorb the output of even one blast furnace; consequently the entire tax burden placed on ferromanganese would fall on him, because he must buy, rather than produce, his supplies.

Furthermore, the proposed tax on manganese ores, to any steel works importing the ores, would mean a tax on about 2.2 tons of manganese ores, the amount required to produce one ton of ferromanganese, or a total duty of approximately $23.65, whereas the smaller steel works buying the ferromanganese or finished material would pay a tax of $39.42, which in effect suggests a tax discrimination of $15.77 per ton in favor of the U. S. Steel Corporation and others who produce their own ferromanganese, which discrimination places the smaller steel works at a serious disadvantage.

Aside from all these questions of equity respecting taxes on manganese ore, it is generally conceded that our supplies of manganese ores are of exceedingly meager proportions, and lean in character, and if you place a prohibitive duty on manganese, you may force the consumer to use the domestic product, which will more quickly exhaust our reserves, and therefore, as a matter of conservation or broad Governmental policy, all of these minerals, such as man-

ganese ores, fluorspar and magnesite, should be kept on the free list, for the protection of our country in times of war, when outside sources of supply of these very essential materials required for steel production might be shut off.

Other Metals and Alloys

I particularly desire to emphasize my opposition to the ferrosilicon rate, because this item is one of large importance to the manufacturers of soft steel. The other alloys however, not specially mentioned by me, are of no less importance to the manufacturers of special steels. I do not believe it will be contended by the manufacturers of these alloys, that they employ relatively speaking either as much capital or labor as is employed by the manufacturers of steel, whose operations are more widely diversified and integrated; therefore, it is difficult for us to understand why these manufacturers of alloys need the protection they ask, or why they need even the ad valorem equivalent asked by the manufacturers of steel, which averages about 15 per cent, whereas the proposed alloy duties range from 45 per cent to 215 per cent.

As to pig tin, paragraph 386; zinc, paragraph 390, and lead, paragraph 389 of schedule 3, there can be no justification for increasing our import taxes on these products, from a protective standpoint at least. The smelting of tin ores in this country is an industry which was established on a free trade basis, and the only plants operating are located on the Atlantic coast and use imported ores. Inasmuch as tin smelters everywhere operate under equal conditions as to raw material supplies, there can be no justification for showing preferential treatment to this domestic industry, which has demonstrated its ability to live and prosper without protection.

What is true of pig tin is likewise true of zinc, lead or other raw materials, and any added cost for these materials, through increased taxation, will be directly reflected in the cost of galvanized fencing, wire, pipe, and sheet metal products generally, which are largely used on the farms, in housing construction and for household wares. Therefore, increased taxes mean increased cost of living to the great mass of our people.

Aside from these reasons, any increase in cost would be an added burden difficult to overcome, in maintaining competition for our exportable surplus, and will bear most heavily on the small steel manufacturers, because here, too, the United States Steel Corporation produces in part its own zinc supplies and imports both its pig tin and zinc in its own bottoms.

Labor Conditions

Briefly, referring to our labor and general cost conditions, I would state that owing to the upset conditions now existent throughout the world, it is rather difficult to obtain full data. I shall submit later some general information on this subject as a supplemental statement.

As a broad, general statement, however, it can be said that a day's labor in America will buy more than double the necessaries of life which can be obtained with a day's labor anywhere else in the world, and that notwithstanding recent reduction in labor costs which have taken place in the steel trade, our present wage scales in the steel industry are about 52 per cent higher than during the year 1913, while our average selling prices are only 33 1/3 per cent higher; although our cost for assembling raw materials, due to freight rate advances, are up over 100 per cent, so that to-day the selling price of pig iron at $20 per ton carries with it freight charges to the amount of $10.50 per ton. In fact, to-day, with pig iron selling at $20, the maker does not realize enough cash to return him the cost of his raw materials and freight bills, he being out of pocket as to labor cost and overhead. What is true of pig iron is likewise true of finished products made from pig iron under the iron and steel schedule.

Worst Depression in History

In other words, the iron and steel business to-day is suffering from the greatest depression it has ever experienced, and we must have cost relief in every conceivable direction. Not only must our raw materials be cheapened, but our transportation costs must be reduced, if we are to get back to normal business conditions. If our raw materials are taxed on the present schedule under H. R. 7456, we will not, owing to high costs, have adequate protection, and schedule 3 rates will have to be raised, as an alternative for taxed steel raw materials. In other words, you must give us free raw materials or increase our iron and steel schedule and revise generally the iron and steel classification.

It may be stated in this connection that the present world tendency is toward protective tariff measures, with strong preferential features. This is notably true of the British possessions, whose colonial tariffs give England a distinct advantage through imperial preferences in such important markets as Canada, Australia and South Africa.

In view of this situation we strongly indorse the bargaining clause of H. R. 7456, which empowers the President to negotiate reciprocal treaties for the promotion of foreign trade, where sufficient trade advantages can be obtained to justify tariff concessions by us.

We also heartily approve of the bounty clause in H. R. 7456 as a reasonable measure of protection to home industry against the unfair competition caused by foreign Governmental bounties in favor of foreign products.

American Valuation Favored

We strongly approve of the American valuation plan, as a prevention against fraud and under-valuation, and also because the American valuation plan provides for protection against the unfair competition brought about through a dislocation of rates of exchange, which rates are now from 25 per cent to 94 per cent discount below pre-war normal.

I would further state that without the protection of the American valuation plan, the rates of duty for iron and steel under schedule 3 of H. R. 7456 are not protective. We do not agree with the opponents of the American valuation plan, who have condemned this feature of H. R. 7456, and who claim the administrative features of the plan are not practical. We, on the other hand, believe the administrative features of this plan can be easily made operative without confusion, because we believe that it will be easier to obtain the necessary data for appraising market prices at home than it now is to obtain market prices in foreign countries.

Another feature of the American valuation clause to which I would call your attention is that under the present law of 1913 paragraph K requires that all appraisements shall be based on the actual market value and wholesale price of merchandise, at time of exportation, in the principal markets of the country from whence products have been imported, and when values cannot be satisfactorily ascertained, paragraph L of the law of 1913 provides that our appraising officers after having failed to obtain cost of production at place of exportation, may appraise such or similar imported merchandise at not less than such or similar products are actually sold or freely offered for sale in the usual wholesale quantities, in the United States in the open markets, less cost of transportation and insurance, subject to a deduction for commissions or profits not to exceed 6 to 8 per cent.

It would therefore appear that as a practical measure the present law recognizes American valuation when other methods of valuation fail, thus emphasizing our claim that American values are more easily ascertained than are values and costs in foreign countries. Therefore, why not apply the American valuation as a primary method of determining values, rather than as a last resort method, as the law of 1913 provides.

The iron and steel industry, both on account of its size and importance, as related to many other industries dependent upon it, has always been regarded as the key industry, and therefore, struggling as we are in our efforts to get back to normal, would it not be fatal to future prosperity to reverse our past tariff policy, which has given us free raw materials and prosperity, by a change so fraught with danger to business success as is now proposed?

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.75c. to 1.80c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.35 to $2.50
Large boiler rivets..... 2.45 to 2.60
Small rivets.....65, 10 and 10 to 65, 10, 10 and 5 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer,
65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60 and 5 per cent off list
Larger and longer sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $40 to $42; chain rods, $40 to $42; screw stock rods, $45 to $47; rivet and bolt rods and other rods of that character, $40 to $42; high carbon rods, $48 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes, 9/16-in. and larger, $2.50 to $2.60 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.60c. to 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 1½	+27½
¼ to ⅜	53½	27	½	31½	13½
½	58½	44	¾	37½	22½
¾	62½	50	1 to 1½	39½	24½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	34½	20½
2½ to 6	60½	48	2½ to 6	37½	24½
7 to 12	57½	44	7 to 12	35½	22½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 9½	+42½
¼ to ⅜	49½	32	½	30½	18½
½	55½	44	¾	37½	23½
¾	60½	49	1 to 1½	39½	25½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	35½	22½
2½ to 4	58½	47	2½ to 4	38½	26½
4½ to 6	57½	46	4½ to 6	37½	25½
7 to 8	53½	40	7 to 8	30½	18½
9 to 12	48½	35	9 to 12	25½	13½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45	No. 28 (base)	2.75
Nos. 22 to 24	2.50	No. 29	2.85
Nos. 25 and 26	2.65	No. 30	2.95
No. 27	2.70		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75	Nos. 25 and 26	3.45
Nos. 12 to 14	2.85	No. 27	3.60
Nos. 15 and 16	3.00	No. 28 (base)	3.75
Nos. 17 to 21	3.15	No. 29	4.00
Nos. 22 to 24	3.30	No. 30	4.25

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55	No. 28 (base)	2.75
Nos. 17 to 21	2.60	No. 29	2.80
Nos. 22 to 24	2.65	No. 30	2.80
Nos. 25 to 27	2.70	Nos. 30½ and 31	2.85

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Aug.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
24	12.00	11.62½	25.62½	4.40	4.20	4.65	4.15
25	12.00	11.50	25.50	4.40	4.20	4.65	4.15
26	12.00	11.37½	26.00	4.40	4.20	4.65	4.15
27	12.00	11.50	....	4.40	4.20	4.65	4.15
29	12.00	11.62½	26.25	4.40	4.20	4.62½	4.12½
30	12.00	11.62½	26.75	4.40	4.20	4.62½	4.12½

New York

NEW YORK, Aug. 30.

There is very little change in any of the markets. Buying of copper is light and prices are lower. The movement in tin has been of fair proportions. The lead market continues steady and firm. Demand for zinc is still very light and prices have again eased off.

Copper.—Copper has touched new low levels in the past week, electrolytic having sold for early delivery as low as 11.37½c., New York, or 11.62½c., delivered, but only from one or two sellers. Whether this is due to the recent tendency of some holders to convert metal into cash at the end of the month is not known, but it is probably the explanation. At any rate, very little metal is now available at lower than 11.75c., delivered, with the prevailing quotation for early delivery ruling at 11.87½c., delivered, or 11.62½c., New York. Inquiry is fairly large from various sources and it is probable that if buyers could obtain the metal at their ideas of prices a fair buying movement would result, but most producers will not sell below 12c., delivered. The market for Lake copper is entirely nominal.

Tin.—Steady sales of Straits tin are reported to have been made each day in the past week in a quiet way, so that the aggregate has amounted to a fair total. Most of these sales have been made by two importers with dealers and consumers the buyers. At certain times there was a firm desire on the part of some sellers to get rid of their tin in spite of an advancing market in London. Yesterday and to-day the market has been very quiet, buying being absent because of the higher prices. Spot Straits tin is quoted to-day at 26.75c., New York. The quotations in the London market were £156 10s. for spot standard, £158 15s. for future standard and £157 5s. for spot Straits, total sales amounting to 800 tons and the market reported strong. Arrivals thus far this month have been 2500 tons, with 3340 tons reported afloat. It is stated that one American consumer bought 1000 tons direct from the Far East.

Lead.—The market is quiet and firm. A steady business is reported both by the leading interest and by outside sellers. Quotations are unchanged, that of the leading interest being 4.40c., both New York and St. Louis, and that of the outside market 4.40c., New York, and 4.20c., St. Louis.

Zinc.—Demand for zinc is extremely light and, as the result of offerings by one or two interests, prices are lower and prime Western for early delivery is quoted and has been sold as low as 4.12½c., St. Louis, and 4.62½c., New York.

Old Metals.—The market is dull and very little business is being transacted. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.50
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Antimony.—The market is unchanged with wholesale lots for early delivery quoted at 4.50c., New York, duty paid.

Aluminum.—Virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery, is quoted by the leading producer at 24.50c., f.o.b. plant, while the same grade from importers is held at 19c. to 20c., New York, duty paid.

Chicago

AUG. 30.—While there has been some buying of all of the metals except tin, it has been of a spasmodic character. Tin, lead and antimony have declined and spelter and copper are weak. No changes are to be noted in old metal prices. We quote in carload lots, tin, 27.50c.; lead, 4.30c.; in less than carload lots, antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c. All buying prices for less than carload lots.

St. Louis

AUG. 30.—There is almost no business reported. Lead is steady at 4.25c., carlots, and zinc is steady at 4.15c. We quote Lake copper at 12.48½c., to 12.73½c., carlots; tin, 26.86c.; antimony, 5.23½c. On old metals, we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

British Makers of High Speed Steel Protest

WASHINGTON, Aug. 30.—Representing a delegation of producers of high speed steel in Sheffield, England, Arthur Balfour of Arthur Balfour & Co. appeared before the Senate Finance Committee this morning and suggested a reduction in the rates proposed in the Fordney tariff bill. In paragraph 304, Mr. Balfour said he thought the rate of duty of 20 per cent proposed on steel valued above 40c. per lb. should be reduced to 10 per cent and in paragraph 305 suggested that a compensating duty of 72c. per lb. on tungsten content should be reduced to 35c. per lb. He claimed that if the proposed rates become operative, Sheffield high speed steel makers will have the American market, with which they have long been associated, entirely cut off. He also expressed opposition to American valuation. In mentioning the depressed condition of industry and increased costs in England, the reply made by Senator Smoot was that the same condition prevails here. Senator Smoot asked if English makers would be satisfied with a tariff representing the difference in labor cost and equalizing exchange. Mr. Balfour replied they would be, provided it is not made permanent and the high tariff did not remain in effect. He said the cost of making high speed steel in England is greater than in the United States and that he earnestly hoped trading with this country would be allowed to continue so as to aid industry as well as stabilize the exchange situation.

Nickel Plant Will Close

TORONTO, ONT., Aug. 29.—The huge smelter, mines, and works of the International Nickel of Canada will close down Sept. 1, for an indefinite period, according to official announcement made at the Coppercluff, Ont., office. Operations have been curtailed to a minimum for months past and the closing down announcement was not unexpected. Business depression and the resultant piling up of heavy metallic stock, due to lack of market, is given as the reason. Six hundred employees, nearly all old hands are affected. During the war, however, upwards of 2500 men were employed.

British Iron and Steel Market

Activity Increasing—Three More Furnaces Blowing—Continental Steel Competition Hurts

(By Cable)

LONDON, ENGLAND, Aug. 30.

Fourteen Cleveland blast furnaces are now blowing, a gain of three since last week, but the general pig iron position is unchanged. Hematite is more active and supplies are scarce, but makers are not anxious to re-light their furnaces until production costs are reduced. Continental basic iron is arriving in fair quantities at £4 5s. ($15.72) ex-ship Tees.

Improvement in the British steel position is evidenced by the starting up of several works. Orders have been placed here for 50 tank steamers; also, a large contract for passenger ships is pending. Baldwin's secured a rail order for China. Home trade quotations are unchanged, but export figures are easier.

Continental semi-finished steel prices are hardening, good tonnages of sheet bars having been sold at £7 to £7 5s. ($25.90 to $26.82) c.i.f. German merchant bars are quoted by the works up to £8 10s. (1.40c. per lb.) f.o.b. German galvanized wire is being sold at £15 15s. (2.60c. per lb.) basis, for No. 8 gage, cost and freight to Japan. German wire nails can be done at 22¼s. ($4.12) cost and freight to Japan per pikul keg for December shipment. French plates are held at £8 2½s. (1.34c. per lb.) f.o.b. Merchants have sold Belgian or German merchant bars, at seller's option, at £7 15s. (1.28c. per lb.) f.o.b., for October or November shipment. Belgian wire and sheet mill output is affected by strikes.

Tin plates are easier with cheaper fuel. Eastern buying continues in fair quantities, and is the main support of the market. Sellers are asking 23½s. ($4.35) prompt and 22½s. ($4.16) f.o.b. for forward shipment. War stocks of canned foods are now liquidated, except in meats, which Russia will probably absorb. Galvanized sheets are weak, small sales having been made at £20 10s. (3.39c. per lb.) f.o.b. Wales sold to Japan specifications black sheets at £19 10s. (3.22c. per lb.) f.o.b.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.70 per £1 as follows:

Durham coke, delivered	£1 15	$6.47
Cleveland basic	7 7½ & 7 10*	27.29 & $27.75
Cleveland No. 1 foundry	7 0	25.90
Cleveland No. 3 foundry	6 15	24.97
Cleveland No. 4 foundry	6 10	24.05
Cleveland No. 4 forge	5 17½	21.74
Hematite	7 0*	25.90
East Coast mixed	8 0 & 7 15*	29.60 & 28.67
Ferromanganese	18 0 & 14 10*	66.60 & 53.65
Rails, 60 lb. and up	10 10 to 14 0	38.85 to 51.80
Billets	8 0 to 8 10	29.60 to 31.45
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.60 to 31.45
Tin plate base box	1 2½ to 1 3½	4.16 to 4.35
		C. per Lb.
Ship plates	13 10 to 14 0	2.23 to 2.31
Boiler plates	18 0 to 19 0	2.97 to 3.14
Tees	13 10 to 14 10	2.23 to 2.39
Channels	12 15 to 13 15	2.21 to 2.27
Beams	12 10 to 13 10	2.06 to 2.23
Round bars, ¾ to 3 in.	12 10 to 13 10	2.06 to 2.23
Galvanized sheets, 24 g.	20 10 to 21 0	3.39 to 3.47
Black sheets	17 0	2.81
Steel hoops	17 0	2.81
Cold rolled steel strip, 20 g.	26 10	4.38

*Export price.

GERMAN COMPETITION

No Effort to Be Made to Sell in United States—Japanese Buying Largely in Europe

NEW YORK, Aug. 30.—Representatives of German interests in New York consider that competition in iron and steel with American manufacturers, except in a few special materials, is remote. The attitude of German mill interests since the armistice and at present is explained as one of "hands off" as far as competition in the United States is concerned. They believe that any success in such trade would be only temporary, as they would be stopped by cutting of prices by American mills and special tariff barriers enacted against German materials. Added to this, according to the men in close touch with German mills, manufacturers will soon be well filled with orders for several months. Within the past week a representative of a large German interest cabled a plate inquiry of about 1000 tons to Germany and was informed that no delivery could be promised under one year on plates, as the plate mill was booked solid.

With low-priced coal and the depreciated condition of the mark in international exchange, German production costs appear at a minimum. But as coal shipments to France and Belgium in accordance with the terms of the reparations agreement are based upon the internal price of coal in Germany, an effort is being made by the Government to bring this price up by taxation. The mark is also considered by Germany to be too low in value, and an effort is being made to bring the value up to about 10 per cent of the pre-war or par value, which would be about 2.40c. per mark instead of the current rate of about 1.30c. With the value of the mark increased and coal increased in price, German prices will be considerably higher, and as the mills are rapidly filling up with orders, poor deliveries, it is held, will tend to lessen German competition in foreign markets.

While German interests at present have no intention of attempting anything resembling aggressive selling in the American market, representatives of foreign interests believe that some effort may soon be made to sell ore and other raw materials in this market when there is some recovery from the present depressed condition. At present German prices and under the prevailing exchange rates, it is stated that 60 per cent low phosphorus iron ore from German-owned Swedish fields can be put down on the Atlantic seaboard at about $6.50 per ton, and an effort may be made to sell to furnaces that are not too far inland. It is also stated that German ferromanganese can be imported to sell at $64 per ton, Pittsburgh. With a recent reduction of about 20 per cent on Swedish bar iron, high speed steel, etc., it may be possible to import some Swedish material profitably.

The Japanese market is dull, with prices of iron and steel at a low level. Much of the buying of iron and steel in Japan is being done in Germany, Belgium and other Continental markets, according to reports received by Japanese branch export houses in the United States. It is estimated by some Japanese exporters that as much as 80 per cent of the current purchases of iron and steel items are being made in Europe, with the remaining 20 per cent coming to the United States.

Among recent export sales may be mentioned about 2000 boxes of tin plate, several hundred tons of wire nails to South America, and a round lot of skelp to Europe.

For supplying information on the Peruvian import market, a Peruvian General Information Office, Calle de San Pedro 370 (Altos), Lima, Peru, has been opened by Profs. J. B. and J. A. de Lavalle, the former a lawyer and the latter an engineer. Charges will be made for information supplied, depending on the importance and the technical work required and covering such matters as the examination of industries and the handling of buying and selling. Luis Ibarra, Cinco de Mayo No. 10, Mexico, D. F., is interested in tractors, agricultural implements and road-making machinery, and wishes to receive catalogs and prices on this type of machinery, quoted f.o.b. New York.

Machine Tool Builders' Convention in October

The annual convention of the National Machine Tool Builders' Association will be held Oct. 18, 19 and 20 at the Hotel Astor, New York.

PERSONAL

Carl F. Dietz, vice-president and sales manager of the Norton Co., Worcester, Mass., has resigned to become president and general manager of the Bridgeport Brass Co., Bridgeport, Conn. He will finally sever his connection with the Norton Co., Oct. 1, when he will assume his new duties at Bridgeport. He succeeds as president Fred J. Kingsbury, of New Haven, who wishes to be relieved of some of his responsibilities and becomes chairman of the board of directors. Mr. Dietz will also be general manager. He has been connected with the Norton Co. for 10 years, first as plant engineer, then as assistant sales manager, and afterward as sales manager of the wheel division of the business, and two years ago when the Norton Co. and the Norton Grinding Co. were consolidated he was made vice-president and sales manager. He was born in New York, Feb. 12, 1880, and was graduated from Stevens Institute of Technology in 1901, and subsequently took post graduate courses in the Royal Technical College, Berlin, in sciences, metallurgy and mining. Early in his career he was employed for three years at plants of the United States Steel Corporation, largely in blast furnace operation and large gas engine installations. In 1905 he engaged in development of zinc-smelting processes, and later operated a mining lease in Utah, installing a dry method for concentrating lead-silver ores. He designed and built modern ore-milling plants for the American Glue Co., as a part of its sandpaper factory at East Walpole, Mass.; Grunelli Chemical Co., Park City, Utah, where the separation of iron and zinc sulphides was the problem; and the Ozark Smelting & Mining Co., Magdalena, N. M., where zinc ore required concentration for paint making. In 1908 he joined the Minerals Separation, Ltd., London, as consulting engineer and in the interest of this company developed treatment methods at the Dunderland iron ore deposits in Norway, north of the Arctic Circle, and studied ore treatment methods for properties in Russia, Bolivia, Australia and Africa. He put into operation the San Francisco del Oro mines in Mexico, yielding complex lead and silver ores. He is a member of the American Society of Mechanical Engineers and the American Institute of Mining and Metallurgical Engineers.

Vice-President William Le Coste Neilson, foreign sales manager of the Norton Co., with headquarters in London, who is now on his way to the United States, will succeed Carl F. Dietz as sales manager of the Norton Co.

Robert B. Moir has been appointed manager of the New York branch of the W. A. Jones Foundry & Machine Co., Chicago. He will assume his new duties immediately, making his headquarters at the present sales office and transmission warehouse of this company at 20 Murray Street. Mr. Moir has been actively connected with the home office and factory for several years.

F. C. Wiese is organizing the sales department of Amplex, Inc., importer of S&N beam shears, solid steel frame combination punches and shears and Hercules angle bending machines. R. Bauer, formerly with Joseph T. Ryerson & Son, has been placed in charge of the metropolitan district.

H. E. Mandel has severed his connection with the Lindsay Chaplet & Mfg. Co., and is now general manager of the Pennsylvania Foundry Supply Co., Philadelphia.

The Columbia Steel & Shafting Co., Pittsburgh, announces that effective Sept. 1, Harwell C. Booth, has been appointed district manager of sales for New York, succeeding Edward T. Corbus, who will assume important duties elsewhere for the organization. Mr. Booth has been associated with the cold finished steel industry for a considerable period and during the last few years has been identified with this company as sales representative in Connecticut and eastern New York.

L. Norris Hall, vice-president Pennsylvania Steel Export Co., and W. W. Baker & Co., has resigned from both companies to take effect Sept. 1, and has leased a concrete warehouse at 940 North Front Street, Philadelphia, where he expects to engage in the steel jobbing business. Prior to joining the export company he served about 16 years in the Philadelphia sales office of the Carnegie Steel Co.

Frank Johnson, automotive engineer, has joined the engineering staff of the Cadillac Motor Car Co., Detroit.

At a recent meeting of the board of directors of the Hurley Machine Co., Chicago, the number of vice-presidents was increased from three to five, Edward N. Hurley, Jr., and James A. McCoy being elected to the two vacancies created. John Proudfoot, formerly assistant treasurer of the company, was elected treasurer to succeed Mr. McCoy.

F. Baackes, vice-president and general sales agent American Steel & Wire Co., Chicago, announces the appointment of H. S. Durant as sales agent and M. W. Floto assistant sales agent at the Detroit office of the company, to succeed M. Whaling and T. J. Usher, Jr., resigned.

Arthur Balfour, of Arthur Balfour & Co., and Peter Macgregor, of Sanderson & Newbould, both well-known steel manufacturers of Sheffield, England, are now in this country on a business trip.

Howard A. Coffin, formerly secretary of the Detroit Pressed Steel Co. and manager of that company's Disteel wheel division, has been elected vice-president of the White Star Refining Co., manufacturer of lubricants, with a plant in Detroit and a fuel storage warehouse in Ecorse, Mich.

J. J. Dale, president Dale Machinery Co., New York and Chicago, has removed his place of residence to the latter city. He will continue to divide his time between his Chicago and New York stores, and the latter, as heretofore, will remain the head office of the company.

Prof. A. A. Aagaard has been appointed assistant professor of steam and gas engineering in the College of Engineering, University of Wisconsin.

K. E. Steinhauer, attorney for the Federal Trade Commission, and H. G. Pickering, attorney for the Western Association of Rolled Steel Consumers, spent two days in St. Louis last week, collecting evidence for the commission's hearings in September on the Pittsburgh plus plan. Local manufacturers and fabricators were interviewed.

Ira N. Hollis, president Worcester Polytechnic Institute, Worcester, Mass., has returned to that city following a trip abroad. Dr. Hollis went to London as one of the delegation from the engineering societies of the United States chosen to present the John Fritz medal to Sir Robert A. Hadfield.

R. W. Andrews who has been with the Fairbanks Co. for the last seventeen years, the past year and half as manager of the branch at Rochester, N. Y., has resigned and is contemplating going into business.

D. D. Lewis has been appointed general manager of the Carroll Foundry & Machine Co., Bucyrus, Ohio. Mr. Lewis was formerly general manager of the Southward Foundry & Machine Co., Philadelphia, and also served as general manager of the Buckeye Engine Co., Salem, Ohio. He had also been identified at times with the Cambria Steel Co., the Jones & Laughlin Steel Co. and the Algoma Steel Co. He was associated with the late Tom L. Johnson when the latter built the Johnson steel plant at Lorain, Ohio. W. E. Matthew, who has been general secretary and manager of the Carroll company for the past year, will devote his time exclusively to the Lambert boring mill branch of the company's business and will continue to act as secretary of the company and as a member of the executive committee.

J. C. Ward, Sheffield, England, president Edgar Allen Steel Co., Inc., Chicago, and a managing director of Edgar Allen & Co., operating the Imperial Steel Works at Sheffield, is now in the United States.

Samuel Mather and W. G. Mather, Cleveland, sailed for Europe Aug. 24.

Chas. H. Kittenering, president Defiance Machine Works, Defiance, Ohio, has been appointed special representative in the United States to act for the Chinese Government in the purchase of machinery to be used in various development projects in China, including railroads, water power, canals, telegraph, etc. The Kettenering interests had previously been selected to supply motor trucks and transportation equipment for China. It is stated that a large part of the equipment required will be supplied by the Defiance Machine Works, Defiance Motor Truck Co. and the Highway Engine Co. of Defiance.

Sydney Jessop Robinson, of William Jessop & Sons, Sheffield, probably the most frequent visitor to the United States among British steel makers in the past 25 years, arrived in New York last week for a stay of three or four weeks.

OBITUARY

BENJAMIN H. JONES, president Smith & Davis Mfg. Co., St. Louis, metal beds, died in that city on Aug. 22 of a complication of blood poisoning and pneumonia after an illness of three weeks. He was 64 years old. He had been with the Smith & Davis company since he was 12 years old.

FRED ABBOTT DEXTER, founder of the Leavitt Machine Co., Orange, Mass., valve reseating machines, etc., died Aug. 26 at his home, aged 58 years.

PERCY M. FOWL, 37 years old, president Cadillac Tool Co., Detroit, died on Aug. 24, at Harper Hospital, that city. He was born in Elyria, Ohio, and went to Detroit in 1907. He was employed at various times by the Ford Motor Co., the Burroughs Adding Machine Co., and later was Detroit manager for Strong, Carlisle & Hammond. He became president of the Cadillac Tool Co. in 1917.

FRANK J. SMITH, district engineer, American Can Co., Chicago, died Aug. 21, at his home in Oak Park, Ill., aged 44. The first oil pipe line across the Panama Canal was constructed under Mr. Smith's supervision. He later had charge of the establishment of pipe lines and storage tanks in Venezuela and Cuba.

DANIEL SOLLINGER, aged 63 years, died at his home in Chicago on Aug. 24. His entire life had been spent in the iron and steel business. He was early employed at the Wyandotte Rolling Mill Co. and later at the old Bridgeport rail mill of the Illinois Steel Co. For more than 20 years he was in the employ of Robert W. Hunt & Co., engineers, Chicago, for most of which time he was in charge of inspecting rails at the South works of the Illinois Steel Co.

MICHAEL KENNEDY, secretary and treasurer Shenango Machine Co., Sharon, Pa., died at his home in that city Aug. 23. He was 53 years old and a native of Stoneboro, Pa. He took an active interest in politics and was a member of the Pennsylvania legislature during the 1909-10 term.

PETER COOPER HEWITT, scientist and inventor, died in Paris Aug. 25. He was born in New York Mar. 5, 1861, and educated at Stevens Institute and at the Columbia School of Mines. His inventions covered many fields, including evaporators, centrifugal machines, automotive details, the Cooper-Hewitt mercury vapor lamp, the static converter or rectifier, the electrical interrupter or circuit breaker, a wireless receiver, helicopter, etc. He was for a number of years vice-president of the Pequest Co., which operated the Pequest furnace at Buttzville, N. J. This furnace was built in 1874, and was dismantled a few years ago. Mr. Hewitt was a director or trustee of many enterprises, and a member of many societies and clubs, including the Engineers' Club of New York. He was a son of Abram S. Hewitt, formerly mayor of New York, member of Congress and well-known iron master of Civil War and later days, who, in an address made when the members of the Iron and Steel Institute came from England to visit the United States in 1890, predicted the doubling of the output of American pig iron every ten years.

FRANK D. MOFFAT of Frank D. Moffat & Co., New York, and New England agent for the Atlas Steel Casting Co., and the Bay City Forge Co., died at the Hotel Vanderbilt, New York, Aug. 20. His death followed a brief illness upon his return from abroad recently. He was 61 years of age and had been identified with the pig iron and coke business for many years.

ALBERT H. CHILDS, retired iron broker, died Aug. 26, at his summer home near Port Hope, Ontario. Mr. Childs was 82 years old. He was born in Pittsburgh and received his early education there, afterward going to Yale. Returning to Pittsburgh, he engaged in the iron brokerage business, from which he retired several years ago.

EDWARD A. CRAIG, manager of the export department, Westinghouse Air Brake Co., died Aug. 28, at his home in Edgewood, Pa., after a brief illness. He was born in Allegheny, Pa., 48 years ago and as a boy entered the employ of the Westinghouse Air Brake Co. as a messenger. He later became secretary to the general superintendent of the plant then located at Allegheny, then became assistant auditor, then auditor, and later manager of the southeastern district. About two years ago, when the company organized its export department, he was appointed its manager. Recently he had been appointed president of the Westinghouse Pacific Coast Brake Co., and Pacific Coast district manager of the company. It was while preparing to assume that position that the illness which resulted in his death overtook him.

JAMES SWEENEY, until 1919 treasurer of the W. H. Sweeney Mfg. Co., nickel-plate ware, Brooklyn, N. Y., died at his home in that city Aug. 23. He was born at Napanee, Ont., Canada, March 3, 1847. He retired two years ago, taking up the treasurership of the Sweeny Realty Co.

LOUIS J. GOLDMAN, president of the Cincinnati Electrical Tool Co., Cincinnati, died at his home in that city Aug. 22, aged 71. He was a national figure in Jewish activities. A son, J. Albert Goldman, is treasurer of the Cincinnati Electrical Tool Co.

ALBERT H. WINSLOW, manager of the appropriations department of the National Lamp Works plant, Nela Park, Cleveland, of the General Electric Co., was killed in an automobile accident Aug. 26. He was 56 years of age and had been connected with the National Lamp Works about 20 years.

BAYARD PHILLIPS, treasurer Phillips-McLaren Co., Pittsburgh, died at the St. Joseph Hospital, Pittsburgh, Aug. 30, following a surgical operation. Mr. Phillips was well known in Pittsburgh iron and steel and business circles, as he was secretary of the Pittsburgh Foundrymen's Association and a number of other business organizations. He was born in Glenfield, Pa., June 30, 1879. He was graduated from Washington & Jefferson College in the class of 1898 and from the medical school of the University of Pittsburgh in 1901. He practised medicine for about four years, having been company physician for the Pressed Steel Car Co. from 1902 to 1906. In the latter year he became identified with the Phillips-McLaren Co., in which his family had been interested since its organization many years ago.

The Valley Mould & Iron Corporation, Sharpsville, Pa., will resume within the next 10 days on a 50 per cent basis, after a prolonged suspension. The Shenango Furnace Co., a merchant interest, will start its No. 2 blast furnace at Sharpsville on Sept. 10.

Machinery Markets and News of the Works

HOPES FOR SEPTEMBER

Prospects Developing in August Indicate Better Business Coming

Santa Fe Has Out New List—Three Price Reductions Announced

The trade has sanguine hopes that September will be one of the best months of the year. The increased inquiries and prospective business which developed in August are responsible for that more optimistic feeling. Actual business in August was generally no better than that of July, New England reporting it the quietest month of the year, Cincinnati suggesting that with many dealers, at least, it has considerably surpassed the preceding month.

The Santa Fe is now asking for eight machine tools for its shops at Argentine, Kan., and will possibly seek more equipment for Albuquerque, N. M., and for its coast lines. The H. A. Smith Machinery Co., Syracuse, N. Y., is asking for about a dozen machines for its own prospective customers.

The Board of Education, Canton, Ohio, rejected all bids when some manufacturers wired reductions from 10 to 20 per cent, and will receive new bids Sept. 16 on a revised list of 21 machines.

Recent price reductions include the following: 20 per cent by the South Bend Lathe Works, South Bend, Ind.; 12½ per cent by an Eastern manufacturer of milling machines, drill presses, hand screw machines and profiling machines; 15 per cent by a Wisconsin maker of tool grinders.

A central Massachusetts forging company has purchased 10 used Waterbury-Farrel Foundry & Machine Co. presses and hardening and tempering equipment from Bridgeport, Conn., interests. The Hartford-Springfield Street Railway Co., Warehouse Point, Conn., bought six machines from a Springfield, Mass., concern. The International Nickel Co., New York, has bought seven gate shears for its new plant at Huntington, W. Va.

Most of the foreign inquiries come from the Far East, there being one inquiry for seven lathes for Manchuria. Belgian agents inform American tool builders that it is practically impossible to sell high grade American tools in the face of German competition.

New York

NEW YORK, Aug. 30.

While machine-tool sellers are not expecting much railroad buying this year, there is a good deal of interest in tentative preparations which the roads are making for next year. The New York Central, for example, has included about $300,000 worth of machine tools in its 1922 budget. Purchases of these machines will, of course, be contingent on the financial situation.

One of the largest transactions of the week was the purchase of seven gate shears by the International Nickel Co., New York, for its new plant at Huntington, W. Va. The order went to a Pittsburgh company. The American Sugar Refining Co. is placing orders against its recent list, now pared down to about a dozen machines, and the Durant Motor Co. continues to buy a few tools for its assembling plant at Long Island City. A few orders have been placed by Stone & Webster, Boston, for the new Fordson tractor assembling plant at Green Island, Troy, N. Y.

Foreign inquiries come almost entirely from the Far East. Such inquiries, however, are frequently duplicated, as for example, one for seven lathes for Manchuria, which has been sent out for quotations by at least four New York export houses. American tool builders are advised by their Belgian agents that it is almost impossible to sell high-class American tools in competition with the low-priced German tools.

The dull condition of the crane market in this district continues. Sales of electric overhead cranes are particularly inactive, but there is a fair volume of inquiries in the locomotive crane field, and sales of hand power cranes, although small, are considerably more numerous than the sales of electric cranes. Some business has evidently been stimulated by the lower prices now prevailing among builders of hand power cranes. An inquiry is in the market from the William Steele & Sons Co., Philadelphia, for a 6-ton, 70-ft. span bucket crane and two 3-ton overhead traveling cranes. The American Locomotive Co. has asked for quotations on a 2-ton, 40-ft. span overhead traveling crane for its Dunkirk plant. A request for bids on specification 4509 has been issued by the Bureau of Yards and Docks, Navy Department, Washington, calling for a 10-ton hand power crane for the Bureau of Mines depot, Yorktown, Va.

On the two 3-ton portal cranes for the Gowanus Canal, purchased by New York State, the lowest bid was submitted by the Lambert Hoisting Engine Co., Newark, N. J., quoting $25,590 for the two cranes; Pawling & Harnischfeger Co. quoted $25,950; Heyl & Patterson, $29,720; Manning, Maxwell & Moore, $29,960, and the Wellman-Seaver-Morgan Co., $32,800. The rumored purchase of cranes by the American Dock & Terminal Co. at Tompkinsville, Staten Island, consisted of two 2000-lb. capacity electric hoists, for warehouses, purchased from the Lidgerwood Mfg. Co. Further purchases of electric hoists may be made. Tenders on the 34 3-ton cranes for the Stapleton, Staten Island, piers being built by the city of New York for the Pan-American Terminal & Dock Co. will probably be issued in about one week by the Commissioner of Docks. The Kentucky & West Virginia Power Co. has purchased a 15-ton hand power crane from the Reading Chain & Block Corporation. The Lancaster Wrecking Co., Lancaster, Pa., desires catalogs and prices from manufacturers of crawl tread locomotive cranes.

The Wheeler Co., care of the Graham Beach Realty Co., Brooklyn, has acquired 17 lots on Coney Island Creek, Flatbush section, for the establishment of a new shipbuilding works, to specialize in the construction and repair of small vessels.

The Bernard Mailing Machine Co., New York, has been incorporated with a capital of $50,000 by J. Wile, F. McCarthy and T. Donohue, to manufacture mailing and addressing machines and parts. It is represented by Henry Hoeltjes, 95 Madison Avenue.

The Fordham Plaza Auto Co., Inc., 1856 Bath Avenue, Brooklyn, is completing plans for a new three-story automobile service and repair works, 100 x 150 ft. on Webster Avenue, New York, estimated to cost about $150,000. Charles S. Clark, 443 East Tremont Avenue, New York, is architect.

The Driggs Ordnance & Mfg. Co., 19 West Forty-fourth Street, New York, is arranging equipment and facilities at its plant at New Haven, Conn., for the manufacture of lightweight automobiles and parts. Production will commence at an early date.

The Instantaneous Electric Water Heater Corporation, Brooklyn, has been chartered under State laws to manufacture electric water heaters and parts. The incorporators are L. Feinman, M. Holland and Samuel Rubinton, 32 Court Street.

The Power Driven Machine Gun Corporation, New York, has been incorporated with a capital of $100,000 by J. F. Mathias, W. D. O'Gorman and P. M. Kelly to manufacture machine guns and parts. It is represented by Hardy, Stanoliffe & Whitaker, 165 Broadway.

The International Cement Corporation, 342 Madison Avenue, New York, has arranged for a note issue of $1,500,000,

the proceeds to be used for plant improvements, operations, etc.

A. Schrader's Sons, Inc., New York, has been incorporated under Delaware laws with capital of $100,000 by M. Charles Schweinert and Phillip G. Cole, Forest Hills, N. Y., to manufacture valves, couplings and kindred products. It is represented by the Corporation Trust Co. of America, duPont Building, Wilmington, Del.

The Cowles Heater Co., New York, has been incorporated with a capital of $100,000 by H. L. Cowles, J. J. Young and J. A. Trimble, to manufacture heaters and heating equipment. The company is represented by F. A. Hutson, 41 Park Row.

Arrangements are being perfected for a merger of the General Asbestos & Rubber Co., 58 Warren Street, New York, and the Raybestos Co., Bridgeport, Conn., under the first noted name. The consolidated company will have aggregate assets of $9,615,000. The General Asbestos company operates a large plant at North Charleston, S. C., for the manufacture of brake lining and kindred products, and the Raybestos Co., in addition to the Bridgeport works, has plants at Stratford, Conn., and Peterboro, Ont. The different plants will be continued in operation. C. Bissell Jenkins is chairman of the board, and Sumner Simpson, president of the new organization.

The Havana Electric Railway, Light & Power Co., Havana, Cuba, has disposed of a note issue of $1,500,000, the proceeds to be used in part for extensions, improvements, etc., in electric power plants and system.

The Vulcano Mfg. Co., New York, has been incorporated with a capital of $50,000 by H. J. Friedman, J. M. Nimhauser and A. G. Solomon, 200 Fifth Avenue, to manufacture tools, hardware products and other metal goods.

The Manhattan Roofing Co., 133 East 118th Street, New York, has acquired a three-story building at 121 East 120th Street, on site 25 x 100 ft., and will remodel the structure for a new plant. Max Pischler is president.

The Bunnell-Stevens Co., recently organized under Delaware laws with capital of $400,000, will operate a plant at New York for the manufacture of engines and machinery. It is represented by R. D. Bunnell, 2 Rector Street.

Fire, Aug. 22, destroyed three high-pressure boilers and other auxiliary power equipment at the plant of the West Virginia Pulp & Paper Co., Mechanicsville, N. Y. The department will be rebuilt.

Schulz & Co., Inc., New York, has been chartered under State laws to manufacture machinery and parts. The incorporators are H. Schulz, I. Spencer and Charles Marks, 302 Broadway.

The New Jersey Power & Light Co., Dover, N. J., has been granted permission to acquire the Lambertville Public Service Co., Lambertville; Flemington Light, Heat & Power Co., Flemington, and the Newton Gas & Electric Co., Newton, and to issue securities in an amount of $446,300 to effect the purchases, and for plant and system extensions and improvements.

The Radio Service Laboratories, Inc., Asbury Park, N. J., has been incorporated with a capital of $50,000 by Harold M. Lewis, Hobart A. Simpson and Melvin S. Moore, to manufacture wireless and other electrical equipment. It is represented by Joseph M. Turner, 701 Mattison Avenue.

Fire, Aug. 22, destroyed the machine shop, forge shop, pattern shop, sawmill and power house at the plant of the Vulcan Iron Works, Hudson and Essex streets, Jersey City, N. J., with loss estimated at about $250,000. The company specializes in marine iron and steel construction, and is operated by the Grymes Engineering & Vulcan Iron Works Co. A. J. Grymes is president.

Matthew Walsh, Brooklyn, manufacturer of belting, has leased a three-story building, aggregating about 6000 sq. ft., at the rear of 28 Orange Street, Newark, N. J., for the establishment of a new plant.

The Kelsey Motor Co., 25 Branford Place, Newark, will break ground at once for its new plant at Belleville, N. J., on a seven-acre tract recently acquired. It will be used for the manufacture of parts and assembling.

The Kolb Sheet Metal Works, 30 Orange Street, Newark, has filed notice of organization to manufacture fans and blowers and other metal products. Norman L. Kolb, 56 Crawford Street, heads the company.

The Amalgamated Iron & Steel Co., Newark, has filed notice of organization to manufacture iron, steel and other metal products. Elwood B. Hendricks, 645 Springvale Avenue, East Orange, N. J., heads the company. The same interests have also organized the Bolt, Nut & Rivet Co. and the Brass, Bronze & Copper Co., both of Newark.

The Newark Die Co., 17 Frelinghuysen Avenue, Newark, has filed notice of dissolution under State laws.

The M. L. Copper Welding Works, Newark, N. J., has filed notice of organization to operate a plant at 207 Sixteenth Avenue. Meyer L. Levy, 125 Somerset Street, heads the company.

John L. Reid, Newark, N. J., former police commissioner of the city, and associates have organized the Proctor Typewriter Co., to manufacture a new typewriting machine and parts. Initial production will be carried out at Baltimore and arrangements are being perfected for a plant. Later it is planned to establish works at Newark.

The Trethanay Mfg. Co., 154 Wright Street, Newark, N. J., has filed notice of organization to manufacture toys, metal novelties, etc. Charles and Joseph Trethanay, 31 Lincoln Park, head the company.

New England

BOSTON, Aug. 29.

Local machine-tool houses report comparatively little business the past week. One firm sold a used six-spindle drill and a 16-in. lathe to a New Hampshire repair shop, and another two new 16-in. lathes, while here and there a new and used tool has changed hands. Indications are that August will be the smallest month this year in the amount of business booked by local selling interests. Sufficient new inquiries and prospective business, however, are at hand to warrant expectations of better market conditions next month. Since our last report a local representative of a low-priced lathe has received 10 inquiries on small equipment.

Elsewhere in New England encouragement is found in business reported. A central Massachusetts forging company has purchased 10 used Waterbury Farrel presses as well as hardening and tempering equipment from Bridgeport interests. The Hannon-Finton Co., Springfield, Mass., reports recent sales as follows: One No. 5B Becker vertical milling machine to the Schuykill Forge Co., Philadelphia; one No. 4B to the W. H. Stearns Stamping Co., Worcester, Mass.; one 36-in. x 10-ft. planer to a Chicago dealer; two No. 2 Hendee universal milling machines with vertical attachments to a New York dealer; No. 4 Landis universal grinder to a Springfield concern for regrinding automobile cylinders, the buyer purchasing an attachment for grinding crank shafts direct from the Landis company; No. 1 Norton universal grinding machine and a 14-in. grinder stand to a Northampton garage; small universal milling machine to the Rue Mfg. Co., Philadelphia, and one band saw, combination wood-working machine, bolt cutter, power hack saw, car wheel boring machine and one 20-in. drill press to the Hartford-Springfield Street Railway Co., Warehouse Point, Conn. The company is negotiating with a local metal-working concern for two vertical milling machines. The Metal Saw & Machine Co., Inc., Springfield, reports the sale of two 10 x 10-in. saws for Australia and considerable band saw business for British accounts.

Although the Bangor & Aroostook Railroad Co. has laid off for six weeks 280 men at its Derby machine shop, the New England railroad shop situation is brighter. The Bangor & Aroostook car repair shop crew is busy getting cars ready for fall traffic. All employees laid off some time ago at the East Hartford, Conn., shops of the New York, New Haven & Hartford have been taken back and the company will take on additional men at New Haven and elsewhere in the immediate future. Work at the locomotive repair shops of the Boston & Albany at West Springfield, Mass., has been resumed, approximately 200 machinists having been recalled. This railroad is in the market for a 2500-lb. single frame steam hammer and a 28-in. motor-driven shaper. The Maine Central is expected to take some action in the near future on equipment, inquiries for which were sent out several weeks ago

The Whitin Machine Works, Whitingsville, Mass., has purchased a 2000-kw. General Electric steam turbine generator and an Alberger condenser for its power plant which is being rearranged.

The affairs of the Boston District Ordnance Salvage Board practically have been wound up. All machine tools have been taken out of the market so far as this particular branch of the Government is concerned.

The A. Burlingame Co., 149 Commercial Street, Worcester, machinist, is asking bids for the erection of two additional stories, 78 x 500 ft.

Bids are being asked on the construction of a four-story and basement printing plant, 80 x 180 ft., contemplated by the Rumford Press, Concord, N. H.

Charles E. Wilson, 198 Franklin Street, Springfield, Mass., machinist, is building a one-story shop, 40 x 100 ft., on Riverside Drive.

The Connery Machine & Tool Co., 56 Harrison Avenue, Springfield, Mass., small tools, is negotiating for property on which the erection of a small plant is contemplated.

Plans are being prepared for a one-story factory, 60 x 160 ft., with ell, 60 x 100 ft., contemplated by the Williams & Anderson Co., Providence, R. I., emblems.

The Utilities Mfg. Co., New Haven, Conn., has been formed with an authorized capital of $50,000 by T. A. Cooney, Cheshire, and J. D. Beecher and William B. Turley, New Haven. Among the products to be manufactured are can and bottle openers.

A Massachusetts charter has been granted the Saving Spring Co., Boston, to manufacture automobile springs. It is capitalized for $100,000. Thomas W. Morris is president and William P. Everts, treasurer, both at 709 Pemberton Building, Boston.

Mack Klein, 146 Shirley Avenue, Revere, Mass., is president and David Adelson, 150 Campbell Avenue, treasurer of the Century Mfg. Co., Boston, capitalized for $25,000, which has been granted a charter to manufacture automobile accessories.

The Hampton Tool Co., 238 Dwight Street, Springfield, Mass., tool maker, within the immediate future will build a one-story plant, 40 x 100 ft., at 562 St. James Avenue. Provision will be made for additional floor space when business conditions warrant. At present the company is engaged in the manufacture of a patented ice cream freezer and kindred machinery for outside interests. G. T. and P. P. Murphy are proprietors.

The Metal Saw & Machine Co., Inc., Springfield, Mass., saws and cutting-off machinery, has installed considerable heavy production tools and otherwise equipped the part of its plant formerly given over to the manufacture of hack saws, for the manufacture of high production and other special machinery for outside interests. New equipment includes monorail system on which a Franklin-Moore 1-ton electric hoist operates. Additional machine tool equipment will be installed within the next few months. The company maintains an engineering department for developing special machinery. Howard L. Washburn will supervise production.

The K. B. Noble Co., 249 Pearl Street, Hartford, Conn., manufacturer of contractors' machinery and parts, has completed plans for extensions and improvements in its plant to cost about $30,000. Buck & Sheldon, Inc., 60 Prospect Street, is architect.

The Grant Motor Radiator Works, 8 Calender Street, Providence, R. I., has filed notice of organization to manufacture automobile radiators and other metal products. Leonard W. Forest and Chester M. Grant, 718 North Broadway, East Providence, head the company.

Plans for a new one-story power plant for mill service are being prepared by Benedict Schwanda & Sons, Staffordville, Conn. It will be of hydroelectric type.

F. A. Ryer, purchasing agent Boston & Albany Railroad, Boston, will receive bids until Sept. 6 for engine truck swing frame, steam pipe flanges, trailer truck box, cylinders, valves and other equipment for locomotive rapair work.

The Worcester Electric Light Co., 11 Foster Street, Worcester, Mass., has completed plans for a two-story machine shop estimated to cost about $35,000.

The Spindle City Brass Foundry, South River Road, Lewiston, Me., is planning to rebuild the portion of its foundry destroyed by fire, Aug. 17, with loss estimated at about $10,000.

The Union Rubber Co., Inc., Calais, Me., has been incorporated with a capital of $400,000 by C. L. Lello and Harold H. Murchte, Calais, to manufacture tires, etc.

The Porcupine Co., Bridgeport, Conn., manufacturer of boilers, has awarded a contract to the T. J. Pardy Construction Co., Bridgeport, for a one-story, brick and steel addition, 148 x 240 ft., estimated to cost about $30,000.

Fire, Aug. 23, destroyed the power plant of the Lincoln County Power Co., Damariscotta Mills, Me., and the plant of the Damariscotta Leather Co., manufacturer of leather board products, with loss, including equipment, estimated at $100,000. Both properties are operated by Burgess & Lang, Boston.

The Bigelow Co., 92 River Street, New Haven, Conn., manufacturer of steam boilers, has completed plans for a one-story boiler shop addition, 53 x 105 ft. Henry R. Kent & Co., 5 Erie Avenue, Rutherford, N. J., are architects and engineers.

The Mechanical & Electrical Mfg. Co., Bethel, Me., has been incorporated with a capital of $100,000 to manufacture electrical equipment and machine products. Theodore Morin, Bethel, is president and treasurer; Ellery C. Park is secretary.

The power house and compressor plant at the works of the Wetmore & Morse Granite Co., Websterville, near Montpelier, Vt., were destroyed by fire, Aug. 17, with loss estimated at $100,000. They will be rebuilt.

Chicago

CHICAGO, Aug. 29.

The Atchison, Topeka & Santa Fe has issued an inquiry for equipment for its Argentine, Kan., shops. It is also expected to enter the market soon for additional machinery for its Albuquerque, N. M., shops, as well as for equipment for its coast lines. The Argentine list is as follows:

One heavy duty double-end 52-in. car wheel axle lathe with slip ring induction motor.

One car wheel journal truing machine with slip ring induction motor.

One 5-ft. radial drill.

One 36-in. x 16 ft. engine lathe.

One 28-in. crank shaper.

One 24-in. x 10-ft. engine lathe.

One heavy upright drill of sensitive type with capacity to drill 1½-in. steel.

One motor-driven 76-in. boring and turning mill.

All of the machines with the exception of the axle lathe, the journal truing machine and the boring mill are to be arranged for belt drive. The Santa Fe is expected to close on a number of overhead traveling cranes for Albuquerque some time this week.

The general situation in the trade has undergone little change. Inquiries, principally for single machines, are more numerous than in July, but actual buying is still light. Local dealers have received from the H. A. Smith Machinery Co., a machinery house in Syracuse, N. Y., a list including four 2¼-in. turret lathes, two 6-in. spiral bevel gear generators, two 12-in. spiral bevel gear generators, one No. 12 Barber-Colman gear hobbing machine, and two No. 70 Heald grinding machines. The company states that it has live inquiries for all the tools mentioned and that slightly used machines, or new machines, at attractive prices, will be considered.

An Eastern manufacturer of milling machines, drill presses, hand screw machines, and profiling machines has reduced prices 12½ per cent. A Wisconsin maker of tool grinders announces a reduction of 15 per cent.

The Reliable Sheet Metal Works, 1325 Belmont Avenue, Chicago has let contracts for a factory addition, 25 x 65 ft., to cost $8,000.

The J. G. Pressler Co., 326 West Madison Street, Chicago, has been incorporated with $10,000 capital stock to manufacture rubber hose, other rubber products and automobile accessories. The officers are J. G. Pressler, president; D. C. Pressler, treasurer, and R. H. Inman, secretary.

The Sterling Trap Co., 105 West Monroe Street, Chicago, has been incorporated with $5,000 capital stock to manufacture fly traps. For the present the company will merely supply the dies to be used in punching out the traps, but later expects to do its own manufacturing. The officers include Frank C. Powers, president; J. H. Clark, vice-president, and Edward J. Hess, secretary and treasurer.

The Ludlow Typograph Co., manufacturer of type setting and type casting machines, 2032 Clybourn Avenue, Chicago, has let contract for a one-story office and factory, 47 x 52 ft.

The Standard Electric Co., Hammond, Ind., has been incorporated with $25,000 capital stock to manufacture electrical equipment. The incorporators include W. R. Wermine, Ernest Freeman and Oliver W. Hershman.

The Improved Power & Machinery Co., Pueblo, Colo., is building an addition to cost $4,000.

The Pence Auto Co., Eighth Street and Hennepin Avenue, Minneapolis, Minn., has let contract for a one-story plant, 100 x 220 ft., at 2401 Broadway, to cost $65,000.

Joseph Spingola & Sons, 750 Taylor Street, Chicago, are receiving bids through A. V. Capraro, 105 North Clark Street, on a two-story garage, 75 x 120 ft., 1918 South Morgan Street, to cost $50,000.

The City Council, Carrollton, Ill., has preliminary plans under way for a new municipal electric power plant to cost about $90,000.

The Pendergast Fence Co., Fort Madison, Iowa, is having revised plans prepared for its new one-story and basement factory, 60 x 120 ft., to manufacture wire fencing.

The Coal Products Mfg. Co., Lockport Township, Joliet, Ill., will break ground at once for a two-story and basement addition, 48 x 65 ft.

The Chicago, Rock Island & Pacific Railroad Co., LaSalle Street Station, Chicago, has taken bids for its new one-story car repair shop at Trenton, Mo., 85 x 400 ft., estimated to cost about $65,000.

The Shelbyville Ice Co., Shelbyville, Ill., is planning the erection of a new ice-manufacturing plant, with initial daily capacity of about 65 tons. D. B. Isenberg is president.

The Western Metal Products Co., Joliet, Ill., has been incorporated with a capital of $50,000 by Walter B. Stewart, A. D. MacIntyre and Frederick A. Hill, 314 Barber Building, to manufacture metal goods.

Philadelphia

PHILADELPHIA, Aug. 29.

The Reid-Avery Co., 1434 Brandywine Street, Philadelphia, operating an electric welding and repair works, has leased the two-story building at Twenty-first Street and Washington Avenue, owned by the Merchant & Evans Co., for a new plant.

The Acme Iron & Metal Co., Twenty-third and Arch streets, Philadelphia, has acquired property at Twenty-fifth and Dickinson streets, 85 x 169 ft., to be used in connection with plant extension.

The Columbia Steel Equipment Co., Third and Annsburg streets, Philadelphia, manufacturer of steel filing cabinets, etc., will build a one-story addition.

John P. Smith, Inc., Philadelphia, is being organized by John P. Smith, Franklin S. Morehouse and Joseph S. Shusted to manufacture heating equipment, piping, boilers, etc. The company is represented by Leighton P. Stradley, Land Title Building. Application for a State charter will be made Sept. 19.

The John Best Lock Nut Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture nuts, bolts and kindred products. It is represented by F. R. Hansell, Land Title Building.

The Lutz Co., Thirty-first Street and Grays Ferry Avenue, Philadelphia, manufacturer of machinery and parts, has filed plans for a one-story foundry addition, 80 x 120 ft., at its works on Hayes Avenue, Camden, N. J. William Lutz is president.

The Superior Radiator Co., Hanover, Pa., has been incorporated with a capital of $25,000 to manufacture automobile radiators and kindred equipment. Edgar P. Wentz, Hanover, is treasurer.

The Philadelphia Rapid Transit Co., Land Title Building, Philadelphia, will soon break ground for the erection of a one-story addition to its car repair shops on Dauphin Street, estimated to cost about $50,000. Henry E. Baton, 1713 Sansom Street, has the contract.

The Harrisburg Corporation, Harrisburg, Pa., has taken over the control of the Harrisburg Foundry & Machine Works, Harrisburg, and in the future the plant will be operated under the purchaser's direction. It manufactures engines and kindred mechanical equipment. Alfred Sohland is president, and C. H. Israel, general sales manager.

The Hendrick Mfg. Co., Dundaff Street, Carbondale, Pa., manufacturer of perforated metals, screens, etc., has awarded contract to the Austin Co., Bulletin Building, Philadelphia, for a one-story addition, 100 x 220 ft., to cost about $100,000.

The Lehigh Structural Steel Co., Allentown, Pa., is considering the erection of a number of additions. It recently secured a contract for the reconstruction and repair of 200 steel hopper cars for the Lehigh Valley Railroad Co.

The Wenz Granite Quarries Co., 1141 Hamilton Street, Allentown, Pa., is installing new equipment at its plant, including polishing machinery, lathes and power plant apparatus.

Pittsburgh

PITTSBURGH, Aug. 29.

While actual business in machine tools in this district still is of very limited proportions, the tendency being to purchase only such tools as needed, the trade is encouraged by the inquiries that are coming out from time to time. A railroad list involving seven tools has just been issued, but the inquiry does not seem to have been very widely scattered and those who have it are inclined to withhold details, both as regards the name of the company and the tools wanted. This is the first railroad inquiry in several months and is looked upon as a favorable development. The movement on the part of some railroads to close their own shops and transfer repair work to private establishments, to put such work outside of the scope of the Railroad Labor Board, seems to be gaining ground and it is thought this may be productive of some business for tool builders. No price changes have come out in this district the past week. The crane market shows very little life. Several requests for prices for estimating purposes have reached local offices, but as yet nothing has been done regarding the cranes for the galvanizing plant of the Wheeling Steel Corporation, Beech Bottom, W. Va., nor for the crane which the Bessemer Gas Engine Co., Grove City, Pa., recently inquired for with one or two makers. These have been regarded as the livest inquiries before makers and awards had been expected by this time.

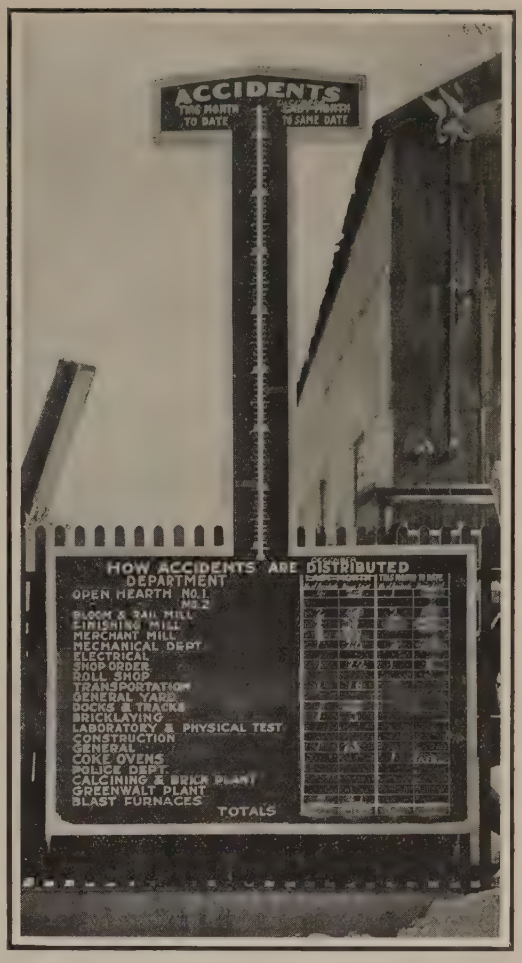
The Scientific Specialty Co., Pittsburgh, has been incorporated with a capital of $25,000 to manufacture hardware specialties, metal kitchen utensils, etc. C. D. Stewart, Crafton, Pa., is treasurer. The company is represented by C. L. McCobb, 425 Wabash Building.

The Pittsburgh Radio & Appliance Co., Pittsburgh, is being organized by Frank Feldman, Max Hirsch and Martin W. Kunkel to manufacture wireless apparatus, electric fixtures and equipment, etc. It is represented by Frank R. S. Kaplan, 922 Frick Building.

The McCrey Sanitary Collapsible Barrel Co., Apollo, Pa., has completed plans for the erection of a one-story factory, 50 x 160 ft., to cost about $42,000. It recently arranged for a change of name to the Sanitary Collapsible Barrel Co., and will maintain headquarters at Pittsburgh.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has awarded contract to the J. W. Cowper Co., Oliver Building, for a one-story addition to its plant on Sixteenth Street, estimated to cost about $17,000.

Plans are being completed for a new four-story power plant at the McKeesport Hospital, McKeesport, Pa., and bids



The photograph here reproduced represents an accident indicator used at the works of the Algoma Steel Corporation, Sault Ste. Marie, Canada. The accident prevention campaign has been in progress there for the past ten months. Frank J. McGue, director of safety, says that the result has been a diminution of over 50 per cent in accidents, 70 per cent in lost time and some 70 per cent in compensation.

The indicators were designed to keep every man in the plant informed every day of exactly what progress is being made in fighting accidents. The belief is that if everybody at all times be made to think of safety, greater care would always be taken and there would be fewer accidents. One of these boards is placed at every gate or clockhouse, where every man passing in or out must of necessity see it. The photograph was taken in February, and instead of the comparison being made with January, when operations were curtailed to some extent, the figures were compared with those for December, so that there would be a fair basis of camparison.

will be asked at once. It is estimated to cost in excess of $60,000. Sidney F. Heckert, Pittsburgh, is architect.

The P. Wall Mfg. Supply Co., Pittsburgh, is being organized by Frank T. Page, J. M. Irwin and H. E. Letty to manufacture galvanized iron and steel products. Application for a State charter will be made on Sept. 12. The company is represented by Calvert, Thompson & Wilson, 1737 Oliver Building.

M. B. Kelly, care of the American Steel Co., 1300 Park Building, Pittsburgh, and associates are planning for the purchase of a factory for manufacturing mechanical products, utilizing tin plate, wire, etc. It is proposed to re-establish the plant at Pittsburgh or Ellwood City, Pa. The project will represent an investment of close to $1,000,000.

The Hess Coal & Coke Co., Morgantown, W. Va., will install new electrical and mechanical equipment at its local properties to cost about $35,000. A number of plant improvements will be made.

Louis Adams and J. P. Hetherington, Huntington, W. Va., are planning the establishment of a new machine repair and electric welding works.

C. H. Craig, Charleston, W. Va., is planning for the erection of a new ice-manufacturing and refrigerating plant at Richwood, W. Va.

Ohio

Sentiment has improved somewhat in the Cleveland machine-tool market and inquiries are more plentiful. This is regarded as encouraging, although it is doubtful whether some of these inquiries will result in the early placing of orders. Local dealers report the volume of sales in August practically the same as in July. However, some improvement is expected during September. The South Bend Lathe Works, South Bend, Ind., has made a further price reduction of 20 per cent. This company states that the average prewar prices on its entire line of lathes were only 37 per cent below the quotations it has just adopted.

In Cincinnati, while no large purchases of machine tools are being made, the month of August with some makers will run far ahead of July as to the number of orders booked. While this does not mean that business is at all brisk, local manufacturers are confident that a turn for the better has come. A number of inquiries for one and two tools are before the trade which are expected to close within the next few weeks. Several Eastern railroads are inquiring for tools, but no large lists are being issued. It appears to be the policy to buy only as machines are urgently required, but manufacturers in close touch with the situation feel that with the better showing of the railroads and the prospects for increased business which now look brighter than for many months, it is only a question of a short time when new tools will be bought. In this connection it is persistently reported that a local manufacturer has secured an order for approximately 60 machines which are destined for several railroad shops.

The Board of Education, Canton, Ohio, has rejected all bids for the machine-tool equipment for the McKinley School in that city and will receive new bids Sept. 16. It is stated that before the bids were opened a number of manufacturers wired new prices, reducing their formal quotations from 10 to 20 per cent, and that the board decided to re-advertise in order to get the benefit of any lower prices that may be named. The original list has been changed and now consists of 21 machines and considerable small tool equipment. The list includes 11 heavy duty and engine lathes, 2 shaping machines, 1 radial drill, 2 universal grinding machines, 2 milling machines, 1 upright drill, 1 hack saw and 1 wet tool grinder.

An interest in the United Machine & Mfg. Co., Canton, has been acquired by Cleveland men and two new directors representing Cleveland interests have been elected. These are P. R. Mather, of Pickands-Mather & Co., and H. B. Bole, vice-president Hydraulic Steel Co. The United company will shortly add to its present line of products the manufacture of underfeed stokers.

The Mansfield Wire Spoke Co., Mansfield, Ohio, has been incorporated with a capital stock of $250,000 and has secured equipment for a plant. Negotiations are pending for acquiring the present plant of the Ideal Electric Co., Mansfield, which will shortly move into new quarters. The officers of the new company are C. E. McElroy, president; A. M. Hall, vice-president, and B. E. Frasher, secretary and treasurer.

The Dillon Brothers Machine Co., Bridgeport, Ohio, has been incorporated with a capital stock of $150,000. It operates a machine shop and it is stated that later a new plant will probably be erected.

Reports from Elyria, Ohio, state that the American Radiator Co. is negotiating for the purchase of the Fox Furnace Co. of that city and that plans for acquiring the works will probably be completed shortly.

The International Steel Tie Co., Waterloo Road, Cleveland, is planning the erection of a one-story factory, 40 x 120 ft.

The Spangler Trap Shoot Mfg. Co., Chillicothe, Ohio, has been organized to manufacture a contrivance for throwing clay pigeons, used by trapshooters. The company has purchased machinery and operations will begin about Oct. 1.

The Shartle Machine Co., Columbus, Ohio, has purchased all of the power house equipment of the smokeless powder plant erected by the Government during the war at Nitro, W. Va. The purchase price was said to be in the neighborhood of $1,000,000.

Baltimore

BALTIMORE, Aug. 29.

The Adamantex Brick Co., Arbutus, near Baltimore, recently organized with a capital of $1,000,000 to manufacture sand-cement bricks, has awarded contract to the L. V. Thayer Construction Co., 25 West Forty-third Street, New York, for its plant, estimated to cost $150,000. The main building will be two stories, 160 x 268 ft., and will be supplemented with a number of smaller structures. Louis F. Ducker is president. The company is represented by Blum & Makover, Equitable Building, Baltimore.

The Continental Engineering & Equipment Co., Baltimore, manufacturer of water sprinklers, etc., has filed notice of change in name to the Central Automatic Sprinkler Co.

The Consolidated Gas, Electric Light & Power Co., Lexington Building, Baltimore, has sold a preferred stock issue totaling $2,500,000, the proceeds to be used in part for power extensions, improvements, etc. Herbert A. Wagner is president.

The Marlin Firearms Corporation, Wilmington, Del., has been incorporated under Delaware laws with capital of $3,450,000 to manufacture rifles, shotguns and other firearms. It is represented by the Corporation Trust Co. of America, duPont Building, Wilmington.

The Kelly Mfg. & Sales Co., 2503 West Lexington Street, Baltimore, has been chartered under State laws to manufacture mechanical toys and kindred products. The incorporators are John I. and Andrew J. Kelly and Harry F. Kimberley.

The Potomac Electric Power Co., 231 Fourteenth Street, N. W., Washington, has been granted permission by the District Public Utilities Commission to issue bonds for $2,600,000 for extensions, improvements, general operations, etc.

Robertson, Strader & Co., Greensboro, N. C., are planning to rebuild their machine shop, recently destroyed by fire with loss of about $30,000.

The Dalford Oil Refining Co., Wilmington, Del., has been incorporated under State laws with capital of $100,000,000 to construct and operate a series of oil refineries. The company is represented by the Corporation Trust Co. of America, duPont Building, Wilmington.

The Pitt Tractor Co., Wilmington, Del., has been incorporated with a capital of $400,000 to manufacture automobile tractors and parts. It is represented by the Colonial Charter Co., Ford Building, Wilmington.

The City Council, Springfield, Ga., is planning for the construction of a municipal electric light and power plant. The machinery installation is estimated to cost about $25,000. L. B. Ackerman, Jr., mayor, is in charge.

The Hampton Roads Equipment Co., 251 Arcade Building, Norfolk, Va., recently incorporated, will operate a local plant for the manufacture of road-building and conveying machinery, electrical equipment, etc. J. M. Sherrod is president and L. P. Beard, vice-president.

The Teal Light & Power Co., Chesterfield, S. C., is planning for the construction of a new power plant.

The Bristol Granite & Marble Works, Bristol, Va., is planning for the installation of new pneumatic and other machinery at its plant. John Shirreff is manager.

The Georgia Marble Co., Tate, Ga., is planning to rebuild its works recently destroyed by fire. New stone-handling and stone-working machinery will be purchased. The plant will be 85 x 300 ft.

The L. Rosenfeld Mfg. Co., 105 South Hanover Street, Baltimore, manufacturer of bakers' utensils, dairy utensils and other metal containers, is planning for the erection of a one-story addition, 40 x 125 ft. The machinery installation will cost about $25,000. The company recently increased its capital to $65,000. Louis Rosenfeld is president.

The Granite Falls Mfg. Co., Hickory, N. C., is arranging for the erection of a new hydroelectric generating plant on

Wilson Creek, near Lenoir, N. C. It will have an initial capacity of 5000-hp.

The American Box Co., Lynchburg, Va., is planning to rebuild its machine shop, recently destroyed by fire with loss of about $50,000.

Buffalo

BUFFALO, Aug. 29.

The Niagara Radiator & Boiler Co., Oliver Street, North Tonawanda, N. Y., has plans under way for a new one-story foundry, 140 x 175 ft., at Sixty-third Street and Woodland Avenue, Chicago, estimated to cost about $100,000. E. C. Andrews is president.

The Thomas Coupling Corporation, Dunkirk, N. Y., has been incorporated under Delaware laws with capital of $1,000,000 to manufacture couplings, clamps and other heavy mechanical products. R. W. Snow, Dunkirk, is representative.

The Buffalo Steel Car Co., Buffalo, has taken a contract for the reconstruction and repair of 500 hopper cars and 2000 box cars for the Buffalo, Rochester & Pittsburgh Railroad Co.

Fire, Aug. 19, destroyed the engine house and repair shop at the yards of the Pennsylvania Railroad Co., Eighteenth and Wayne streets, Erie, Pa., with loss estimated at about $125,000.

The Schloezer-Ash Mfg. Co., Buffalo, has been chartered under State laws to manufacture electric motors and kindred equipment. The incorporators are M. J. and L. F. Schloezer and J. H. Ash. The company is represented by William J. Volker, Mutual Life Building.

The Niagara Falls Power Co., Niagara Falls, N. Y., is planning for extensions in its electric transmission system, with new line from Niagara Falls to Buffalo, to cost in excess of $6,000,000, including steel towers, etc.

The Meldrum-Gabrielson Corporation, Industrial Building, Syracuse, N. Y., manufacturer of milling machines and parts, has awarded contract to Dawson Brothers, Union Building, for a one- and two-story plant on West Fayette Street, 60 x 160 ft., to cost about $75,000. A large portion of the structure will be equipped as a machine shop.

Detroit

DETROIT, Aug. 29

Despite a steady increase in automotive and other machine production in this district and a larger number of inquiries noted, these encouraging features have not yet been reflected in the trade by any sales of importance. This is due in a large degree to the fact that prior to last December purchases of machine tools in the Detroit district were made in quantities which will largely take care of the demand for some time to come.

A steel wheel division has been formed by the Motor Wheel Corporation, Lansing, Mich., which is expected to get into production before the end of the year.

Construction is well under way on the new plant of the Stokes Mfg. Co., Owosso, Mich. It will manufacture a new manifold for motor vehicles.

The Steere Engineering Co., Owosso, Mich., and Detroit, has received an order for the installation of a condensation and gas cooling system at Havana, Cuba, to cost $50,000.

The Reynolds Spring Co., Jackson, Mich., will start immediately on the construction of an addition to care for increased business.

The Oliver Machinery Co., Grand Rapids, Mich., has added to its line of products a new type of belt sander, particularly adapted for the use of automobile body makers and for metal and wood-working plants.

The Standard Auto Co., Bridge Street and Gold Avenue, Grand Rapids, Mich., has completed plans for a new two-story and basement service and repair works and will commence erection at an early date.

The Wilton Tool & Mfg. Co., Grand River Avenue, Detroit, has arranged a list of new equipment to be installed at its plant for the manufacture of steel parts for automobiles.

The Detroit Tap, Die & Machine Co., Detroit, has filed notice of change of name to the Hawken Nut & Screw Co.

The Detroit Machine Products Co., Detroit, has been incorporated with a capital of $200,000 under Delaware laws by Edwin A. Leichfield and Walter A. Foster, Detroit, to manufacture machinery, tools, etc. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The City Council, Traverse City, Mich., will commence the immediate construction of its new hydroelectric generating plant on the Boardman River, estimated to cost about $250,000.

The Warner Auto Equipment Co., Benton Harbor, Mich., recently organized to manufacture shock absorbers and other automotive equipment, will carry out initial production at the plant of the National Axle Co., Benton Harbor. Later it is proposed to build a plant. Clarence T. Warner is president.

Indiana

INDIANAPOLIS, Aug. 29.

The Durant Motors of Indiana, Muncie, Ind., recently organized with a capital of $3,000,000, has taken over the local plant of the Sheridan Motor Car Co., to manufacture a six-cylinder automobile. Extensions and improvements will be made and new equipment installed. Plans are being perfected to commence production in October. Dennis A. Burke is president and general manager of the company, which is affiliated with the Durant Motors, Inc., 1819 Broadway, New York.

The Automatic Sliding Trolley Co., Frankfort, Ind., has been chartered under State laws to manufacture industrial trolley systems and kindred devices. The incorporators are William Robinson, J. A. Lucas and E. A. Spray.

The Interstate Car Co., Massachusetts Avenue, Indianapolis, manufacturer of automobiles, has awarded a contract to the Central State Bridge Co., Beecher Avenue, for a one-story foundry addition, estimated to cost about $25,000. E. H. Darrach is president.

The Concord Foundry Co., Elkhart, Ind., has filed notice of dissolution under State laws.

The Triangle Steel Products Co., Michigan City, Ind., will hold in abeyance the erection of its new plant, estimated to cost close to $75,000, until early next spring. The company is headed by T. C. Casse of the Josam Mfg. Co., 163 Washington Street, Chicago.

The Board of School Trustees, Angola, Ind., will make extensions and improvements in the electric power plant used for local schools.

The Central South

ST. LOUIS, Aug. 29.

The Missouri, Kansas & Texas Railroad Co., St. Louis, is having plans prepared and will soon take bids for a one-story addition to its machine shop at Parsons, Kan., 50 x 50 ft. A. L. Sparks, company address, is architect.

The Federal Penitentiary, Leavenworth, Kan., is planning for extensions and improvements in the power plant at the institution to cost about $115,000. New engines, boilers and auxiliary equipment will be installed. W. I. Biddle is warden in charge.

The Lexington Utilities Co., Lexington, Ky., has disposed of a bond issue of $560,000, the proceeds to be used in part for extensions and improvements in power plant and system.

The Commercial Coal Mining Co., Lexington, Ky., is planning for the installation of new electrical and other operating equipment on property recently acquired.

The Hygienic Heating & Ventilating Co., care of the Chamber of Commerce, Chillicothe, Mo., manufacturer of heating equipment, has acquired local property for the establishment of a new works.

The May Hosiery Mills, Nashville, Tenn., are planning for the establishment of a subsidiary plant for the manufacture of knitting machinery and parts. Julius Martin is secretary and treasurer.

Tabler Brothers, Pittsburg, Kan., will soon commence the erection of a new ice and cold storage plant, estimated to cost about $150,000 with machinery.

J. H. Mitchell, Kankakee, Ill., is planning for the establishment of a new plant at Joplin, Mo., to manufacture automobile trucks and parts. Negotiations are under way with the Joplin Chamber of Commerce for the purchase of a suitable site.

The City Council, Tulsa, Okla., is considering the construction of a municipal electric light and power plant. C. E. Griggs, city engineer, is in charge.

The Midwest Piping Co., 1452 South Second Street, St. Louis, has awarded contract to H. O. Hirsch & Co., Wainwright Building, for a one-story addition, 40 x 150 ft. A. G. Stoughton is president.

Swift & Co., Union Stock Yards, Chicago, are planning the erection of a new packing plant at Sedalia, Mo., to replace the words recently destroyed by fire.

The Chicago, Rock Island & Pacific Railroad Co., La Salle Street Station, Chicago, will take bids at once for the erec-

tion of a new engine house with locomotive repair works at Eldon, Mo. C. A. Morse is chief engineer.

The Peerless Wire Fence Mfg. Co., Adrian, Mich., has acquired property, 310 x 350 ft., at Memphis, Tenn., for a branch plant to manufacture wire fencing, staples and kindred products.

The Topeka Steam Boiler Works, Topeka, Kan., has filed plans for a four-story and basement works at Second and Jefferson streets, 50 x 85 ft.

Electric motors, automatic machinery for wood-working and other equipment estimated to cost about $20,000 will be installed at the plant of the Murphy Chair Co., Owensboro, Ky.

Milwaukee

MILWAUKEE, Aug. 29.

While the volume of new tool transactions remains restricted and sales are few and far between, the revival of the metal-working industry is progressing so well that machine-tool builders and dealers are encouraged over the prospect of an early resumption of buying. A general survey of the metal-working trade of Milwaukee and Wisconsin reveals greater activity probably than at any time within the last seven to eight months. Production of machine tools remains at a minimum pending the appearance of a healthier demand. Manufacturers of cranes are encouraged by increasing inquiry and better sales. The Pawling & Harnischfeger Co. sold a 5-ton electric traveling crane to the Consolidated Water Power & Paper Co., and several other fair-sized sales in this territory are pending.

The Perfection Hoist & Engine Co., Milwaukee, manufacturer of electrogenerating systems for farms and horizontal hoists for motor dump trucks, has purchased the former plant of the Two Rivers Plating & Mfg. Co., Two Rivers, Wis., and will move its factory and offices to that city on Sept. 1. The plant is undergoing some alterations and a small list of equipment will be purchased. Walter F. Mayer, 221 Grand Avenue, Milwaukee, is secretary.

The J. F. Davis & Sons Co., Chicago, which recently acquired the plant, equipment and business of the DePere Mfg. Co. at DePere, Wis., has completed alterations and placed the shop in operation. It will be conducted mainly as a boiler works, but will also fabricate structural steel. J. H. Allison is general manager at DePere.

The Victor Krefl Mfg. Co., Two Rivers, Wis., manufacturer of shock absorbers and other automotive accessories, has taken over the building formerly used as a machine shop by the Two Rivers Wooden Ware Co. and is installing some additional equipment. It has been occupying under lease the former plant of the Two Rivers Plating & Mfg. Co., which has recently been acquired by the Perfection Hoist & Engine Co., Milwaukee, as its permanent works.

The Marshfield Casket Co., Marshfield, Wis., has been incorporated with a capital stock of $25,000 to take over the plant and business of the Elgentone Mfg. Co., which is liquidating. The plant has been used for the manufacture of talking machine and music cabinets and will be partly retooled for manufacturing wooden and metallic caskets, etc.

The Northern Sash & Door Co., Hawkins, Wis., has awarded contracts for a new plant to cost about $65,000. It will consist of a main factory, 70 x 170 ft., a power plant, 30 x 42 ft., and a dry kiln, 36 x 45 ft., to be equipped with new machinery throughout and be ready for operations Jan. 1. Jens Jensdahl is president and general manager.

The Perron Signal Co., Sparta, Wis., has been organized to manufacture a vacuum type of traffic signal for motor vehicles, operated from engine exhaust. The new concern is a companion corporation of the Perron Spark Plug Co., established in Sparta two years ago. A. J. Perron is president of both concerns, which will be housed in the same plant. An addition will be erected later in the fall and some additional equipment is now being purchased.

The Milwaukee Board of Industrial Education will purchase shop equipment for the second unit of the new Central Continuation School in December or January. Much of the equipment for the first unit was acquired from Government tool stocks. Fred H. French is secretary of the board.

The Acme Grey Iron Foundry Co., Milwaukee, has been chartered with a capital stock of $25,000 to engage in the foundry and machine shop business. The incorporators are Warren J. Wheeler, Charles W. Brown and Arthur Breslauer, attorney, 740 Wells Building. A statement concerning the plans will be made shortly.

The Litman Bronze Co., Menomonie, Wis., producer of special bronze alloy castings, is seeking a location for its plant in Appleton, Wis. It is desired to come into close proximity to the paper mill industry of the Fox River valley.

The Gulf States

BIRMINGHAM, Aug. 29.

The Tidewater Glass Mfg. Co., Jacksonville, Fla., is planning for extensions in its plant to include a new metal-working department for the manufacture of caps for glass jars. It will build new works to cost $300,000.

Harry Whittier and William W. Shepard, Jacksonville, Fla., are organizing a company with capital of $3,000,000 to construct a new oil refinery with an initial daily capacity of 2000 bbl.

S. Pearson & Son, Ltd., Orizaba, Tex., operating oil properties, is planning the erection of an addition to its hydroelectric generating plant, with machinery to increase the capacity by about 50,000 hp.

The Maryland Refining Co., New Orleans, has commenced the construction of a new refinery to cost about $2,000,000.

The Safety Guard Rail Lock Co., Orlando, Fla., has been incorporated with a capital of $150,000 to manufacture rail locks, locking devices and other railroad equipment. W. L. Daughtry is president and R. B. Jarvis, secretary, both of Orlando.

The Dallas Railway Co., Dallas, Tex., is completing plan for the construction of an addition to its interurban railroa system from Dallas to Terrell, Tex., about 30 miles, esti mated to cost $1,800,000, including rails, line equipment electric stations, electrical and mechanical apparatus. C. W Hobson is vice-president.

The Texas Oil Products Co., Waxahachie, Tex., has broker ground for a new oil refinery, estimated to cost abou $500,000 including machinery.

The Key West Electric Co., Key West, Fla., is planning for extensions and improvements in its electric power plant to cost about $135,000, including the installation of new engine, generator and auxiliary operating machinery. B. L. Grooms is general manager.

The Jensen Ice Works, Jensen, Fla., is arranging for the erection of a new ice-manufacturing and refrigerating plant, estimated to cost $50,000. H. H. Schultz is general manager.

The Hercules Brick Co., Dallas, Tex., is perfecting plans for new works to cost about $75,000. A. B. Saling is general manager.

The Industrial Mfg. Co., Indianapolis, Ind., George A. Weaver, president, is planning the erection of a new pulp and paper mill in the vicinity of Orlando, Fla., to cost about $2,000,000. A site will be selected at an early date.

The Sawyer Specialty Scales Co., Jacksonville, Fla., has been incorporated with a capital of $500,000 to manufacture scales and similar products. W. H. Sawyer is president and W. E. Sawyer, secretary and treasurer.

California

LOS ANGELES, Aug. 23.

The Central California Ice Co., Fresno, Cal., has plans under way for enlargements in its ice-manufacturing plant. Considerable new machinery will be installed.

Rogers Aircraft, Inc., Los Angeles, has been incorporated with a capital of $150,000 by F y H. Rogers, W. P. Holliday and M. M. Fogel, to ma ure airplanes and parts. It is represented by Fogel & ian, Merchants' National Bank Building.

The American Auto Radia Works, 1909 South Main Street, Los Angeles, has filed e of organization to manufacture automobile radiators a other metal products. Louis Jacobs, 1170 East Twenty-fifth Street, heads the company.

The Wilgus Mfg. Co., Boyd and Wall streets, Los Angeles, manufacturer of oil burne pump governors and other steam specialties, has plans der way for a new one-story plant, 50 x 120 ft., on prope recently acquired.

The Los Angeles Gas & E ric Corporation, Los Angeles, is outlining an expansion and improvement program in electric generating plants and system over a term of years, with estimated cost placed at $5,850,000, including new machinery.

The McLaren Automobile Signal Co., Whittier, Cal., has been incorporated with a capital of $50,000 by Peter McLaren, George L. Hazzard and Rex B. Kennedy, Whittier, to manufacture automobile signal devices and other automotive equipment. It is represented by James S. Bennett, Van Nuys Building, Los Angeles.

The Asphaltum & Refining Co., Los Angeles, has preliminary plans under way for the erection of a new refinery near Long Beach. George Zeeman is president and general manager.

Swift & Co., Chicago, have plans under way for a one-story addition to their meat plant at 922 East First Street, Los Angeles, with installation to include refrigerating machinery and other equipment.

BOOK REVIEWS

The Human Motor. By Jules Amar, D.Sc. Pages, xvi + 470; 5½ x 8½ in.; illustrations and numerous tables, 309. Published by George Routledge & Sons, Ltd., London, and E. P. Dutton & Co., New York.

This unusual work, whose author is the director of the research laboratory of industrial labor at the Conservatoire National des Arts et Métiers, Paris, France, has been translated from the French by Elsie P. Butterworth and George E. Wright. It has for an optional title "The Scientific Foundations of Labor and Industry," and, according to the preface, the author hopes his work may stimulate further research into fields first brought forcibly to the attention of the public by Chauvean and Taylor. According to the publisher's note this work was published in France in 1914, but on account of war conditions an English edition was not heretofore available. It is the publisher's expressed belief, however, that this delay has not affected the value of the book, owing to the general suspension of such experimental research (except as applied to re-education of the disabled) during the war.

As the title suggests, the human body (or motor) is considered in terms analogous to an inanimate body (motor) capable of transforming energy into work. For the benefit of the lay mind the first 84 pages are devoted to a concise summary of the general principles of mechanics.

A discussion of the "Human Machine" follows, taking up the structure of the matter constituting the organs of living machines, and describing the organs of movement and locomotion, or the bones, muscles and tendons. Since the motor in the human body is the muscle, and the muscle functions like a heat engine, a description of its functioning and its fuel (alimentation) follows. After this is treated human energy under the divisions of the laws of energetic expenditure, the yield of the human machine and the physiological effects of fatigue.

Man and his environment are then discussed. The "internal environment" or the blood and the influence of aliments upon it, and the external environment or the atmosphere, temperature, clothing, at various altitudes and under varying conditions, are all taken into consideration and treated in detail.

Thus about two-thirds of the work are given over to establishing the analogy between inanimate and animate motors. Some 70 pages are then given over to a description of the experimental methods, including measurements and instruments, the dynamic elements of the human machine and the measurement of energy. The remainder of the work under the general head of "industrial labor" discusses the human body in equilibrium and movement, industrial labor and locomotion, the tools of industrial labor; and finally the general conclusions of the author. The work is replete with experimental data of a profound and as the author suggests, should stimulate leaders of scientific thought to attempt even more complete treatment of the subject.

E. C. R.

Employee Training. By John Van Liew Morris, Ph.D. Pages, xxiii + 311, 5½ x 8 in. Published by McGraw-Hill Book Co., Inc., New York.

Since the title might be used for books very different in character, it is advisable to note that in this instance the book consists entirely of a very comprehensive compilation of the methods used in the training and educational departments of various corporations throughout the country. The compilation evidently was carefully planned for, since it is confined to metal working industries, electrical equipment manufacturers, shipbuilding and railroads, with one example in the printing industry.

The subject matter of the compilation is based on information gathered in personal visits and supplied by educational and training executives. This is grouped under four main heads of programs for apprenticeship and special training; programs emphasizing apprenticeship; programs emphasizing special training; and programs of primarily technical instruction. After setting forth the findings in this matter, an academic discussion of them at some length follows, and then a brief chapter on conclusions. There is included a selected bibliography and complete index.

The data for this book seem to have been obtained carefully and accurately, and are reproduced in sufficient detail to make the book of considerable value for reference purposes.

Labor's Crisis. By Sigmund Mendelsonn. Pages, xii + 171, 4½ x 7¼ in. Published by the Macmillan Co., New York.

An employer's views and analysis of labor problems, based upon the practical experience of an employer, are given in this very interesting and readable little book. Taking as his basis the fact that a labor problem exists, the author tries to show wherein it differs in this twentieth century from that of the nineteenth. In other words, insufficiency of labor, the inflated wage and the striving for economic dominance by labor constitute for the employer a very different one to-day.

To the author this whole problem seems to revolve about the matter of the number of working hours per day. Arguing that "acute labor shortage cannot be materially relieved by new inventions nor by the more intensive application of labor-saving machinery and devices," and that from a 12 and 14-hr. day we have come to an 8-hr. day, with efforts toward a still shorter work day gaining ground, he discusses both the economic effect and the moral effect of this curtailment of labor.

The nature and effect of poverty as related to labor, labor welfare as related to material and social welfare and labor as it affects the wife and the home are other phases of the problem touched upon.

The Automobile Industry and Its Future. By Leonard P. Ayres, vice-president Cleveland Trust Co., Cleveland, Ohio. This pamphlet of 32 pages is the second of the economic series of the Cleveland Trust Co., the first, also by Mr. Ayres, being on "Price Changes and Business Prospects." A feature of the discussion of the automobile industry is a table presenting in outline the statistical history of the industry from its beginning more than 25 years ago. There is also a description of a new method for computing the elimination of cars year by year. The prognosis of automobile use and production is particularly interesting. The number of cars manufactured up to the beginning of 1921 is put at 11,775,000, of which more than 700,000 have been exported. About 9,000,000 are in use and 2,000,000 have been worn out, destroyed or abandoned. The average term of service has been about six seasons. At the end of 1920 one car was in use for each 12 people in the population. Since 1916 the increases in the annual output have been largely for the increasing demand for Ford and other relatively inexpensive cars, and for some time to come the new users will be people of limited means who will buy inexpensive cars. It is believed the country will shortly need about 1,500,000 cars annually if the use of automobiles remains about at its present status. The production capacity is more than 2,500,000 cars per year. Extensive price readjustments may be expected in the next few years, the author believes, as the industry with its great capacity competes for purchasers among people and countries whose buying power has been sharply curtailed.

South African Engineers' Directory. Electrical and allied trades, including a complete mining directory. Pages X + 481, 6½ x 9½ in. Compiled and published by the South African Mining and Engineering Journal, Johannesburg, Union of South Africa.

This directory covers South Africa and has been planned to embrace every branch of engineering (electrical, iron, steel, machinery, constructional and automobile) and also the hardware business throughout the Union, Rhodesia and Mozambique. It classifies the personnel of the various trades alphabetically and geographically.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Metal Markets."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	12.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.53c.
No. 12	3.58c.
No. 14	3.63c.
No. 16	3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	4.10c. to 4.35c.
No. 16	4.25c. to 4.50c.
Nos. 18 and 20	4.40c. to 4.65c.
Nos. 22 and 24	4.55c. to 4.80c.
No. 26	4.70c. to 4.95c.
No. 27	4.85c. to 5.10c.
No. 28	5.00c. to 5.25c.
No. 30	5.50c. to 5.75c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
⅛ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¼ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap...	— 7	+4

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c. to 4.25c.
Annealed soft	4.00c. to 4.25c.
Galvanized annealed	4.75c. to 5.00c.
Coppered basic	4.50c. to 4.75c.
Tinned soft Bessemer	6.00c. to 6.25c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¾c. to 18¾c.
High brass wire	16¾c. to 21¼c.
Brass rod	13¾c. to 20¼c.
Brass tube, brazed	27 c. to 31 c.
Brass tube, seamless	18½c. to 20 c.
Copper tube, seamless	20 c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 20c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14x20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb....	$6.80	$6.55
		90 lb....	6.90	6.65
		100 lb....	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	29c.
Bar	36c. to 37c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c.to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb....29c. to 31c.

Old Metals

The market is very quiet with no business. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.50
Copper, heavy and wire	8.75
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

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Electric Furnace Operating Experiences

Experiments with Three Forms of Furnace Bottom—Methods of Building Bottoms—Experiments with Roof and Sidewalls—Metallurgical Features

BY LARRY J. BARTON*

DURING the last five years the electric furnace has shown the greatest increase of its career. Under the conditions of war specifications there was great need for a melting medium which would furnish the required steel. Many orders carried such rigid specifications that they could only be met by steel made either in the electric furnace or the crucible. Eliminating the crucible due to its small tonnage and high cost, there remained only the electric furnace. The tests of this steel, the tonnage possible in a given period, and its commercial costs, opened the eyes of manufacturers to its peace time possibilities. Its scope or adaptability in the making of alloy steels, steel castings, iron castings, etc., have come to be thoroughly recognized, and it has become one of the accepted factors in the steel industry.

Many new furnaces have come into existence and many executives have adopted the idea that all they need to produce steel of exceptional quality is an electric furnace. The personal equation is either ignored or passed over as a minor point. The following paper is an attempt to show what highly varying results can be obtained on the same furnace under different conditions of operation. The points shown are not brought forward as anything new, but merely to bring before the eyes of the electric furnace industry some points usually regarded as minor, yet points which may mean commercial success to a new undertaking.

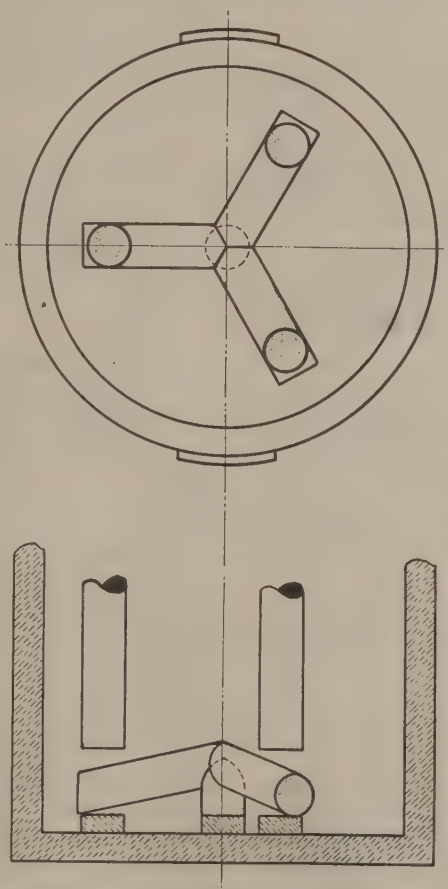

Fig. 1—Arrangement of Electrodes for Burning the Bottom of the Furnace by Sintering Bit by Bit

Furnace and Equipment

The furnace discussed in the following article is a standard 6-ton Heroult, basic lined. The electrical equipment used throughout is of General Electric make. This furnace is working on steel castings and high-grade rolling and forging ingots for general railroad work. The scrap used is not selected, but is taken as it comes from the road, consisting of such material as old track bolts, spikes, tie-plates, old castings, forge flashings and butts, borings and turnings, etc.

When the furnace was about to be put into operation great consideration was given as to whether an acid or a basic process was to be used. The advantages for the acid process were hotter and cheaper steel and greater tonnage in a given period. Against this were the disadvantages: selected scrap must be used to meet specifications, due to the inability to do any refining of note on an acid bottom; specifications and analyses are harder to meet with constant exactitude; alloy steels cannot be very satisfactorily made, and can never be remelted to save alloys; no iron refining can ever be done; power surges and even control give more trouble than on a basic bottom.

As the scrap to be used was high in phosphorus and sulphur, due to large quantities of wrought iron, it became imperative to use the basic process. Against the disadvantage of higher cost for this process were the ability to make any analysis with ease; great refining possibilities; easier power control; elimination of power surges with high peak loads; reclamation of alloy steel scrap; and most important of all, complete de-gasification.

Basic Furnace Bottoms

There are three methods in use for the making up of a basic bottom.

1. The bottom is sintered in bit by bit, being always under the heat of the arc.

2. The whole bottom is rammed into place, the furnace filled with coke and heated white hot for from

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8 to 24 hr., burning in the complete bottom at one operation.

3. The bottom is rammed in an inch or two at a time, and then burned as in method 2.

Believing that the better the bottom at first, the less trouble in the future, we used the first method. This method is one which, if properly done, will give

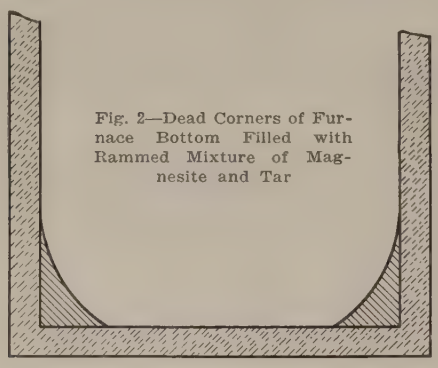


Fig. 2—Dead Corners of Furnace Bottom Filled with Rammed Mixture of Magnesite and Tar

a bottom of solid material all the way through, without any foreign material such as coke from tar, as would be obtained in a rammed bottom. Then there is no danger of the bottom rising in layers as is possible when put in by ramming a layer at a time.

The following is a log of the bottom burning:

Electrodes set on bottom as shown in Fig. 1.
Dead corners of bottom filled with rammed mixture of magnesite and tar, as shown in Fig. 2.

4:30 p. m. Current on at 2000 amp.; 500 kw.
5:30 p. m. Current 3000 amp.; 700 kw.
6:30 p. m. Current 4000 amp.; 900 kw.
7:30 p. m. Opened doors for first time after start, raised electrodes and inspected walls. On lowering electrodes the plug in bottom connection slipped.
8:05 p. m. Current on again at 900 kw.
9:45 p. m. First addition of magnesite-basic open-hearth slag, 4:1, made around corners; 1200 kw. Walls glistening.
9:45 p. m. and 1:00 a. m. Additions made regularly as long as previous layer had become thoroughly sticky and pasty.
1:00 a. m. Bottom as high as possible on this set up. Shut off current and pulled electrode stubs. Bottom looking fine, walls have run slightly.

Second Set Up.

5:10 p. m. Current on, 500 kw.
6:10 p. m. Increased to 600 kw.
7:10 p. m. Increased to 750 kw.
8:10 p. m. Increased to 900 kw. Furnace getting very hot.
8:30 p. m. First addition of 6:1 immediately to rear of No. 2 electrode, where arc is directly striking. Walls glistening. Additions now being regularly made of 6:1.
9:40 p. m. Cut power to 700 kw.
10:50 p. m. Cut power to 600 kw.
11:40 p. m. Cut to 500 kw. From this point used all mixture in a moist condition and used spoon for all wall touching. All additions being made with current on.
3:40 p. m. Current off and stubs removed. Bottom looks fine and hard as rock.

Bottom 8 in. thick at center.
Total time 19 hr.

This bottom has been in use for a year and a half on 24-hr. operation, and has not given a bit of trouble.

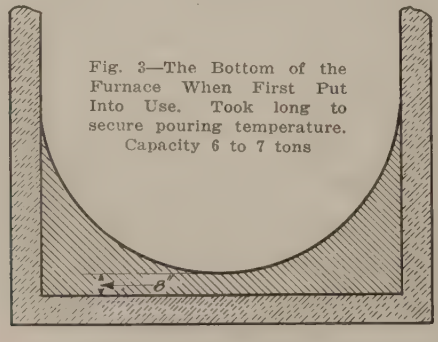


Fig. 3—The Bottom of the Furnace When First Put Into Use. Took long to secure pouring temperature. Capacity 6 to 7 tons

While on the subject of bottom making, it might be a good thing to mention the use of the cement gun. While not particularly applicable on such a small installation as ours, in the case of a 75 to 100-ton open hearth furnace, it has proved to be a wonderful aid in bottom making and patching between heats. The best open-hearth bottoms are those put in the same way as indicated by the preceding log. The old way was to have a gang of men throw the patching material across the furnace with shovels. For this purpose the cement gun is now coming into large use. Some of its advantages are: The bottom can be made up while the gas is on and the doors down; there is practically no wasted material; the material is shot precisely to the points where wanted; the men can stand away from the heat, and only two men are needed to handle the apparatus; the time between heats can be materially lowered.

Experiments on Bottom

The bottom when first put in was as shown in Fig. 3. After following results very carefully on this shape of bottom, we allowed the bottom to "build up" to shape shown in Fig. 4. When our figures from this method were enough to prove the results, we changed to the shape as shown in Fig. 5. During this period we ran heats of 5 to 8 tons, keeping careful figures on all such points as time of melting down, refining, etc. From this mass of data we obtained the following points:

1. Bottom No. 1 melts down fastest. It takes longest to heat to the pouring temperature. Refining is not as good as No. 3. Trouble is experienced with side walls digging opposite the arcs. Due to its increased depth, there is a greater length of electrode necessary between the roof and the bath during melting down. In other words, due to the electrode's digging deeper, the holders must be fastened to the electrode

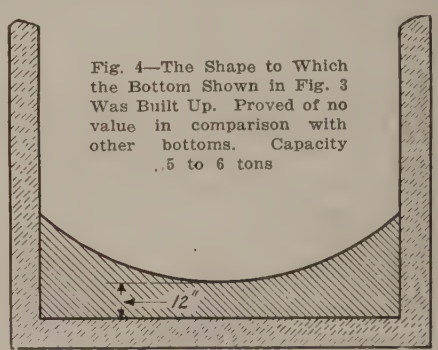


Fig. 4—The Shape to Which the Bottom Shown in Fig. 3 Was Built Up. Proved of no value in comparison with other bottoms. Capacity 5 to 6 tons

higher up. This results in a greater amount of electrode becoming heated and results in greater electrode consumption.

2. Bottom No. 2 proved to be of no value at all, in view of the working of the other two. It took greater power, more time, more electrode consumption in proportion, to turn out the smaller heats than with the larger heats on the other shape bottoms.

3. Bottom No. 3 proved to be the best all around bottom. While it did not melt as fast as No. 1, the total time per ton was less, due to shorter time of refining and superheating. Absolutely no trouble was experienced with side walls, and refining was possible without extra trouble, down to 0.005 per cent sulphur. The main point found was that with a bottom shaped as No. 3 it was possible to melt and pour 8 tons of metal, in the same time as would take for 6.5 tons on bottom No. 1, or 5.5 tons on bottom No. 2. On this bottom we have made 8-ton heats, for steel castings, in as short a time as 3 hr. 5 min. from the time current was put on until pouring.

Furnace Walls

Having determined the shape bottom which gave us the best results, our next step was made on the side walls. These were of 18-in. silica brick, two courses, laid flat. The bricks were made by the American Refractory Co., analyzing about 90 to 95 per cent silica,

and have proved very reliable. These bricks were laid perfectly dry and completely up to the roof ring. After running several linings we changed as follows: The lining next to the shell was run all the way to the roof, while the inside lining was run only as high as the arches. This made an 18-in. lining up about half way, and a 9-in. lining from that point to the roof. After obtaining our figures on this style of wall, we substituted magnesite brick for the silica brick, in the

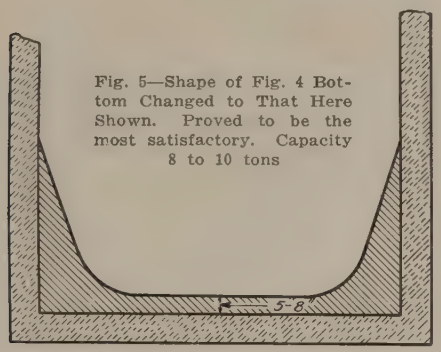


Fig. 5—Shape of Fig. 4 Bottom Changed to That Here Shown. Proved to be the most satisfactory. Capacity 8 to 10 tons

inside lining for a space of about 2 ft. directly opposite each electrode. Then we did the same thing, using carborundum brick opposite the electrodes. Our next step was to use only 9 in. of brick in the walls, trying both silica and magnesite. In the near future we expect to try this with carborundum brick.

From our trials we found that:

1. Both with full 18-in. walls, and with 18-in. walls only half way up we experienced the trouble of having the brick burn through opposite the arcs. This is shown in Fig. 6. This weakened the wall and we had great difficulty with the upper part of the wall falling in when pouring. To overcome this we moved the electrodes 2 in. in toward the center of the furnace, but still had the same difficulty.

2. Magnesite brick opposite the arcs hold up much longer than the silica brick, but tend to spall severely, coming off in pieces 2 in. thick.

3. Carborundum brick burned off 2 in., while magnesite brick under them burned 9 in., and silica brick above burned through 18 in. These bricks gave excellent service, but at a price of $1.75 per brick, the cost is prohibitive. We expect to put in a full wall of these bricks to determine exact costs of same.

4. Best results were obtained with only a 9-in. wall. While the loss of heat was greater, by lining a little oftener this was entirely overcome, and the extra cost of brick was saved by the ability of repairing in shorter time than when a full 18 in. was used.

While there are many other combinations of brick which could have been used, we feel that we have tried out enough to be able with certainty to foretell the condition of our furnace weeks ahead. We believe that as good results are obtained with only 9 in. of brick as with 18, figuring on a yearly basis.

Furnace Roof

Our roofs are made up in the standard way, using the common shapes of silica brick. The only experimentation done on the roof was trying out different heights from the bath. We have tried with the roof resting on the roof ring of furnace; with it 2½ in. higher; and with it 5 in. higher. We find that by raising the roof we save enough to obtain a few heats more from each roof, but it takes longer to get out the heats. Our present practice is to rest the roof directly on the ring. We are now collecting figures on the operation of a Griffin patent roof, which was put into operation a few weeks ago.

Carbon electrodes of 17 in. diameter and graphites of 10 in. diameter have both been tried with the balance in favor of the carbon. Our main objection to the graphites is the fact that they are too fragile and do not stand up under tonnage work. In addition they require too much lowering in the holders, causing a large amount of delays. With the carbons we found that they would melt quicker, did not break so much, required less lowering, gave better power figures, and in general under our conditions proved much better.

Slags

The slags are the heart of the electric furnace process. Under an oxidizing condition phosphorus is removed, while under a reducing condition sulphur is eliminated. As these impurities are removed by the slag it follows that the greater the amount of slag, the larger the amount of impurities that will be removed. It also follows that the greater the amount of slag, the greater the power necessary to melt and keep this in a molten condition. It normally takes about 530 calories to melt low carbon steel, while it takes about 650 calories for the same amount of basic slag. Therefore the slag requires more heat for the same amount than the steel, and all heat or power wasted in heating unnecessary amounts of slag is money wasted.

What Is Correct Amount of Slag?

The problem therefore is to ascertain the correct amount of slag to use to eliminate the impurities. As the base of the slag is lime, and this is practically infusible, there must be something else added to form a slag with the calculated weight of lime. There are two main materials, silica sand and fluorspar. Of these silica sand is much the cheaper, and if possible should be used in greater quantity than the fluorspar. Now the question comes up, "How much of these shall I use?" One naturally wishes to add enough to make the slag thoroughly fluid and yet not make it watery or tend to go acid, nor does one want to have a thick viscous slag.

After a large number of trials and experiments on this subject, we have adopted the following: Lime, 2 per cent of the charge; sand, 20 per cent of the lime; spar, 10 per cent of the lime; ground coke, two large scoops to each side, or four large scoops to the total. For our first slag we use 2 per cent of the charge lime only, the lime having enough dirt and sand from the scrap to flux it thoroughly. The second slag material is added half at a time, being thoroughly mixed on the

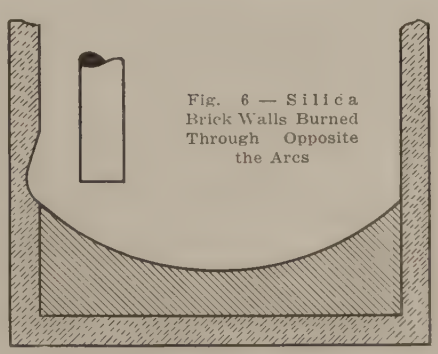


Fig. 6 — Silica Brick Walls Burned Through Opposite the Arcs

floor. In a large majority of cases this mixture will give a finished slag in 20 min. to half an hour. If anything this slag tends to come up a little thick, requiring one scoop of about 25 lb. of spar to finish it. The amount of ground coke will not affect the carbon in the metal and is the principal cause for a quick clearing of the slag. We have run hundreds of heats call-

ing for under 0.10 per cent carbon with this mixture and have seldom had an off analysis.

Alloys

All our alloys are added to the furnace. Our ferromanganese is added immediately after slagging off. Then when the slag has cleared and powders on exposure to the air we add the silicon. If alloy steels are being made, then is the time to add the alloys. This applies to chrome, chrome-vanadium, high silicon, manganese steel, and any others in which the alloy itself is likely to become oxidized. Copper and nickel can be added in the charge with no appreciable loss. Immediately the final alloys are added, the slag must be given a heavy dusting of ground coke to prevent any possible reoxidization. On heats under 0.10 per cent carbon, we add ¼ lb. of aluminum per ton of metal, in the ladle, to prevent any rising in the molds.

Pouring

We do not use any skimming gate when pouring. We do not claim that this is the best of practice, but find that the class of steels we make do not require such precautions. In a case for very high grade forging ingots, for instance, just a few minutes before pouring we throw a scoop of lime on the edge of the slag just inside the tapping door. This thickens the slag enough to act as a skimmer, the slag following into the ladle after the greater part of the metal. On heats of this kind we tap at a much higher temperature than required, add a few pounds of fluorspar in the ladle, and hold the metal in the ladle 10 or 15 min. before pouring any ingots. The fluorspar tends to bring any foreign matter to the top during the period when holding.

We have made numerous tests to determine segregation but have never found any to amount to anything. We lay this to the fact that the steel is completely finished before it ever touches the ladle, the pouring operation serving merely further to mix it.

Conclusion

After an intensive series of experiments we have adopted the following conditions as being more economical and efficient in every manner, under our conditions of working:

1. The bottom shall be nearer the shape of a saucer than a cup.

2. The thickness of the bottom shall be ⅝ in., and shall be made of double dead burned magnesite, sintered in bit by bit.

3. The walls shall be of silica brick, 9 in. thick.

4. The walls shall be laid either dry, or with a thin coating of silica cement.

5. The roof shall rest not over 2½ in. higher than the roof ring, preferably on it.

6. Electrodes shall be of amorphous carbon, 17 in. in diameter.

7. Dephosphorizing slag shall be 2 per cent of the charge lime.

8. First slag shall be added during melting down, never added on the hearth.

9. Deoxidizing or final slag shall consist of 2 per cent of charge lime; 20 per cent of lime sand; 10 per cent of lime fluorspar; 4 scoops ground coke.

10. This final slag charge shall be added a few minutes after slagging off, one-half at a time.

11. All alloys shall be added in the furnace, and steel shall be in a finished condition before the ladle is called for.

In closing, the writer again wishes to reiterate that the ideas expressed in the foregoing are not offered as a text on electric steel, but merely as a few suggestions of the great amounts of varying results which can be obtained with the same apparatus, showing the great importance of the human equation. Our conditions as we found them may be a great deal different in another shop under different conditions, but the record of the experience may serve as a guide to meeting difficulties as they come. In the face of the present competition it is the shop with the best and most efficient "system" which will win out.

Causes and Cures of Depression

In discussing the current business situation, President F. C. Biggert, Jr., United Engineering & Foundry Co., Pittsburgh, states—"Always it is the arousing of the national consciousness to the fact that something is out of joint, or likely to go out of joint, that causes depressions. This time it is the foreign situation which looms largest as a disturbing factor. This situation is the inevitable consequence of our war commerce; its correction will be by the inevitable operation of the law of compensation, and a very long time, a great many years, will be required to re-establish the balance.

"To be sure we can recover our breath and go ahead within our own country and be prosperous for a long time, without any considerable commerce with other nations; but we must recognize and obey the natural conditions to be successful in this.

"We must buy from outside nations more than we sell to them, and to offset this purchase of foreign labor, we must occupy ourselves in the development of our own country to the highest possible state of economy. We need railroads and railroad equipment, improved highways, development of waterways, houses and farm machinery. We should develop our water powers to the end that less coal be consumed and should burn our coal more efficiently where we must burn it. We should study the economical use of all our labor and materials.

"Under our present conditions it will be difficult to do these things. Wise counsel and judicious government will be necessary to their proper consummation, but they are the key to our success in the future."

Improvements of American Roll & Foundry Co.

A program of improvements at the American Roll & Foundry Co. department at Canton, Ohio, of the United Engineering & Foundry Co., Pittsburgh, started in 1920, is now nearing completion. It includes an extension of 120 ft. to the roll and machine shops, 200 ft. to the foundry, new pattern shop, new blacksmith shop, modern office building together with various additions to equipment, including a number of cranes, roll lathes, new type air furnace, with waste heat boiler, and Fuller coal pulverizing equipment.

The plant produces gray iron castings, sand and chilled rolls, and is equipped for and makes a great many rolls for rolling iron, steel, spelter, brass, copper and alloyed metals, and also makes a specialty of rolls for rubber and paper mills.

"Peds" to Attach Trim to Concrete

The General Fireproofing Co., Youngstown, Ohio, is introducing to the building trade a "ped" or spot ground for attaching wood and metal trim to walls, and screeds to concrete floors. A ped consists of a nailing block of wood forced into a circular metal plate. The wood block, 2 in. in diameter, is treated to prevent rotting or swelling from moisture. The metal plate, 3⅝ in. in diameter, is painted to prevent rust and perforated with ⅜-in. holes. The ped is bonded to the wall with plaster or to the floor with cement, and the plaster or cement comes through these holes and keeps the ped firmly attached to the basic surface.

When the plaster or cement has set, the walls are plastered flush with the top of the wood nailing block, and the floor screeds are nailed down. The peds form solid, permanent spot grounds in the walls for the secure fastening of wall trim, and a firm foundation for the wood floor.

Foundry Irons for Particular Uses

Differentiating Characteristics of Gray Iron, Mottled, Chilled or White—Skill of Manufacture—Analyses for Certain Castings

BY Y. A. DYER*

GRAY iron may be designated as a stable system (Fe—Fe_3C—C) when compared with white iron. That is: at different prolonged cooling temperatures and concentrations, sufficient time elapses for its constituent parts—more particularly carbon—to reach a state of comparative equilibrium with reference to molecular adjustment. Therefore, when gray iron is permitted to cool gradually, its molecular structure follows more closely the curve lines of stability. During the cooling periods the iron carbide has sufficient time to decompose naturally into iron and carbon—part of the carbon separating out as particles of graphite. The presence of this graphitic carbon in cast iron controls its eutectic, or melting point, and largely determines its fluidity and freezing point. That is: the melting point of graphite has not been determined, and the specific heat of carbon is high (at 23650 deg. Fahr. it is 0.505) and varying with rise in temperature; therefore, the melting point of the iron will be high and the latent heat of carbon in solution high.

If an equal quantity of heat be given out (and it is) by the graphite when the reverse change takes place—in cooling—then the carbon, as it separates out of solution with the iron, must give up equally as high heat—hence the giving up of this latent heat by the carbon as it separates out through the different stages of cooling prolongs fluidity of the metal and controls its freezing point. Each time the metal temperature is lowered, its power to hold carbon in solution decreases; therefore, as more carbon separates out, additional heat is added by its dissociation.

It would seem that, in a measure, this is a rational explanation as to why the melting point of gray iron is higher than that of white iron; also why its fluidity is prolonged over that of white iron by reason of the high percentage of graphite present; and also why its freezing point is lower than its melting point. The iron carbide in iron is a very unstable compound, and when formed at a high temperature decomposes into graphite and iron according to the formula: $Fe_3C = 3Fe + C$. Later on, in discussing white iron, another phenomenon of the performance of iron carbide will be noted. A typical gray iron melts at about 2260 to 2280 deg. Fahr.

Mottled Iron

The classification of mottled iron, with reference to structural composition, may be described as partly gray and partly white iron; or the "hybrid" of cast iron—it is neither white nor gray iron. Its matrix contains particles of small size graphite and particles free from graphite; or cementite and pearlite. In the classification of pig iron it is graded as low silicon, 0.75 to 1.25 per cent, and contains high sulphur, usually 0.08 to 0.12 per cent. It is generally the product of an irregularly working furnace.

That portion of metal which lies between the chilled tread and hub of a carwheel, or between the chilled surface and core of a chilled roll, is typical mottled iron. The blending from white to gray is gradual, hence the nearer the approach to the gray portion of the metal the larger the graphitic flakes will occur. It contains much free cementite, hence is inclined to be hard and brittle. A typical mottled iron melts at about 2200 to 2230 deg. Fahr.

White Iron

White iron is a supercooled solution of iron and carbon; and, compared with gray iron, may be considered an unstable system between Fe_3C and Fe. That is, its carbon is in an unstable condition, due to the iron carbide not having had an opportunity, during the rapid cooling process, to carry forward the reaction: $Fe_3C = 3Fe + C$. Thus, an iron suddenly cooled presents the spectacle of having its constituent molecules frozen before there has been sufficient lapse of time for proper "molecular adjustment"—hence the molecules are tense and subject to crack by sudden impact or rapid heating and cooling. By annealing such an iron a sufficient length of time, there will be created a "molecular readjustment," and high tension will thus be relieved.

Molecular readjustment may be illustrated by reference to the treatment of "fatigued" iron or steel. Thus, a chain or wire rope which has undergone severe strain of molecular structure may be materially strengthened by the application of heat to readjust its molecules and thereby relieve the tenseness. In the production of chilled carwheels it is very necessary that the wheels be placed in "soaking" or annealing pits, after having been removed from the molds at red heat, in order that there may be created a readjustment of the differentiating molecular structure of the three combined types of metal—white, mottled and gray—thus relieving the tension and preventing cracks and weakness.

During the quick-setting period of white iron the iron carbide has not had sufficient time to decompose into iron and carbon; therefore, after the solution of iron and carbon has set or frozen, this condition renders the carbon very susceptible to subsequent heat reactions. That carbon atoms are migratory, or move and are transferred, is fully demonstrated by the change of structure from white iron to malleable under intense heat; and by the fact that solid iron or steel will absorb carbon, upon being placed in contact with incandescent carbon.

It is possible to produce a white iron in the presence of 2.00 to 3.00 per cent silicon, and in the absence of much manganese and sulphur, if the mixture be melted hot and cooled quickly before the iron carbide has had time to break up. This fact is demonstrated by casting iron in chilled molds, or cooling it quickly by a spray of water. It is also possible for an iron containing a small amount of silicon and large amounts of manganese and sulphur to cool slowly and yet be white in nature. This is illustrated by casting grinding slugs and stars in green sand molds. A typical white iron melts at about 2000 to 2070 deg. Fahr.

Lack of reactions created by graphite separating out of solution, to prolong the fluidity of the metal, explains why the freezing and melting points of white iron may be considered practically the same. Hence white and mottled iron will melt at a lower tempera-

*Birmingham, Ala.

ture than gray iron, and freeze at practically the same temperature.

Skill of Manufacture—Gray Iron

Compared with the high skill and art necessary in the production of chilled or hardened castings, there is usually as fine art and skill needed in the production of certain types of gray iron castings. The founder's wit and skill should be at "par" when he decides to enter the field of brake shoe manufacture, engine and automobile cylinders, piston heads and rings, projectiles, shells, propeller blades, ingot molds, welding rods, acid and alkali resisting castings, glass molds, stills, eggs, retorts, valves, fittings, etc. The relative importance of standardizing certain of these castings is briefly touched in the following paragraphs:

Brake shoes: A casting which will resist sudden and variable frictional wear, yet not be so hard as to break down in an irregular way the wearing tread of the wheel, should be the aim of the manufacturer of brake shoes. The silicon should be fairly low, sulphur low, phosphorus medium and manganese fairly high. The braking power of the shoe will be commensurate with its softness; but soft shoes wear more rapidly. One street railway system manufactures its own brake shoes; they are chilled throughout. This company is noted for the number of flat wheels on its cars; also for the "bell chimes" created by the shoes idling against the wheels while the car is in motion. The following analyses are recommended for brake shoes:

Percentage Contents

	Si	S	P	Mn	Total Carbon
Hard	1.50	0.08	0.60	0.70	3.25
Soft	2.00	0.07	0.70	0.50	3.40

These castings are sold under a guarantee, hence the percentage of good foundry iron should be used as the base metal, with major percentages of steel and low silicon cast scrap.

Automobile castings: The manufacture of automobile cylinders requires a standard of high art. The cylinder specifications not only require minimum thickness, but maximum strength and density, to insure safety from impact of explosion and effective compression; also to care for contraction and expansion due to fluctuating temperatures. Minimum frictional wear is also essential. These are a combination of factors for solution by the most renowned construction engineers. The ingenuity of the molder is also put to a severe test, for much depends on the construction of the mold, and on the gating and pouring. Following are suggested analyses for cylinders:

	Si	S	P	Mn	Total Carbon
Medium	1.75-1.85	0.07-0.08	0.25-0.35	0.75-0.80	3.30
Light	2.00-2.15	0.06-0.07	0.25-0.35	0.60-0.70	3.40

Piston heads and rings should be of softer material, in order not to scorify or wear away the cylinder. The rings should be of a springy nature. Following compositions are suggested:

	Si	S	P	Mn	Total Carbon
Rings:					
Medium	2.00	0.07	0.40	0.75	3.40
Light	2.25	0.06	0.50	0.65	3.45
Pistons:					
Medium	1.85	0.07	0.25	0.60	3.40
Light	2.15	0.06	0.35	0.50	3.45

Projectiles; shells: Cast projectiles, ordinarily used by the Government for target practice, require for their production strict attention to melting practice; also gating and molding. A dried mold, whirl gate and bottom pour are features which will tend to soundness and homogeneity of casting. Shells should be cast vertically, and may number four to the flask for smaller sizes. Twenty-five per cent of steel scrap may be used to good advantage in large size shells, and from 18 to 20 per cent in smaller sizes. Steel will lower the phosphorus and total carbon.

As compressive strength, or resistance to expansion, is an important requisite of shell metal, density is a controlling factor. Specifications usually call for 28,000 to 30,000 lb. per sq. in. tensile strength, and 18-in. impact. Inasmuch as the smallest pin-hole may cause the rejection of shells, it is necessary to minimize oxidation of the metal and guard against segregation, by the use of low phosphorus metal superheated and poured hot. Charges should be well fluxed; good substantial risers used, and metal be allowed to cool in the mold 4 to 6 hr.

Following analyses are suggested:

	Si	S	P	Mn	Total Carbon
Light, 3 to 5 in.	1.40	0.06	0.30	0.60	3.35
Medium, 6 to 8 in.	1.20	0.07	0.30	0.70	3.20
Heavy, 10 to 12 in.	1.10	0.09	0.30	0.80	3.10

Propeller blades: Because propeller blades are for use in both fresh and salt water, corrosion at once suggests itself. Low total carbon, with comparatively high graphite, resists corrosion from salt water. The silicon should not be too high, manganese medium, phosphorus and sulphur reasonably low. As much as 20 per cent steel will assist in lowering total carbon. If propeller blades are heated, and then coated with tar, the treatment will assist in resisting corrosion for a long period of time. Following analyses are suggested:

	Si	S	P	Mn	Total Carbon
Light	1.80	0.06	0.40	0.50	3.40
Medium	1.40	0.08	0.40	0.60	3.25
Heavy	1.15	0.10	0.40	0.70	3.15

Ingot molds: Service and economy are the prime requisites of ingot mold metal. The molds are bulky castings, but continued service depends on their composition; more especially the economy question, as old and worn-out molds are put through the open-hearth furnace for entrance into a new steel mixture. Therefore sulphur and phosphorus should be low. One steel plant produces periodically, for this purpose, in one of its small blast furnaces, a metal of the following analysis: silicon 1.80 per cent, sulphur 0.04 per cent, phosphorus 0.08 per cent and manganese 0.80 per cent. This metal is produced from steel scrap, manganous slag and silica rock. It is then put through the cupola, and poured as ingot molds of following analysis:

Si	S	P	Mn	Total Carbon
1.65	0.06	0.10	0.65	3.40

This analysis constitutes an excellent ingot mold metal, and its duplication in a cupola is suggested.

Welding rods: Clean and flawless metal with reasonably high melting and freezing qualities are desired in welding rods. High silicon, with its fluxing qualities, is a desirable element. Sulphur and phosphorus should be reasonably low and manganese medium. Following composition is suggested:

Si	S	P	Mn	Total Carbon
3.50	0.06	0.50	0.50	3.50

Snap graphite board flasks, inclined vertically, make desirable molds for casting rods. The product will be clean and symmetrically shaped. However, the rods may be successfully cast in dry or green sand. Because the metal section is small and the iron poured hot the grain will be close and even.

Acid-resisting Castings.—Of course, the ideal metal to resist corrosive effects of hot and cold acids would be one which approaches iron silicide; that is: an alloy metal which contains 12 to 15 per cent silicon, or following approximate analysis:

Si	S	P	Mn	Total Carbon
14.00-15.00	0.05	0.05-0.20	0.35-2.50	0.60-1.25

Such a metal, however, could not be classed as cast iron. This metal may be produced in an air furnace or electric furnace by the use of ferroalloys. The nearest approach to an acid-resisting metal, poured from cupola iron, would be of following suggested composition:

	Si	S	P	Mn	Total Carbon
Light	2.00	0.05 max.	0.30 max.	0.75	3.25
Medium	1.50	0.05 max.	0.30 max.	1.00	3.20
Heavy	1.25	0.05 max.	0.30 max.	1.25	3.10

Alkali and heat resistant castings come under the above analyses, with slight rise in silicon and lowering of manganese for heat resistant castings; and still further reduction of manganese for alkali resistant castings.

Gun Iron.—As the name implies, this metal once found its most practical use in ordnance work, mortar guns, cast iron cannon, etc. It has since gained quite a reputation for use in chilled rolls, gas and steam engine cylinders, piston rings, liners and various engine castings which require a smooth, dense and tough structure—"Hunt-Spiller" metal being a fair specimen.

This metal is also essentially a product of the air or electric furnace, in which the elements may be regulated to suit the specific casting required. Carbon control is ideal under such melting conditions, as well as silicon, sulphur, phosphorus and manganese, according to the lining used. While large percentages of steel may be used in cupola mixtures, yet the total carbon in resultant casting may vary considerably, due to the metal's contact with incandescent carbon. Additions of steel scrap will materially assist in accomplishing the desired results. The nearest approach to the analysis of gun iron metal in cupola mixtures would be the following:

	Si	S	P	Mn	Total Carbon
Light	1.80	0.05	0.35	0.60	3.35
Medium	1.40	0.06	0.35	0.70	3.20
Heavy	1.15	0.08	0.35	0.80	3.00

Skill of Manufacture—White Iron

There is no branch of foundry work where skill of operation and metallurgical knowledge are put to a more thorough test than in the manufacture of chilled or hardened castings. The real fine point to be observed in the production of hardened castings is the manner in which the transition of the white section is made to interlock or merge into the mottled section. It should be the endeavor of the producer to have the white fibers interlock or "dove-tail" into the matrix of the mottled section. This conditions decreases straight line cleavage areas and minimizes cracks. Manganese promotes a fibrous, tough chill, whereas sulphur is more conducive to cleavages and brittleness. High phosphorus also has a tendency to produce cleavages, as well as segregation.

For many years foundrymen clung tenaciously to the idea that it was absolutely essential to use charcoal iron in mixtures requiring a hardened or chill process. While modern foundry practice has to a great extent removed the barrier, the fact remains that dependable low silicon iron of high grade is yet peculiarly a product of the charcoal furnace.

As low silicon irons, 1.25 per cent and under, produced in a coke furnace, are likely to be "off grade" by reason of excessive sulphur or other causes incident to an irregularly working furnace, they may prove to be an inferior product. In many instances, however, it is possible to use the higher silicon coke irons, 2.25 to 2.75 per cent silicon, in chilled or hardened mixtures, by having available sufficient low silicon cast scrap, 0.50 to 0.70 per cent silicon, and steel scrap.

The following comparative results reported by Evans are interesting:

Mixture A	Per Cent	Analysis	Per Cent
Pig iron	11.6	Silicon	0.607
Steel scrap	8.3	Sulphur	0.148
Old wheels	80.1	Phosphorus	0.430
Ferromanganese	0.2	Manganese	0.563
		Graphite carbon	2.587
		Combined carbon	0.729
		Total carbon	3.316

Tests	Crack	Break	Chill
Average drop blow	27.6	66.2	0.51-0.60 in.
		Chilled Tread	Test Ingot
Hardness		477	482
		Load	Deflection
Transverse 1¼-in. round-gray		2,948 lb.	0.123 in.
Transverse 1⅛ in. square-chilled		2,611 lb.	0.043 in.

Mixture B	Per Cent	Analysis:	Per Cent
Charcoal pig	13.30	Si	0.634
Steel scrap	8.30	S	0.160
Old wheels	78.30	P	0.350
Ferro-manganese	0.05	Mn	0.425
		Graphitic carbon	3.191
		Combined carbon	0.344
		Total carbon	3.535

Tests	Crack	Break	Chill
Average drop blow	15.4	49.6	0.46-0.56 in.
		Chilled Tread	Test Ingot
Hardness		457	478
		Load	Deflection
Transverse 1¼ in. round-gray		2,975 lb.	0.111 in.
Transverse 1⅛ in. square-chilled		2,617 lb.	0.043 in.

Car Wheels.—An economical mixture, as well as one which will produce a wheel to stand all the requirements of the Master Car Builders' Association, may be made with the following materials:

	Si	S	P	Mn	Total Carbon
12.0 per cent pig	2.30	0.04	0.55	1.15	....
10.0 per cent steel	0.10	0.03	0.06	0.50	....
78.0 per cent wheels	0.65	0.12	0.35	0.58	....
0.3 per cent ferro-manganese	....	....	....	80.00	....
Wheel analysis	0.65	0.12	0.35	0.60	3.35

The depth of chill on tread of railroad carwheel ranges from ¾ to ⅞ in.; street carwheels require considerably lower depth of chill. The safer policy would be to aim for a lower silicon content in a wheel, rather than a high one, for high-silicon iron or ferrosilicon may be quickly added to raise the silicon, whereas if the silicon should be too high, more drastic steps have to be taken to "pig down." Therefore, in mixtures for chilled castings, the silicon content in the metal mix should be low.

Chilled Castings.—Where only a hard, smooth chill is wanted, the manganese may range from 0.25 to 0.35 per cent; sulphur 0.07 to 0.10 per cent. This especially applies to chilled rolls. Following approximate analyses have proved good mixtures for rolls:

	Si	S	P	Mn	Total Carbon
Light	0.85	0.07	0.50	0.35	3.00
Heavy	0.60	0.08	0.35	0.35	2.85

Following analyses for other chilled or hardened castings have proved satisfactory:

	Si	S	P	Mn	Total Carbon
Plow points	1.25	0.07	0.50	0.85	3.10
Dies	0.85	0.08	0.40	0.50	3.00
Anvil blocks	0.85	0.10	0.35	0.60	3.00
Armor	0.70	0.08	0.40	1.00	3.00
Grinding balls	0.75	0.15	0.40	0.80	3.00

Rate of cooling also has its effect on the chill and texture composition of metal mixtures desired for hardened castings. The process is accomplished by the sudden cooling of the molten metal coming in contact with a metal chiller, the depth of chill depending on the chemical composition of the metal and the temperature at which it is poured. Chill test blocks are made 6 x 4 x 1½ in., and are usually cast in the mold with the casting, and from the same ladle of metal, as a check or indication of chilling qualities.

Low silicon, high combined carbon and medium manganese are ideal chemical components, and hot unoxidized metal, poured at a temperature between 2400 and 2500 deg. Fahr., favors satisfactory chilling conditions. If melting conditions should be right, and careful attention given to the matter of pouring tem-

perature, higher silicon mixtures may be made to produce a deep chill. However, the metal must not be oxidized, or the resultant casting will be irregular and weak.

Iron properly chilled should show a structural mixture of cementite and pearlite, with quite an excess of free cementite; the mottled portion, in addition to cementite and pearlite, will reveal small patches of graphite; the gray portion will show relatively large plates of graphite in pearlite, with a comparatively small amount of free ferrite in pearlite. The chemical composition of white, mottled and gray sections of hardened iron would be expected to approximate the following percentages:

	Si	S	P	Mn	Graphitic Carbon	Combined Carbon	Total Carbon
White....	0.65	0.11	0.40	0.50	0.05	3.25	3.30
Mottled...	0.65	0.12	0.39	0.52	1.50	1.60	3.10
Gray.....	0.60	0.13	0.38	0.55	2.40	0.80	3.20

CHINA BUYS LOCOMOTIVES

American Builders Secure Part of Large Order for Rolling Stock

WASHINGTON, Sept. 5.—Forty-one locomotives were required for three Chinese Government railroads, for which bids were received from 28 manufacturers, including British, German, French, Belgian, Japanese and American factories. The business was divided into four items and awarded as follows:

Item 1.—30 Prairie type locomotives for Pekin-Hankow Railway. Awarded to Forges Usines et Fonderies de Haine-St. Pierre Ateliers Metallurgiques Tubize Société Franco-Belge à la Croyere, Belgium.

Item 2.—6 English type locomotives for Shanghai-Hangchow-Ningpu Railway. Awarded to Forges Usines et Fonderies de Haine-St. Pierre Ateliers Metallurgiques Tubize Société Franco-Belge à la Croyere, Belgium.

Item 3.—2 Mikado type locomotives for Pekin-Suiyuan Railway. Awarded to American Locomotive Co.

Item 4.—3 Pacific type locomotives for Pekin-Suiyuan Railway. Awarded to American Locomotive Co.

Two hundred and forty all-steel cars were required, 100 of which were open and the others covered. Although three items were represented, all were awarded to Compagnie Centrale de Construction à Haine-St. Pierre, a Belgian company.

Bids were submitted in seven different currencies, and certain bids were rejected because the delivery offered was not as specified. The following table gives the lowest bid of each of the several nationalities:

Items and Nationalities	Bid—Currency	Bid—Amount	Equivalent in Taels
Thirty Prairie type locomotives:			
Belgium	Belgian francs.	452,550	55,210
Japan	Yen	85,000	62,475
United States	Dollars	42,200	68,510
Germany	Dollars	49,215	76,280
Great Britain	Pounds sterling	13,647	78,880
Six British type locomotives:			
Belgium	Belgian francs.	434,660	53,025
United States	Dollars	43,230	67,000
Great Britain	Pounds sterling	11,750	67,915
Germany	Dollars	49,540	76,790
Three Pacific type locomotives:			
Japan	Yen	94,000	61,740
Belgium	Belgian francs.	515,000	62,830
United States	Dollars	50,880	78,860
Great Britain	Pounds sterling	14,310	82,710
Germany	Dollars	53,910	83,560
Two Mikado type locomotives:			
Belgium	Belgian francs.	548,600	66,930
Japan	Yen	100,000	73,500
United States	Dollars	52,000	80,600
Great Britain	Pounds sterling	14,904	86,150
Germany	Dollars	57,000	88,350
One hundred all-steel "open wagons":			
Germany	Pounds sterling	612	3,540
Belgium	Belgian francs.	31,325	3,820
United States	Dollars	2,550	3,950
Japan	Yen	6,000	4,410
Great Britain	Pounds sterling	1,016	5,870

It will be noted that the relative positions of the various countries change very little and that the American product is competitive. Belgium and Japan were consistently lower, and Great Britain and Germany consistently higher, in prices for locomotives, than was the United States. It is necessary to make certain allowances in interpreting the above data. Specifications for the 30 Prairie type locomotives conformed almost exactly with the Belgian locomotive already operating, and the 6 British type locomotives are to conform strictly with existing locomotives of British manufacture. Certain bids were disqualified, even though nominally lowest, because they did not include all items as required for delivery as specified. The two Mikado and three Pacific type locomotives were awarded to the lowest bidder that conformed to the specifications for a cast-steel bar frame.

These figures indicate what is to be anticipated in the present disturbed condition of international exchange. In spite of the fact that the American dollar is at a premium over all the other currencies, it is still possible to submit competitive prices. As the indications are that the amount of this premium will gradually decrease during the next few years, it should have the effect of placing American manufacturers in an increasingly favorable position.

If the Belgian franc stood at 10c. instead of 8c. it would have raised all of the Belgian bids 25 per cent. Also it is understood that a great deal of the steel now being made in Belgium is produced largely from scrap, rather than being worked up from ore, and is correspondingly cheap. As time exhausts these stocks it will probably be found that Belgian prices increase. It is noteworthy that the German bids on locomotives were in dollars; on cars, in pounds sterling.

Steel Corporation Analysis Methods

The various committees of chemists of the United States Steel Corporation have prepared up-to-date pamphlets covering the following subjects: "Sampling and Analysis of Iron Ores," "Sampling and Analysis of Pig Iron," "Sampling and Analysis of Fluxes, Cinders and Refractories," "Sampling and Analysis of Plain Steels," "Sampling and Analysis of Ferroalloys and Bearing Metals," "Sampling and Analysis of Gases," and "Sampling and Analysis of Coal, Coke and By-products." These pamphlets, it is announced, are prepared solely for the use of the chemists of the Steel Corporation and are of interest only to chemists. To limit the requests from outside sources, which the committee does not feel it can wholly deny, a charge on them of $1 each has been imposed, payable to the Carnegie Steel Co., payment to accompany the request. The matter is in charge of J. M. Camp, chairman Chemists' Committee, U. S. Steel Corporation, Carnegie Building, Pittsburgh.

The evening courses of Pratt Institute, Brooklyn, N. Y., begin Sept. 22 for the trade classes and Sept. 26 for the technical classes. The technical courses include industrial electricity, practical electricity, technical chemistry, mechanical drawing and machine design, elements of power plant operation, stationary steam plant operation and automotive engine maintenance and repair. The trade courses include machine work, pattern making, foundry practice, forging and heat treatment and machine shop foremanship.

The President of the Argentine Republic has sanctioned a decree authorizing a further increase of 4,500,000 pesos in the budget for sanitary works for the city of Buenos Aires during the current year. The money will be used in extending the radius of the water and sewer systems and will call for the purchase of pipe and fittings. The work is under the direction of Director de Obras Sanitarias de la Nacion, Buenos Aires.

Following an announcement by the Aetna Nut Co., Southington, Conn., last week of a reduction in wages of 15 to 25 per cent, about 10 per cent of the employees, mostly roughers on heavy and light rolls, walked out, and the plant was obliged to suspend operations. The plant had resumed last week following a long period of inactivity.

British View of American Steel Making

Blast Furnace and Open-Hearth Practice Compared—Coke-Oven Gas as a Fuel—Rolling Mills Here and in England

THE *Journal* of the West of Scotland Iron and Steel Institute publishes an article, "Snapshots of an American Pilgrimage" by R. Percival Smith, which was read at the June meeting of the society. The author is connected with the Lanarkshire Steel Co., Ltd., Motherwell, Scotland. His impressions were received on a "somewhat hurried visit to several important centers of the American steel industry" in 1920, and are of such interest as to warrant the reproduction of liberal extracts below:

Works Organization

What impressed me, and what would, I believe, be bound to impress every stranger going to America for the first time, is the splendid organization of the works. When you introduce yourself you see the general superintendent, who immediately refers you to his departmental chiefs, and the departmental chiefs approach you and talk to you about the plant as if the plant were their own property. It is a pleasure to see what personal pride they take in the mills and shops under their charge. They look upon their departmental chiefs as fellow-workers and accept suggestions from them readily. Men are not discouraged by being turned down again and again. The American never hesitates to give an idea a fair trial if he thinks there is anything in it. If a venture proves successful, the author is given full and due credit; if, on the other hand, failure attends an honest effort at improvement, the man responsible for the suggestion is not unduly discouraged.

American steel makers show no hesitation in exchanging views and experiences, and in holding out a helping hand to the competitor in difficulties. To whatever works I went in America I found they were in intimate touch with the others and could tell me what was happening elsewhere and direct me where to go to see things of interest.

Organization also has its outward and visible signs. Its impress is upon all American works; you cannot escape it. You go to America knowing you are going to a country where they worship hustle, and you may have a suspicion that this must go on with a reckless disregard of outward appearances. If so, there is a surprise in store for you. American works are kept in beautiful order, and put ours to absolute shame.

It is probably true that the American has in the past paid attention to speed production to the exclusion of every other consideration, but he is certainly beginning to realize that quality must not be sacrificed; and there is every indication that he is going to find means of producing good iron and steel without losing time about it.

The free interchange of views and experience has led to standardization of plant and method, and it is only in certain instances that difficulty seems to be experienced in coming to a complete understanding as to which is really the best. There appears to be no unanimity about the best type of gas producer, for instance; the Hughes and the Morgan gas machines seem to be struggling for mastery. Upon the question as to which is the best type of open-hearth furnace reversing gear there are sharp differences of opinion, and there is a bewildering variety of checker-work formations in use.

But though repetition in plant is very marked wherever you go, this does not imply that Americans are content to follow on in a well-defined groove. Changes take place rapidly. When it becomes known that alterations in one plant have been attended by success, others are not long in following suit. That changes are not looked upon with disfavor was unconsciously expressed by superintendents, who, upon hearing that I had visited certain plants, wanted information concerning them, as they had not been there for two or three years, and showed evident disgust when it transpired that there had been no or only trifling development.

Far-reaching standardization has the obvious advantages of quick delivery and reduction of initial costs.

America has its difficulties—difficulties unknown to us. They have long hauls, and severe winter weather causes very serious disturbances. Works have to be fitted with large storage accommodation to tide them over the closed season, when sea and land is in the grip of winter. The American has faced these difficulties courageously. By wide application of machinery, handling costs have been greatly reduced, and plant equipment has been provided to meet every emergency. If errors have been made, they have been made on the side of over-equipment.

Ore Handling

A very good instance of ore handling is to be found at South Bethlehem. The yard there has a storage capacity of 1,000,000 net tons of ore. It is served by two ore bridges with 15-ton grabs. The ore in 75 trucks with side hoppers empties itself into concrete trenches running the length of the yard on both sides, and is lifted from there to the pile by the grabs. Special provision is made for dealing with solid bottom trucks, which are used extensively in the transport of ore. The loaded truck is run into a lattice-work drum, so placed that when it rolls on its pinion racks, thereby inverting the truck, the ore is emptied into hopper wagons on the road at the side of the trench. The method is simple and effective. As 75 tons are thus dealt with in 10 min., which corresponds to an hourly capacity of 400 to 500 tons, less than 1 cent per ton will pay for the service of the eight men in attendance.

From the yard the ore is transported in hopper wagons to the daily supply bins, whence it flows into the trucks that weigh it and dump it into the blast furnace skips. All operations are performed rapidly and with the minimum expenditure of time and effort. Though South Bethlehem has been quoted here, it is not singular. Many instances could be mentioned of plant for handling ore and coal and other raw materials.

To make direct comparison between Scottish and American blast furnace practice would serve no purpose, for the conditions in the two countries vary so widely. Some facts about American blast furnace practice are nevertheless bound to be of interest to us.

Mesabi ore, which is used largely, is a gravelly ore, very rich in iron and easily fluxed. The reducing agent is in every case coke, produced from the finest quality of coking coal, and very carefully prepared. It is screened to secure uniformity in size. The large coke goes to the blast furnaces, the smaller coke is sold for household purposes, and the coke breeze is, in certain cases at any rate, used by the works themselves for steam raising under boilers with mechanical grates specially devised for the purpose. American blast furnaces are generally about 100 ft. in height, the blast pressure varies from 16 in. to 21 in., and the output for 24 hr. from 400 to 700 tons. The average is probably anything from 500 to 600 tons.

From the steel makers' point of view, the quality of iron produced is highly interesting. So-called American standard iron has the following composition:

Silicon	0.75 per cent
Manganese	0.75 per cent
Phosphorus	0.70 per cent
Sulphur	0.04 per cent

Hot Metal Steel Practice

Cold metal practice is practically non-existent. Hot

metal practice may be said to be universal. That in July of last year duplexing, the more elaborate adaptation of hot metal practice, was not much in evidence is perhaps no matter for surprise, when the relation between the prices of pig iron and scrap at that time is taken into account. It is of great interest to note, however, that in some quarters doubts are entertained as to the economic advantages of duplexing, not on general grounds, but as the result of careful and exhaustive inquiry. In 1912 or 1913 an influential American corporation drew up comparative costs between the duplexing process of one of its plants and the ordinary hot metal practice of another, and came to the conclusion that, considered purely from the point of view of economy, the former has no advantage, or so very little that when you throw its disadvantages into the balance it is not worth consideration.

Hot metal practice in America is conducted on similar lines to what it is in this country, as much scrap entering into the composition of a charge as can be conveniently handled. The percentage of scrap used there on an average appears to be somewhat lower than is the case in the best-conducted plants in this country. Taking the composition of American standard iron into account, this is only to be expected. The analysis shows that it has a lower silicon content and a very much lower phosphorus content than the grades of iron in general use with us.

It follows from the foregoing that a strict comparison between British and American open-hearth practice is impossible, but there is no reason why we should not equal their very best practice, or even surpass it. Our latest plants do not differ widely in essentials from the latest American open-hearth plants. There is this to be said, however, that in America there does not appear to be the same tendency to underpower shops in certain essentials to the everlasting detriment of free unhindered production. The American believes in a margin of safety, and if mistakes are made it is usually on the side of liberality.

Gas Producers

To give an instance, the two 80-ton open-hearth furnaces at the Brier Hill Steel Works, have four producers for each furnace; each of the four has an hourly capacity of 3000 lb. This may seem over-generous, may be regarded as unwarranted extravagance, yet there is no gainsaying the fact that the average fuel consumption calculated over a year's operations is very creditable. We are bound to look upon a fuel consumption of 700 lb. per ton of ingots produced as a fairly satisfactory performance. Wherever producer gas is used in America, the figure quoted was approximately the same.

Mechanical producers of one form or another are universally installed. It cannot be said that producer practice is very carefully controlled. Generally speaking, we keep a more rigid check on the operations of the gas bench. But here again the American is amply blessed. Consider the following analysis of West Virginian gas coal:

Ash	7.0 per cent
Volatile matter	37.0 per cent
Moisture	2.0 per cent
Sulphur	1.0 per cent
B.t.u.	13,800

We might well envy him. The attitude of the American open-hearth manager is perhaps after all not to be wondered at. He is quite satisfied that all is well with the producers as long as the paces of his furnaces are satisfactory. He may, however, some day recognize that with systematic control of producer practice results would be even more satisfactory and, when fuel of less excellent quality has to be accepted, the consequences less serious. How serious they may be under existing conditions was exemplified in one plant where the usual supplies failed, and Indiana gas coal of the following composition had to be used instead:

Ash	8.5 per cent
Volatile matter	41.7 per cent
Moisture	10.4 per cent
B.t.u.	10,940

We would consider ourselves very fortunate if we were assured of a constant supply of such fuel, yet the melting shop outputs in this instance fell off in alarming fashion.

Coke Oven Gas for the Open-Hearth

As you all know, producer gas is not used exclusively in America, nor yet to a preponderating degree, in open-hearth furnaces. They have a variety of fuels. At the top of the list stands natural gas. It is considered the best fuel of all, but its uses are now restricted. In having supplies of this gas America was richly blessed. Having come into such wealth without a struggle, the American failed, however, to appreciate it fully and squandered it. It is now available for melting purposes in a few places only, and in these cases provision is made for its immediate discontinuance. The American regrets its passing. Coke oven gas is employed largely. Its constitution and heating value is exemplified by the following analysis from the coke oven plant at Clairton, the most modern of its kind in the United States:

Carbon dioxide	1.65 per cent
Carbon monoxide	3.93 per cent
Illuminants	3.32 per cent
Carbohydrates	33.53 per cent
Hydrogen	54.11 per cent
Nitrogen	3.46 per cent
B.t.u.	578
Sulphur, per 100 cu. ft. of gas	0.0606 lb.

Coke oven gas is very light, and consequently difficult to control. As far as my experience goes, only one firm in America uses it alone successfully; in all other cases that came under my notice tar was used with it, the tar being introduced above the gas by means of a small nozzle after passing through a special form of carbureter. Tar by itself is highly favored, in spite of certain drawbacks. Carburetion does not yet appear to have reached perfection, a black heart being very noticeable in the flame. The checkers soon become very dirty, and have to be cleaned out after a run which never seems to exceed 200 charges. The heating value of tar as fuel for open-hearth furnaces is, however, undoubted as long as the system is in good condition, and the speed with which a furnace thus heated melts and works a charge must be considered quite satisfactory. The amount of tar used per ton varies between 30 and 40 gal. Each gallon contains about 155,000 B.t.u., of which, therefore, 4,650,000 to 6,200,000 are expended in the manufacture of one ingot ton. If you express the results obtained with producer gas in the same terms, you will find that tar compares very favorably indeed with it.

Powdered Coal As a Fuel

The use of powdered fuel for open-hearth and mill heating furnaces has not hitherto been attended by success. The heat of the flame is intense, but its control presents great difficulties. Powdered fuel plant was installed in the melting shop at Clairton; the furnaces were, however, unable to stand it, and the men demanded their time. An experiment was then made with it in the mills, but abandoned when a hole was burnt through the bridge in an unguarded moment. Apart from this, powdered ash very soon chokes up the checker chambers, putting the plant out of commission. In connection with this question, the following figures supplied by Clairton of the heating values of the various fuels in use might be of some interest:

Blast furnace gas	90 to 110 B.t.u. per cu. ft.
Producer gas	140 B.t.u. per cu. ft.
Coke oven gas	578 B.t.u. per cu. ft.
Natural gas	1,000 B.t.u. per cu. ft.
Tar	155,000 B.t.u. per gal.

As has already been mentioned, the American open-hearth plant does not differ largely from ours. In keeping with a very liberal policy ample yard room is always provided, and generally adequate means for forwarding materials to the furnaces. In this respect America shows a superiority, but I do not think it can be said that its practice is in every respect superior to ours. The American is occasionally inclined to be coarse in his methods. Water cooling is a feature of melting shops both in the United States and Canada. Water-cooled doors and door frames are universally employed. Water-cooled ports are very common, and some form of bulkhead cooling is frequently installed.

In some instances the application of water cooling goes still further, as, for instance, at South Chicago, where the furnaces, as well as having all the equipment already mentioned, are fitted with devices for cooling skew-backs and slag lines.

The following details of the cooling arrangements in No. 4 shop at Homestead may be found interesting. It is very complete; the end walls are cooled by means of pipe lines, which are looped back and forth, the water being admitted at one side of the furnace and drawn off at the other. There are 10 loops in all—six of them below the charging floor level and four above. An 8-in. pipe cools the blocks and the bridges of the air wells, the air uptakes entering the furnace as in the case of the Maerz block. Doors and door frames are water cooled, and an 8-in. water pipe runs the length of the furnace both at the front and at the back, immediately under the bottom flange of the channel carrying the crown; 5,800,000 gal. of water are required for cooling purposes in 24 hr., when 14 furnaces are in operation.

Car casting has found general adoption in America, the ingot being stripped in a separate bay. This arrangement leaves more room in the casting bay.

An interesting feature of American open-hearth plant is the skull breaker. The tripod has been discarded, and in its place you find a gantry and crane, with magnet equipment for lifting the round balls that are in general use. It is obvious that the running costs must be low, as two men are quite sufficient for all purposes.

Figures dealing with the time occupied with furnace repairs are instructive. At Brier Hill, a plant near Youngstown, they put up a full back wall in 15 min., a front wall in 40 min., remove a Blair port pan and put another in its place in 20 min. without the aid of a crane, and perform a general repair in somewhat less than six days.

American Blooming Mills

The blooming mill is an interesting feature of American steel works plant. The soakers of a 40-in. cogging mill in this country have a capacity of, say, 200 tons; the soakers of the 38-in. blooming mill at Duquesne, to take one instance, are capable of holding 500 tons in 3-ton ingots. Also a blooming mill in America is a specialist. It is generally called upon to break down ingots to blooms of a definite size.

If further reduction is called for before the finishing stage, another specialist, the roughing mill, undertakes the work, and to the finishing mills restricted tasks are apportioned. Mill work is characterized by far-reaching specialization.

You find elaborate blooming mills in America. That they porform an amazing amount of work is not astonishing. Take, for instance, the three-high blooming mill at the Ohio Works, or the continuous blooming mill at Gary, with its nine stands. In their way they are very interesting. But I do not think they could ever impress the stranger in the same way as the ordinary reversing blooming mill, in most respects so like our own. The days of the steam engine are said to be numbered, but at present the motive power is, as a general rule, supplied by twin compound condensing engines, though atmospheric exhaust is not unknown even in otherwise up-to-date plant. The work of these mills would call forth nothing but pleasure in the mind of the visitor. The following table shows the roll design and the procedure in the 44-in. mill at the works of the Youngstown Steel & Tube Co.:

First pass	12¾ in. groove
Second pass	55 in. slabbing
Third pass	3⅞ in. groove
Fourth pass	8¼ in. groove
Fifth pass	5¾ in. groove

Breaking Down

Ingot, 20 in. x 22 in.; bloom, 7¾ in. x 3¼ in.

	Total
Slabbing—2 passes–t.o.*; 4 passes–t.o.	6
12¾ in. groove—2 passes–t.o.; 2 passes–t.o.	4
8 in. groove—2 passes–t.o.; 1 pass	3
Slabbing—1 pass–t.o.	1
3⅞ in. groove—2 passes	2
Slabbing—1 pass	1
	17

*t.o. = turnover.

You will observe that if the amount of work performed at each pass is greater than is the case with us, it is not strikingly so, yet 17 passes are given to the piece in 85 sec. by the stopwatch. The performance was even better at Duquesne, where, in the 38-in. blooming mill, 60 sec. only were required for 15 passes and 7 turnovers. It is inspiring to watch these mills at work. The crews give a fine display of team work; the engineman is not afraid to reverse his engine. All auxiliary gear is electrically driven, including the tilts, which work in slots in one of the side guides, and are raised and lowered by a bell crank on the motor shaft.

Finishing Mills

In finishing mills you find a bewildering variety, but they are all either continuous or semi-continuous. For sections the cross-country mill, a most attractive form of semi-continuous mill, appears to be highly favored, whereas for billets, sheet bars, and skelp, shapes for which there is a constant demand, the continuous mill seems to be almost universally employed. A fine example of this type of layout for the rolling of billets and sheet bars is to be found at the Trumbull Steel Works, Warren, Ohio. Here one 3-ton ingot is broken down to 8-in. sheet bars in one minute. When adequate supplies of steel are available, there is only one brief interruption in the amazing flow after every third ingot. The stoppage takes place to allow the cooling bank crane to lift the sheet bars out of the cradle. A red light flashes on as a warning for a short arrest of 15 to 20 sec.; the light goes out and work proceeds. To pass from one side of this mill to the other you go through tunnels beneath the rack. No undue precaution this.

The subject is a fascinating one, but also very wide. We can touch upon it only briefly. To conclude, it seems evident that the Americans are far ahead of us in mill practice, but for no very obvious reason. It may not be possible to introduce into this country the highly specialized mill, but apart from it we have leeway to make up. There is surely no reason why we should not be equal to the task. It is certainly not that we lack the men. We supply America with man material of the very best kind, with which they are obviously perfectly satisfied.

In my experience, Americans were seldom supercilious. I did, however, come across an exception. He was general superintendent, and was inclined to underestimate our powers. To his credit be it said, however, that he admitted the point frankly when it was suggested to him that Britishers were serving America very well. Scotsmen and Englishmen are to be found everywhere in highly responsible positions, carrying on the work of the great Republic, and, as it is no doubt still true that "there are as good fish in the sea as ever came out of it," there is surely no reason to despair. It is certain, however, that we would find it both useful and profitable to review our own position with a critical eye, and then, if we find that all is not well, to face unpalatable facts undauntedly, and to correct them in a courageous and enterprising spirit.

The Pittsburgh chapter of the American Society for Steel Treating has practically completed its program for its regular monthly meetings, which are held on the first Tuesday evening of each month. Included among the speakers are professors from the University of Pittburgh, Harvard University, the University of Illinois and a number of men identified with various corporations and societies. At the first meeting of the new season, to be held at Hotel Chatham, Sept. 6, Prof. F. F. MacIntosh, Carnegie Institute of Technology, Pittsburgh, will speak on "The Metallurgy of Iron and Steel."

Repairs costing $60,000 now are nearing completion at the New Castle, Pa., works of the American Sheet & Tin Plate Co., which has been closed down for some time. The plant will be ready to start in the near future.

SECRETARY HOOVER'S VIEWS

Germany Not the Dangerous Competitor Generally Described

WASHINGTON, Sept. 5.—Germany is not proving to be the post-war competitor in the commercial world that has been credited to her, said Secretary of Commerce Hoover. After stating that an investigation disclosed that Germany was not making inroads in the commercial field in Mexico to the extent reports have indicated, the Secretary alluded to the fact that Germany has been compelled to abandon orders taken for steel in Argentina. Specific reference was made to sales of structural material at low prices, against which, it is said, it has been found German mills cannot make delivery. This situation has been explained in THE IRON AGE. Mr. Hoover said also that not only does Germany lack the supplies and the ability to sell at prices quoted on steel and other products, but that the quality of material being produced was inferior and consequently has lost much of its marketable value.

The Secretary is entirely optimistic with regard to American trade prospects in South America and declared that the bugbear of ruinous competition in that market has gained credence in some trade quarters that is entirely unjustified by facts. Mr. Hoover said that Germany cannot undersell the American exporter in South America for any appreciable length of time because she cannot square the existing low cost of production in some lines with the economic problems she faces in keeping her industry going and in meeting the condition imposed with regard to war reparations.

Credit Facilities

"Insofar as German inroads upon American trade in South America are dependent upon alleged superior credit facilities, it is entirely improbable that any such advantage can be maintained. Credit terms in Latin America have been materially changed during the war, all exporting nations offering less favorable terms than previously. The depletion of German financial resources makes it improbable that the long and favorable credit terms freely offered in some cases before the war can be continued, even though temporarily renewed. With the present financial difficulties of the German Government, which must inevitably be reflected in German finance and ultimately in German industry, there will be no opportunity for adopting credit policies which nations much stronger financially cannot duplicate.

"American manufacturers are in a more favorable position than previously as regards both banking and distribution facilities in South America. While an extensive American distribution mechanism has been built up throughout Latin America since 1914, the German system of banks and trading companies has been seriously damaged. Important German interests in public utilities companies and others have been liquidated and the whole basis for sales of German goods in South America has been materially weakened. Another factor of prime importance to American trade extension is the increased tendency toward American investments in Latin America. There will be no exportable capital available in Germany, as there was before the war, and South American countries will more and more look to the United States.

Reparation Payments

"The reparations payments will also handicap German exporters. The taxes necessary to raise them, however they may be apportioned among German export industries, must increase export prices to a point much nearer the world level. It is primarily by means of exports that the German Government must meet the reparations payment and the natural tendency will be to charge all that the tariff will bear.

"Altogether, it appears that the prospect of ruinous German competition in South America has been exaggerated. Even admitting the present advantages of German exporters, they are apt to be of a temporary nature, in view of the artificial basis upon which German industries rest at this time."

FRENCH COKE REDUCED

Now Quoted at 75 Fr. per Ton—Only 25 Furnaces Out of 312 in Blast—Railroads Busy

(*Special Correspondence*)

LONGWY, Aug. 16.—French ironmasters have lodged numerous protests against prevailing high freight rates from the interior to seaports and also against the high price of coke. As a result the price of coke has been lowered by nearly 35 fr. per ton at one cut. In fact, with the price of coke in France officially fixed at 75 fr. per metric ton, it is expected to have an important effect on surrounding countries. Manufacturers, however, are not satisfied with this improvement in the situation and are pressing the government to remove many of the present taxes imposed upon them.

It is reported that Poland contemplates an order for trucks and railroad material, the Government of Warsaw having recently communicated with the French Government on this subject. Speculating on the heavy decline in coke, Lorraine metal works are already quoting reduced prices. In fact, No. 3 pig iron (smooth skin quality) is quoted at 170 to 175 fr. per 1000 kg. for substantial orders. There are only 25 furnaces in operation out of the total of 312 in France. There is no doubt that such a large number of idle works is responsible for the drastic decline in the price of coke. Ironmasters in Nancy are persuaded that this new price of coke will enable producers to come nearer the German prices.

The railroads are becoming more active with orders. When the effect of the coke decline will have affected prices generally the railroads will no longer have reason to hold back. General optimism is also inspired by the situation in Russia. It is believed here that Russia will be progressively restored to business and that French investments in that country, totaling many billions of francs, will, at last, become active.

Locomotive works are booking orders for repair and for new construction, and the decline in British and American exports will surely be a strong bid for fresh business, probably involving further declines in prices. Malleable castings and steel castings in general are suffering from the present depression, and the only alternative to save these works from difficulties is the booking of railroad orders. War material is in course of completion for Rumania and other Balkan countries.

English and Continental Prices

The following schedule, prepared by the Bureau of Foreign and Domestic Commerce, Washington, presents a comparative statement of (British) domestic and Continental prices during the first six months of 1921:

	No. 3 Foundry Pig Iron		Billets (Soft)	
	Home Price	Approximate Continental c.i.f. Price	Home Price	Approximate Continental c.i.f. Price
Months	£ s.	£ s.	£ s.	£ s.
January	10 17½	8 10	15 12½	11. 0
February	9 15	8 0	14 0	10 0
March	7 10	7 10	13 10	9 10
April	6 0	6 10	13 0	8 10
May	6 0	7 0	12 0	8 10
June	*6 10	6 10	10 10	7 10

	Wrought Iron Bars		Steel Bars†	
	Home Price	Approximate Continental c.i.f. Price	Home Price	Approximate Continental c.i.f. Price
Months	£ s.	£ s.	£ s.	£ s.
January	26 13	16 0	22 0	11 0
February	25 0	14 10	20 0	11 0
March	23 0	12 10	17 0	10 0
April	21 0	12 0	15 2	10 0
May	19 0	13 0	13 7	10 5
June	16 0	12 0	13 10	10 0

*Premium of approximately 10s. on basis price.
†No specified test.

Fig. 1

Fig. 2

HOBBING LARGE WORM WHEEL

Hurried Requirement Met by Using Horizontal Boring Mill—Arrangement Described

Confronted with the hurried requirement of cutting a worm wheel too large to be put on a milling machine in the regular way, the Erie works of the General Electric Co. met the situation in a unique manner. The hobbing was done on a horizontal boring mill, as shown in the illustrations, with satisfactory results. The method, as described by E. J. Edwards, superintendent of foundry maintenance, was as follows:

The blank was 46⅛ in. in diameter and the finished worm gear 45⅝ in. in pitch diameter, 190 teeth, with ¾-in. pitch, 14½ deg. angle of pressure. The method of handling was as follows: On a plate 5 ft. in diameter and 2¼ in. thick a 43-in. diameter ball race was cut for 1⅛-in. steel balls. The plate was leveled by being supported partly on the rear side of the mill bed and the overhang jacked up on a horse. Fig. 1 illustrates the arrangement.

A 4-in. pin at the center, surrounded by short pieces of ¼-in. drill rod, served as an axis with roller bearings. A second plate placed carefully on the first could now revolve on the ball bearings with very slight friction. The blank was placed centrally on the second plate and bolted securely to it. To get the required angle for the first or gashing cut, for which a fly cutter was used, both plates and the blank were elevated on one side by blocking and jacking, as shown in Fig. 2.

A mark was made on the lower plate and the upper plate divided as accurately as possible into 190 equal divisions. A roughing cut was taken with the forming tool, the table then being moved around to the next mark and another cut taken, this process being repeated until all the teeth were roughed. The overhang of the plates was supported, as shown in Fig. 3, and moved easily on the balls provided. This allowed the feed for depth of cut to be easily taken care of by the cross-feed screw with which the boring mill was already equipped. The finishing cut as illustrated in Fig. 4 was taken with a home-made hob cutter. Any lateral play of the boring bar was prevented by a thrust collar on each side of the upright supporting the free end of the bar. The finished job set in plate gave satisfactory results.

Census Returns from Mineral Industries

WASHINGTON, Sept. 6.—A preliminary statement of the census of mines, quarries and wells, has been issued by the Bureau of the Census, furnishing comparative statistics covering the years 1919 and 1909 for the mineral industries. These statistics show by industries the number of enterprises reported and the amount received for the materials produced. Figures of interest to the iron and steel and allied industries follow:

Industry	1919 Enterprises	1919 Value of Products	1909 Enterprises	1909 Value of Products
Iron	292	$219,539,000	176	$106,947,000
Copper[1]	195	181,258,000	161	134,617,000
Lead and zinc[1]	432	75,579,000	977	31,363,000
Limestone[2]	895	52,943,000	1,665	29,833,000
Abrasive materials[3]	34	721,000	49	498,000
Fluorspar	54	3,334,000	13	289,000
Graphite	21	869,000	19	344,000
Magnesite	11	2,169,000	6	68,000

[1]Includes reduction mills operated independently of mines and operations on old dumps and tailings.

[2]Excludes enterprises producing limestone for their own use in the manufacture of lime and cement.

[3]Includes enterprises producing emery, garnet, pumice, tripoli, diatomaceous earth, stone for hones, scythestones, whetstones, etc., and tube mill pebbles and liners.

Reflecting industrial stagnation in the Mahoning Valley is the decline in bank deposits. Two affiliated institutions report a loss in deposits of $6,243,857 during the first six months of 1921, of which $1,238,839 was through their foreign department. This was caused mainly by the fact that many depositors sent part of their earnings to relatives in Europe, or were out of work and, therefore returned to their European homes, or went to some other part of the country seeking employment.

Fig. 3

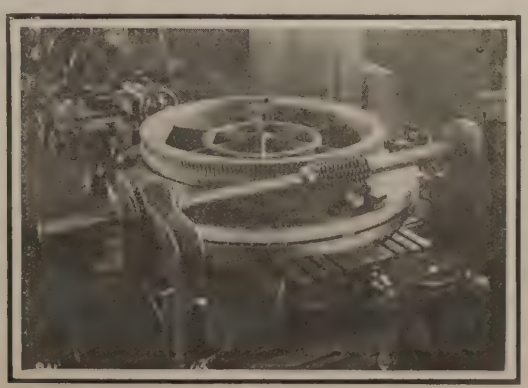


Fig. 4

Three Types of Alloy Sheet Steel—I

Proper High Tensile Material for Aircraft Parts—Specifications, Analyses and Manufacture of the Three Electric Steels

BY HORACE C. KNEER*

THE following report deals with an investigation of three commercial types of high strength alloy steel in sheet form, carried out at the Naval Aircraft Factory, Philadelphia, to determine which was the most suitable for the manufacture of fittings for large aircraft, such as the NC's of transatlantic fame. The word "fittings" is used to describe the many structural parts, made of sheet metal, which are used to connect, support and reinforce diverse members of an aeroplane. They are often of complex shape. Examples of such fittings are shown in the illustration.

Until the development of very large types of aircraft, such as the NC flying boats, low carbon sheet steel, having about 55,000 lb. per sq. in. tensile strength, or a mild grade of alloy steel, was satisfactory for fittings, as their thickness rarely exceeded ⅛ in. But with the advent of planes weighing from 20,000 to 60,000 lb., the use of high strength steel became absolutely essential in order to avoid excessive thickness and weight in the fittings.

Steel was required having a tensile strength of 150,000 lb. per sq. in., combined with a suitable ductility to insure against brittleness. Deep drawing in manufacture was not called for but it was necessary that the steel be capable of severe cold bending in any direction, independent of the direction of rolling, of successful welding by both the acetylene and electric spot methods and of brazing, heat treatment being applied after these operations. Sheets were wanted in thickness of from .035 in. up to ¼ in. and about 18 in. wide by 6 ft. long.

Alloy steel bar stock of the tensile strength indicated has been in fairly common use for years in the aircraft and automobile industries, especially in motor parts. It is not difficult to obtain on the market and the properties of the various types are fairly well known. It was found, however, that very few steel mills had any experience in the rolling of such alloy steel into sheets.

Comparatively little was known as to the rolling properties of the diverse commercial alloys and which, if any of them, would fulfill the required conditions in sheet form. After a canvass of the situation, it was decided to have samples rolled of the three most promising commercial types of alloy steel and to make a careful comparison of their characteristics.

It is believed that the results of this investigation will be of value to users of high grade sheet steel in industry, especially to automobile and aircraft manufacturers. The report, which follows, may also be of interest as illustrating the form in which a research investigation of this nature may be drawn up:

Specifications, Manufacture and Analyses

THE object was to investigate the comparative merits of three commercial types of high strength alloy sheet steel—chromium-vanadium, nickel-chromium (or "chrome-nickel") and 3.50 per cent nickel, for the manufacture of structural parts of aircraft.

The results in general were: chromium-vanadium steel was satisfactory in every respect. The other types, 3.50 per cent nickel steel and nickel-chromium steel, failed in the bend test, the nickel-chromium being the most brittle.

All three steels meet the required static tensile tests (except in thin gauges). They can be acetylene or electric spot welded. They can be brazed and heat treated after brazing. Any of the three steels can be machined in the annealed state without special difficulty, and can be drilled, cut and sheared in the heat treated state.

Aside from the bend test, the three steels did not differ greatly in any of the properties investigated, except that nickel-chromium steel was somewhat inferior to the other two types in electric spot welding and acetylene welding.

Thick specimens showed a better combination of tensile strength and elongation than thin specimens in all cases. The ⅛ in. specimens failed to meet tensile test requirements. Their low strength was probably due to surface decarbonization, and their low elongation to smaller section area which permitted less necking down. Consideration should be given to this matter in specifications and design, especially with light gages.

Cross rolling slightly improves the tensile properties of the three steels, but has no noticeable effect on their bending qualities, at least, in so far as was shown by this test.

Since beginning this investigation, chromium-vanadium sheet steel has been used in the manufacture of aircraft fittings for more than a year with satisfactory results.

Requirements and Specifications

Specifications, N.A.F.* S-35, were prepared to cover the purchase of alloy sheet steel suitable for the manufacture of fittings for the NC flying boats and other aircraft parts requiring high strength and reliability. The physical properties called for were:

Ultimate tensile strength	150,000 lb. per sq. in.
Yield strength	125,000 lb. per sq. in.
Elongation in 2 in.	10 per cent*

*Later revised to 8 per cent.

It was desired to cold bend these fittings in manufacture, although deep drawing was not necessary. It was, therefore, required that the sheets be furnished annealed and the following bend test was specified:

> Test pieces cut in any direction from sheets as received must stand cold bending, without cracking, through an angle of 180 deg. on a diameter equal to the thickness of the sheet.
>
> The minimum *radius* of bend allowed in design was equal to the thickness of the sheet, so that this bend test allowed a fair margin of safety.

Some difference of opinion existed among manufacturers and others as to the most suitable type of alloy for this purpose. A certain latitude of choice for the steel manufacture was therefore believed advisable, and three recognized commercial types of alloy were accordingly included in the specifications, as follows:

> 3.50 per cent nickel steel (No. 2330).
> Nickel-chromium steel (No. 3130).
> Chromium-vanadium steel (No. 6130).

The bidder was permitted to select the type of steel which, in his opinion, was best suited to the require-

* Metallurgist, Naval Aircraft Factory, Philadelphia.

*Naval Aircraft Factory.

ments, both in regard to facility of manufacture and physical properties, and was required to state in his bid the type of alloy which he proposed to furnish. In order to obtain high quality, freedom from impurities and a low sulphpr and phosphorous content, it was specified that the steel be made, or at least finished, by the crucible or electric furnace process.

The chemical analyses of the three types of steel were specified to be within the following limits:

Type	Nickel, 3.50 Per Cent	Nickel-Chromium	Chromium-Vanadium
Steel No.	2330	3130	6130
Carbon	0.25 to 0.35	0.25 to 0.35	0.25 to 0.35
Manganese	0.50 to 0.80	0.50 to 0.80	0.50 to 0.80
Phos. (max.)	0.030	0.030	0.030
Sulphur (max.)	0.030	0.030	0.030
Nickel	3.25 to 3.75	1.00 to 1.50	....
Chromium	....	0.45 to 0.75	0.80 to 1.10
Vanadium	....	....	0.15 (Min.)

Certain objections were raised against these specifications. It was claimed by manufacturers that steels within the required analyses would not meet the physical requirements and that if the carbon content were sufficiently high to insure the tensile strength called for, the steels would not meet the bend test nor possess the required ductility or elongation after heat treatment.

It was also claimed that one or another of these steels would not roll properly to thin sheets or would scale excessively in rolling and that certain of the alloys would segregate and the strength therefore vary and be unreliable. Doubt was also expressed whether these steels could be readily machined and whether they would weld properly.

Manufacture and Analyses of Samples

In order to determine the relative merits in manufacture, fabrication and physical properties of these three types of alloy steel, and to determine whether any modification of the specifications was desirable, the Halcomb Steel Co., of Syracuse, N. Y., through the courtesy of Dr. John A. Mathews, undertook to roll an experimental heat of each type and to submit samples for investigation and test.

This company prepared three heats of electric furnace steel, having the following heat analyses, respectively:

Type	Nickel, 3.50 Per Cent	Nickel-Chromium	Chromium-Vanadium
Steel No.	2330	*	6130
Heat No.	49-H-19	X-1819	155-H-19
Carbon	0.29	0.29	0.29
Silicon	0.28	0.19	0.27
Manganese	0.69	0.40	0.77
Phosphorus	0.011	0.016	0.007
Sulphur	0.007	0.008	0.023
Nickel	3.51	3.45	..
Chromium	..	0.88	0.97
Vanadium	..	..	0.16

*The nickel-chromium steel differed in analysis from No. 3130, called for.

Check analyses made on test specimens at the Naval Aircraft Factory confirmed the above data reasonably well. A carbon content of 0.25 per cent was obtained.

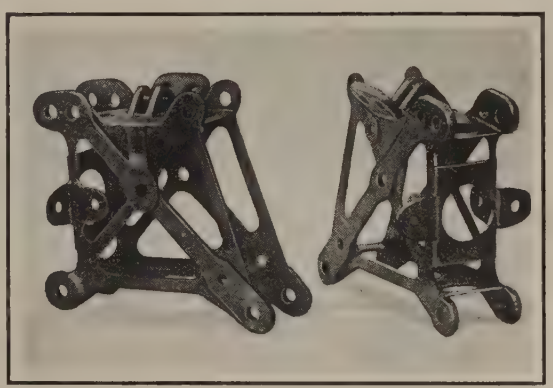
It is noteworthy that the carbon content of these three experimental heats was the same, and that in the 3.50 per cent nickel steel and the chromium-vanadium steel, the carbon, manganese, nickel, chromium and vanadium contents closely conformed to the desired or mean values of the specifications. The nickel-chromium steel was taken from a heat made up prior to having received these specifications, and the nickel and chromium contents differed from those called for. The composition was believed by the manufacturer to be one that would certainly yield the physical properties desired.

Rolling and Annealing

Sheets ¼ in thick and ⅛ in. thick were rolled from each type of steel. In order to determine whether cross rolling would improve the physical properties or cold bending qualities, some sheets of each heat and thickness were cross rolled, the others being straight rolled.

Some of the Many Structural Parts of Thin Sheet Steel Used to Construct and Support the Members of Large Aircraft Such as the NC Flying Boats

In the upper row: Successive stages of wing beam hinge; after welding, fitting is dip brazed and then heat treated. In the lower is a box fitting made of seven pieces which carries a load of ten members



(Cross rolling means rolling transversely to the axis of the ingot or billet. Straight rolling means rolling along the axis.) All sheets were hot rolled to finished size.

The manufacturer annealed all the sheets together, packed in boxes. They were brought to a temperature of 1500 deg. Fahr. (815 deg. C.) after which the temperature of the furnace was lowered to about 1300 to 1350 deg. Fahr. (705 to 735 deg. C.) and held for several hours, followed by slow cooling. This method of annealing was determined upon by the manufacturer as representing good commercial practice but it was not claimed that some other combination of time and temperature might not give better results.

Twelve samples of sheets, each 3 sq. ft. in area, were received from the manufacturer for test, as follows:

Type of Steel	Mark No.	Thickness	Rolled
Chromium-Vanadium	5	⅛ in.	Straight
" "	6	⅛ in.	Cross
" "	7	¼ in.	Straight
" "	8	¼ in.	Cross
Nickel-Chromium	9	⅛ in.	Straight
" "	10	⅛ in.	Cross
" "	11	¼ in.	Straight
" "	12	¼ in.	Cross
3.50 per cent Nickel	13	⅛ in.	Straight
" " "	14	⅛ in.	Cross
" " "	15	¼ in.	Straight
" " "	16	¼ in.	Cross

It was difficult to tell which was the true longitudinal or transverse direction of the sample; speci-

mens were marked L and T to indicate these directions according to the surface appearance of the sheet, but these marks do not indicate with certainty that the specimens were longitudinal or transverse, respectively, in all sheets. They merely serve to distinguish between specimens cut in different directions from the same sample.

Tensile specimens were machined to a 4-in. gage length, ½ in. wide. The elongation was measured in 2 in. and in 4 in. Bend specimens were made 1 in. wide and about 4 in. long. The edges were rounded.

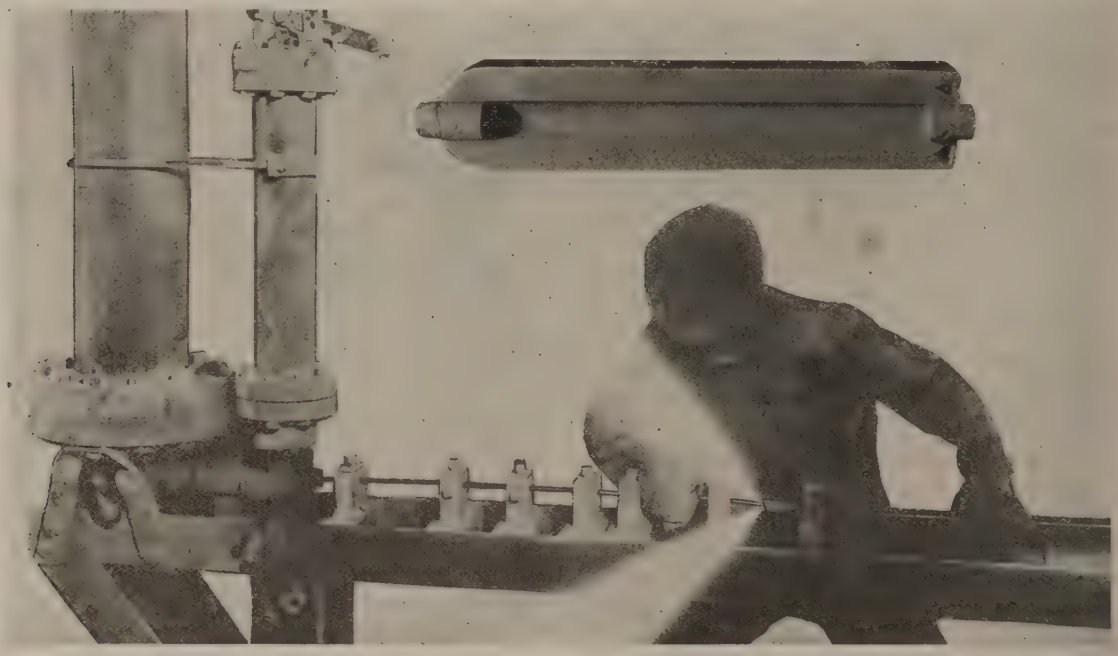
(*To be continued*)

Manufacture of Drill Steel from Hollow Ingots

Process Used by the Ludlum Steel Co. and Its Advantages—Influence of Decarbonized Layers

AT the symposium on drill steel which was a feature of the February meeting in New York of the American Institute of Mining and Metallurgical Engineers, P. A. E. Armstrong, vice-president Ludlum Steel Co., Watervliet, N. Y., read a paper entitled "Drill Steel from Hollow Ingots," which described fully the method of manufacture used by his company. Since the reading of this paper and its subsequent publication in June, some additional details and illustrations have been furnished THE IRON AGE. These have been incorporated in a brief abstract of the original paper which follows:

Hollow drill steel is made by various methods: (1) The drilled billet with a sand-filled core, the general method used in this country, or (2) The drilled, pierced, or the drilled and pierced billet, not sand-filled, is rolled down over a projectile or ball much the same as in ordinary pipe manufacture. The second method is employed largely in Sweden. In Sheffield, England, the general scheme is sand-filling. Swedish hollow drill steel is particularly good and has a worldwide reputation for excellency. It does not follow, however, that steels made by other methods are not efficient.



The Insert Shows a Hollow Cast Ingot by the Tube Method Which Has Been Split on a Planer Without Cutting Through the Plugs

High Pressure Blast Is the Method Employed to Remove the Sand from the Core or Hole in the Bar as Shown

In the Swedish material a peculiar condition is present. The hole is badly decarbonized by the method of manufacture and the extent of this decarbonization varies in bars of different makes.

Decarbonized Layers and Hardening

A question that is worth consideration is this: Is this decarbonized core an advantage or a disadvantage? If it is an advantage, why not duplicate this by controlled practice and not haphazard means of manufacture? If it is a disadvantage, then why is it that steel of this character has such a good reputation for being a good grade hollow drill steel? There is nothing in the steel that can be discerned microscopically or by analysis that proves it to be superior to hollow drill steel of good manufacture made by methods that prevent decarbonization of the hole. Therefore it is fair to assume that the decarbonized wall of the hole is an advantage. On investigating this subject we found that hardened bars with this decarbonized hole do not become so intensely hard on the inside, neither are they so prone to cracking. Bars with radial cracks are of course bad, no matter what the system of manufacture.

The mild steel or decarbonized iron inside the hole acts as a damping effect when hardening is produced. This effect can probably be readily appreciated when the fact is remembered that if a piece of about 1 per cent carbon steel be rough-turned so that all decarbonization is removed from the outside of the bar and this be heated up to just above the transformation point and quenched in water of about 70 deg., the bars will come out hardened in spots in a non-uniform manner. Some places will be hard; others will not. If a further length of the same steel be rough-turned and then ground and polished, this bar, subjected to the same heat treatment and the same speed of cooling, will come out quite file hard all over and not at all spotty. The reason for this is that the rough turning holds the steam arising from the heated metal in contact with the water, and thus causes certain zones to cool at a slower rate than those places where the steam which is generated was quickly removed.

In the case of the polished bar, there is no rough-

ened exterior to hold steam pockets and the steam, as generated, quickly rises to the surface of the cooling fluid and the bar is uniformly hardened over its entire surface. If this bar, which is polished, were covered with a thin tube, then the hardening would not be very pronounced underneath the tube. This of course would vary with the thickness of the tube and whether or not the tube was in good contact with the bar. Such a condition can artificially be produced by decarbonizing the surface of this polished bar. If this decarbonization is carried to a fair depth, 1/32 in., the bar will not be of maximum hardness underneath the decarbonized area after being quenched in water. The thicker the zone the less will be the hardness, and for the same reasons which prevent one from uniformly hardening a piece of similar carbon steel right through to the center when quenched from just above the transformation point. Another way of saying this is that the speed of cooling is only fast enough for a certain amount of penetration or depth of hardness. To harden right across the cross section, alloy steels have to be resorted to, which have a greater lag to transformation.

Hollow Steel from Hollow-Cast Ingots

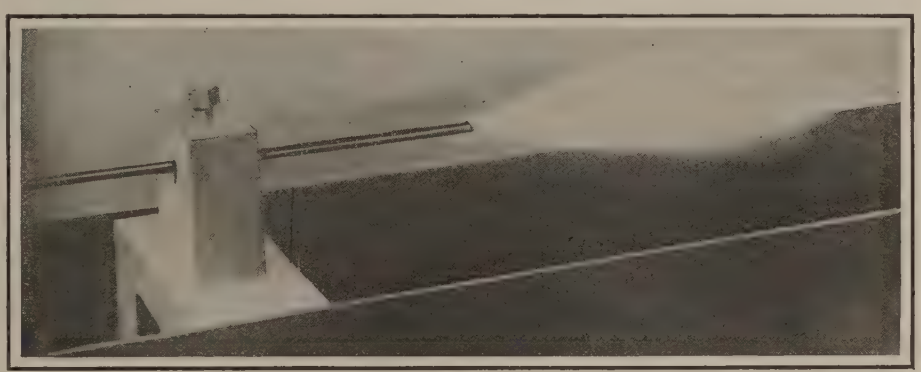
Hollow drill steel made by casting the metal around a tube and mechanically working the hollow ingot down to the required size (filling up the hole with sand and later removing same after rolling) will have an artificially produced equivalent decarbonized core which will be free from any such tendency toward splitting and driving in radial cracks. The surface of the inside of the tube will be comparatively smooth, giving a uniform cooling rate to the inside of the bar, again reducing the tendency for a radial crack to start.

One of the reasons why the carbonless walls of the tube of the bars made by this method do not crack in manufacture is because the mild steel tube is not the result of a decarbonized steel highly impregnated by oxygen and oxides and having a number of microscopical holes where the carbon of the carbides last resided. These holes are places of weakness which may or may not weld up, depending on whether the interior of these microscopical cavities is coated by an oxide layer or filled with gas, either from the gas occluded in this steel or that which has penetrated from the furnace atmosphere. Decarbonized steel is, in my opinion, less strong than mild steel which has been originally made in low carbon and worked down to the required size.

The method employed by the Ludlum Steel Co. in the manufacture of hollow drill steel is to insert a high-grade low-carbon mild steel tube, suitably cleaned by sandblast, into an ingot mold and cast the hot metal around the tube. A mild steel tube, carbon about 0.15 per cent, is plugged at either end and filled up with sand. The hole is drilled through the tube and plugged but it is not pinned; the hole is left open. The tube is then inserted into an ingot mold which is recessed at the foot and a guide is fitted on the top of the tube, centering the tube with the ingot mold. This guide carries a pouring head. In pouring the ingot the hot metal is poured into the pouring head and the metal runs through four small nozzles down the four corners of the ingot mold and around the tube. The tube is cleaned well by sandblasting before being put into the ingot mold and a very excellent weld is produced between the thin wall of the tube and the hot metal. The tube being of mild steel has a higher melting point than the higher carbon of the molten steel, therefore although there is a surface weld between the molten metal and the tube, there is no tendency, or very little tendency, for the tube to burn through. A large number of ingots have been cast by this tube method and not one has burned through. The holes drilled in the plugs are filled up by the molten metal which forms a pin to hold the plug into the tube and in the cast ingot.

One of the illustrations shows a hollow cast ingot by the tube method which has been split on a planer without cutting through the plugs and the holes filled up with the molten metal forming pins can be clearly seen at each end. The smooth, accurate shape of the hole can be readily appreciated and attention is drawn to the particularly small amount of pipe at the top of the ingot, showing the steel to be quite free from gas. As can be seen the weld is nearly perfect down the entire length of the tube. The sand is not removed from the ingot after casting as this sand is employed for the purpose of maintaining the shape of the hole during rolling. The ingots are sent away to the 18-in. mill furnace, reheated to the required rolling temperature and the ingots rolled down to 3½ to 4-in. square billets, depending upon the finished size of the bar.

The method of cutting up billets is interesting. The shear on which these billets are cut is offset slightly so that the end of the billet is dragged down, thereby effectually closing the end of the hole of the billet, cutting out the necessity for plugging. The billets at this stage are just where the usual method of making hollow billets starts, the usual method being to take a 3½-in. billet and drill 1⅜-in. hole down the entire length of it and plug either end of the billet after filling with sand. The billets are then carefully inspected, chipped and ground to cut out any imperfections that may have arisen during manufacture, then sent to the 9-in. heating furnace and rolled down on the 9-in. mill to required size. The bars after inspection are topped and sent to the extracting room.



The Volume of Sand and Air Coming Out at the End of the Small Tube as Contrasted with the Usual Method of Using Only the Air Blast

An illustration shows the machine in operation. High pressure sand blast is the method employed to remove the sand from the core or hole in the bar. The large tube to the right of the machine is the air reservoir carrying high pressure air and the smaller tube parallel with it carries fine sand which has an equalizing valve so as to maintain the same pressure in the sand canister as in the storage. As the air passes across the orifice at the bottom of the sand canister a quantity of sand is sucked down with the air and carried along the small tube which is inserted inside the hole of the bar. The cutting effect of this very high pressure sand blast is quite extensive. It is possible to wear away or drill a hole in a piece of steel by the action of this high pressure sandblast.

The other illustration shows the volume of sand and air coming out the end of this small tube. The usual method is to use an air blast, but this is not quick enough. Another method is to use water in the place of air, known as the hydraulic method. This again

is not so effective as using sand blast. Peculiarly enough there is very little wear on the inside of the tube carrying the high pressure sand blast, as the sand is traveling in the same direction as the tube and the skin friction against the inside of the tube has the effect of driving the sand to the center of the tube and does not scour out the inside of this small tube, which varies in size from ¼ to 3/16 in. It is possible to clean out a 1¼-in. rd. hollow drill steel bar, 20 ft. long, by this process in about one minute.

This method of making hollow ingots and the method of removing the sand from the inside of the bar are covered by patents issued and applied for and is claimed as a big step forward in economical and successful manufacture of hollow drill steel and hollow tubes and tubular bodies generally. The reasons why we believe the tube method of hollow drill steel manufacture is superior to the older methods are:

Greater freedom from external and internal straining. Because of the inherent small crystal size.
Absence of harmful segregation resulting in weakness of the wall of the hole.
Less liability for the steel to crack in the inside of the hole during forging or hardening.
Toughening effect, arising from the mild steel wall of the hole, limiting the intense hardening on quenching.

Electrical Exports Increase

WASHINGTON, Sept. 5—In the face of a world-wide trade decline, exports of electrical goods from the United States are maintaining a strength beyond that evidenced by many other commodities. Figures for July, and for the first seven months of 1921, just available, indicate an optimistic state of affairs especially when the disturbed business and exchange conditions in foreign markets are taken into account.

Figures given in the table below include: Batteries, carbons, dynamos and generators, fans, heating and cooking apparatus, insulated wire and cable, interior wiring supplies (including fixtures), arc and incandescent lamps, magnetos, spark plugs, etc., meters and measuring instruments, motors, rheostats and controllers, switches and accessories, telegraph, including radio, telephones, transformers and electric locomotives.

Exports of Electrical Machinery

	1920	1921	Increase
July	$6,494,332	$6,840,512	5%
First seven months	54,095,088	71,618,254	32%
Fiscal year 1913			$27,046,332
Calendar year 1919			89,925,689
Calendar year 1920			102,870,434

Italian Metal Market Still Stagnant

MILAN, ITALY, Aug. 17.—Prices are unchanged except for copper and brass goods, which have taken another drop. This continued downward movement can only be accounted for by the small demand.

Pig iron is in very small demand; Eglington No. 1 is quoted at 1000 lires ($44) per ton c.i.f. Genoa, and English hematite, mixed numbers, at 600 lires ($26.40).

Here are this week's prices, largely nominal, in lire, f.o.b. Milan, per 100 kg., compared with prices in June and July at dates named:

	June 30	July 27	Aug. 13	Cents Per Lb., Aug. 13
Copper, electrolytic	600	630	650	13.00
Copper sheets	1020	1040	1020	20.40
Brass sheets	900	900	880	17.60
Brass wire	875	880	860	17.20
Brass rods	550	560	535	10.70
Brass tubes	1070	1100	1080	21.60
Black sheets, base, 4 mm	150	160	155	3.10
Galvanized sheets, No. 20	240	235	235	4.70
Tin plate, standard, per case	165	175	175	$7.70

The United States Shipping Board has transferred the title to a building, erected by the Mesta Machine Co. three years ago at its plant in West Homestead, Pa., for the Shipping Board, to the Mesta Machine Co. The sum involved in the transfer was $152,065. The building, a structure 60 x 400 ft., was erected according to the deed, with the understanding that it was to be taken over by the machine company at half its cost of erection following the completion of a contract between the two parties. The transfer of the building is in accordance with that agreement.

BRITISH MACHINERY TRADE

Machine Tool Tonnage Greater Than in 1913—General Movement Smaller

Figures compiled in the American consulate general in London show that, despite a heavy falling off in tonnage of general machinery imports and exports of Great Britain in 1920 and 1921, as compared with 1913, the trade in machine tools has actually increased. Imports of machine tools during the first six months of 1921 were 10 per cent above the figure for the first six months of 1913, while in exports the corresponding increase was 52 per cent.

Machine tool imports were 3.63 per cent of the tonnage of all machinery imports in 1913; 16.8 per cent, in 1920; 6.36 per cent in 1921. Similar figures for exports show 2.47 per cent in 1913; 4.95 per cent, in 1920; 4.69 per cent, in 1921. In value, these figures would be slightly increased, due to the fact that machine tools average higher in unit value than the balance of the machinery entering into British imports and exports.

Textile machinery formed the largest single item shipped out in 1913, 1920 and 1921, with 88,082 tons, 21,139 tons and 79,282 tons respectively. Agricultural machinery provided the largest tonnage of imports in 1913 and 1921, with 18,007 tons and 4911 tons respectively; and, with 4685 tons in 1920, stood second to machine tools, with 7176 tons.

Unit values have advanced heavily, standing in 1921 at approximately 3 times the 1913 figure for all machinery, and at 2½ times the 1913 figure for machine tools. This is brought out clearly in the table.

	First Six Months of 1913	1920	1921
Imports			
Tons	56,121	42,740	35,284
Value	£3,754,233	£9,215,542	£6,997,965
Unit value	£66.90	£215.60	£198.30
Exports			
Tons	346,252	182,471	276,637
Value	£16,867,776	£23,822,933	£41,120,395
Unit value	£48.71	£130.57	£148.66
Machine Tools, Imports			
Tons	2,040	7,176	2,243
Value	£185,312	£1,567,278	£509,571
Unit value	£90.83	£218.40	£227.18
Machine Tools, Exports			
Tons	8,545	9,035	12,977
Value	£501,532	£1,214,936	£1,885,151
Unit value	£58.70	£134.46	£145.29

British Company to Make Surface Combustion Apparatus

British Furnaces, Ltd., Millbank House, 2 Wood Street, London, S. W. 1., England, with an authorized capital of £25,000, was organized in the early part of July, this year, to manufacture and sell in the British Empire apparatus developed by the Surface Combustion Co. The principal stockholders of the new company consist of the Bryan-Donkin Company, Ltd., machinists and founders, Chesterfield, England; Woodall, Duckham & Jones, Ltd., engineers and manufacturers, London, and the Surface Combustion Co., Inc., 366 Gerard Avenue, New York, owner of the surface combustion patents and manufacturer of industrial furnaces.

The Compagnie Generale de Construction de Fours, 32 Rue de la Grange-aux-Belles, Paris, France, is the sole licensee and manufacturer for surface combustion patented apparatus in France and its colonies, Belgium, Holland, Switzerland, Italy, Spain and Portugal.

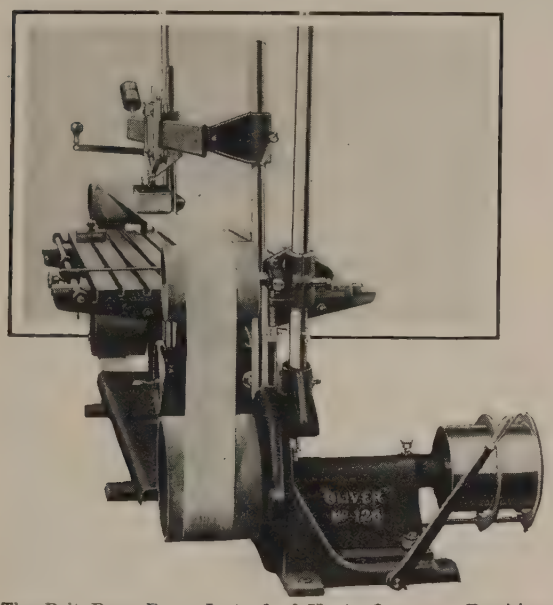
John H. Bartlett, Jr., foreign representative for the Surface Combustion Co., New York, has had charge of this work in the last few years.

The Blaw-Knox Co., Pittsburgh, will occupy booth 716 at the coming National Exposition of Chemical Industries, Sept. 12 to 17 inclusive, in the Eighth Regiment Armory, New York. The company's exhibit includes welded steel plate work, operating models of clam-shell buckets, and sample Blaw-Knox prudential section steel building; also photographs of various other products, including forms, structural steel buildings, transmission towers, water-cooled furnace appliances and miscellaneous steel plate work.

Belt Sanding Machine

The Oliver Machinery Co., Grand Rapids, Mich., has placed on the market a new machine for the rapid sanding and polishing of line and edge moldings, and for sanding and finishing built-up pieces such as desks, chairs, etc. It is said to be adaptable also to the polishing of metal.

The machine as shown in the accompanying illustration will take work of any length and sand to center of 72 in.; taking work on the table 54 in. high and over the floor plate, 72 in. high. There are no over-



The Belt Runs Down Instead of Up to Overcome Breaking of the Sand from the Belt

head belts. The belt is arranged to run down over the pulley instead of up, a feature which not only makes operation safer but is said to overcome the breaking of the sand from the belt, giving the belt a longer life. The idler is adjustable up or down to height of the work and can also be adjusted in a tilting position to keep the sand belt from running to either side of centers. A countershaft is provided to take up belt slack by means of which a flexible tension to suit the work is maintained. Sanding belts up to 10 in. wide may be used.

The table is 32 x 96 in. and rolls on ball bearings, a slight push causing it to run the full travel of 36 in. The vertical adjustment is 14 in. The table top is made up of plain wood strips with 1-in. gaps between to allow dust to drop through. The table is provided with an adjustable bar to hold the work. An edging attachment is mounted on the power stand arm and is used for sanding edge work. It is made up of a belt plate adjustable table that can be tilted to 45 deg. up or down and raised or lowered at will. The machine weighs 1400 lb., and is 80 in. high over all, the floor space required being 72 in. wide and any length preferable. It can be arranged for either belt or motor drive and with or without sanding-pad attachment.

Society of Industrial Engineers to Meet

Industrial stability will be the main theme for discussion of the fifth annual convention of the Society of Industrial Engineers, to be held in Springfield, Mass., Oct. 5, 6 and 7. The topics on the program cover production, finance and accounting, sales and industrial relations.

Among the addresses announced are the following:

"Why Industrial Stability Is Essential to the Prosperity of the Country," by F. M. Feiker, assistant to Herbert Hoover, Secretary of Commerce.

"Setting Sales Standards," by E. St. Elmo Lewis, New York.

"Securing the Sales Force's Co-operation in the Attainment of Sales Standards," by Norval A. Hawkins, director of sales General Motors Corporation, Detroit.

"The Influence of Foreign Trade upon Industrial Stability," by Hon. Eugene Meyer, Jr., managing director War Finance Corporation.

The plant inspection committee has selected the following plants for inspection trips: American Bosch Magneto Corporation, Rolls-Royce of America, Inc.; National Equipment Co., Westinghouse Electric & Mfg. Co., Moore Drop Forging Co., Gilbert & Barker Mfg. Co., Greenfield Tap & Die Corporation, Greenfield, and Fisk Rubber Co., Chicopee Falls.

Facts as to Living Costs Wanted

The Department of Labor, through the Bureau of Labor Statistics, is making a study of the methods of adjusting wage scales, and concluding collective wage agreements where cost of living figures enter into the wage adjustment. To that end, the Bureau of Labor Statistics wishes to communicate with the various companies, members of arbitration boards, labor managers, or others who are using cost of living figures in the determination of wage awards.

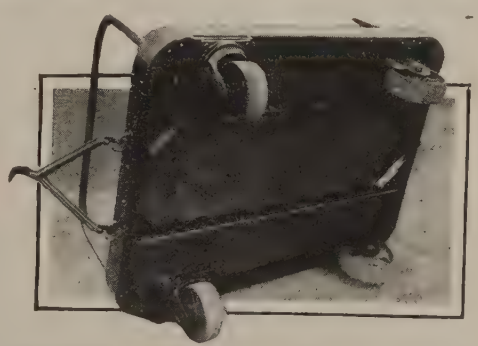
If any reader of THE IRON AGE, who has not already communicated with the bureau, is using cost of living figures in the adjustment of wages, it will be appreciated by the bureau if he will write to the Commissioner of Labor Statistics, Washington, and inform him of that fact.

Heavy-Duty Tractor Trailer

A trailer designed for heavy-duty service with tractors is a recent addition to the products offered by the Sharon Pressed Steel Co., Sharon, Pa. The accompanying illustration shows the general construction.

The frame is made up of 4⅜-in. channel sections pressed from ⅛-in. steel riveted into one-piece channel-section corner pieces, pressed to a 6-in. radius, with a hole for the stake pocket. The two additional members running lengthwise are of 3-in. pressed steel channel, riveted to the end rails and braced laterally to the frame with V-braces which take the pull of the couplers. The couplers are of forged steel, ⅝ in., either one or two being supplied as required.

The rear wheel and front caster supports are 3-in. pressed steel channels riveted to the side rails and



Rear Wheel Brackets Are Pressed from ¼-In. Steel

longitudinal members of the frame. The rear-wheel brackets are pressed from ¼-in. steel and have two stiffening ribs on each side, a construction that is claimed by the makers to be stronger than a malleable casting. The rear wheels are of malleable iron, have a 3½-in. face, and are mounted on 3-in. Hyatt roller bearings on a 1-in. hardened and ground shaft. The front casters are equipped with ball and roller bearings and are bolted to a ½-in. steel plate riveted to the frame. The floor of the trailers is 1¼-in. oak recessed flush in the side and end rails. All frame members are made flush on the bottom to afford even support when the trailer is used in connection with a lift truck. The trailer is designated as the Brute, and is said to have been tested with a load of 8000 lb., without showing signs of weakness. It can be furnished in sizes up to 72 in. long and up to 50 in. wide.

Positive Locking Friction Clutch

A friction clutch with a positive locking feature, designed to permit of starting its load under friction only and becoming locked against slippage when the clutch is completely engaged, has been recently developed by the Carlyle Johnson Machine Co., Manchester, Conn. This is not a completely new design, however, being but a modification of the standard Johnson clutch, the locking feature having been developed to cover the specific need of certain requirements.

Referring to the illustration it will be noted that an outside shifter sleeve carries a sliding wedge, B, between two toggle levers, A; these expand the friction ring, D, to grip the opposing surface of a cup member. This is briefly the principle of operation of the standard

The Locking Feature Consists of Six Pairs of Opposing Pins on the Edge of the Clutch and on the Shifter Sleeve

Johnson friction clutch. To this the positive locking feature has been added, consisting of six pairs of opposing pins spaced equally distant on the edge of the clutch and on the outside shifter sleeve, as shown at E E. When disengaged both the friction surfaces and the positive pins are out of engagement. As the shifting sleeve is thrown in, the friction surfaces take the load and practically pick it up to full speed before the opposing pins come into contact. With the full throw of the clutch the pins become engaged as a locked drive and slippage under load is impossible.

Senate to Increase Revenues in Its Tax Bill

WASHINGTON, Sept. 6.—No surprise was occasioned by the announcement that the Senate committee on finance had decided to re-write the House tax bill. The reason given was that it is desirable to include in one document every internal revenue law on the statute books. The House bill was characterized by Chairman Penrose as a series of amendments to existing revenue laws and he stated that it is the intention of the finance committee to make the bill "all inclusive." The measure is to be reported to the Senate when Congress reconvenes on Sept. 21.

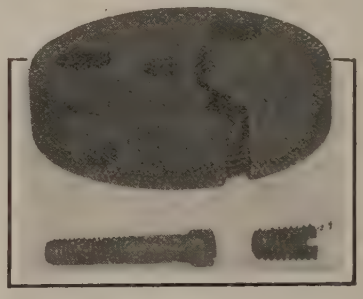
But the conclusion of the committee to re-write the House bill does not by any means find its entire significance in the desire to make it "all inclusive." The fact of the matter is that the House bill is inadequate from a revenue point of view and it remains for the Senate committee to make up the deficiency. In other words, business and other interests are not going to be relieved of taxes to the extent that was stated by House leaders. From the outset there has been considerable skepticism that the Administration will save $500,000,000 in the annual expenditures of the Government, as was planned in framing the House bill. A number of important suggestions for tax legislation that had been made by Secretary of the Treasury Mellon and supported by the Administration were ignored by House leaders. These were considered to be entirely practical and it is thought that they will be resorted to in part, at least, by the Senate committee, with a view to obtaining greater revenue than would be possible under the House bill.

Dr. T. S. Adams, Treasury tax expert, who assisted the House committee on ways and means, in preparing the revenue bill, is also co-operating with the Senate committee on finance. The suggestions of Secretary Mellon, which were largely disregarded by the House, and which are being studied by Republican members of the Committee, involve an assessment of four billion dollars.

Some of the principles advocated by Mr. Mellon were a source of rather general agreement and in consequence are reflected in the House bill. These included such matters as the repeal of the excess profits tax and the lowering of the corporation income taxes. Senator Smoot, a leading Republican member of the finance committee, has prepared a substitute plan for tax revision which calls for a manufacturer's sales tax of 3 per cent, estimated to raise $1,200,000,000. It is largely similar to the measure he prepared some time ago, the substance of which was published in THE IRON AGE, which proposed that taxes shall be raised from six sources only. Senator Smoot does not take a hopeful view with regard to the ability of the Government appreciably to reduce taxes. In a recent address before the Rotary Club in Washington, he predicted that in seven years the United States would face a $5,000,000,000 tax which it was claimed would continue at this rate for half a century.

New Thread Templet Gages

A line of thread templet gages of the familiar round adjustable type but with improvement in the adjustment has been recently placed on the market by the Pratt & Whitney Co., Hartford. The accompanying illustration shows the assembled gage and also the locking and adjusting screws. The latter is a short tapered screw placed parallel to the axis of the gage, one full turn of which changes the effective diameter of the gage about 0.001 in., adjustments finer than 0.0001 being easily made. When the locking screw is tightened the threads of the taper screw form a perfect dowel in both planes, a feature that is said to have been lacking in previous types of adjustable templates. The importance of accurate doweling to maintain a true helix is



One Full Turn of the Adjusting Screw Changes the Diameter 0.001 In

obvious. Both screws are readily sealed after setting. The first thread of the templet is chamfered to the angle of the thread, for ease in starting. The sizes are from 1/16 to 5 in. and larger.

International Engineering Dinner

A dinner to celebrate the homecoming of the mission of American engineers who went abroad to confer the John Fritz medal upon Sir Robert Hadfield of London and Dr. Eugene Schneider of Paris will be held at the Engineers' Club, New York, Oct. 10. The guests will include representatives of the British and French engineering societies.

The appointment of the following committee of arrangements for the dinner has been announced: Calvin W. Rice, secretary American Society of Mechanical Engineers; Frederick F. Sharpless, secretary American Institute of Mining and Metallurgical Engineers; Elbert M. Chandler, secretary American Society of Civil Engineers; F. L. Hutchinson, secretary American Institute of Electrical Engineers; Alfred D. Flinn, secretary United Engineering Society.

The Keystone Steel & Wire Co., Peoria, Ill., has disposed of a bond issue of $3,000,000.

Steel Mill Electrical Engineers Meeting

Program of the fifteenth annual convention of the Association of Iron and Steel Electrical Engineers, which will be held at the Hotel LaSalle, Chicago, Sept. 19-24, has been completed. It follows:

Monday

9:30 a.m.—Business session—election of officers—9:30 to 12.
2:00 p.m.—"Some Recent Developments in Induction Motor Starting," by M. Spencer. "The Electrical Engineer in the Steel Plant and Out," by F. B. Crosby.

Tuesday

9:30 a.m.—"Electrification of Steel Plant Railroads," by R. B. Gerhardt. "Anti-Friction Bearings in Steel Mills," by A. M. MacCutcheon.
2:00 p.m.—Inspection trip.

Wednesday

9:30 a.m.–5:00 p.m.—"Fuel Requirements of Steel Mills," by F. E. Leahy. "The Control of Boiler Operation," by W. N. Flanagan. "General Use of Oxygen in the Steel Mill Industry," by E. A. W. Jeffries. "Waste Heat Utilization for Steam Generation," by G. R. McDermott.

Thursday

9:30 a.m.—Report of electric furnace committee, by E. T. Moore. Report of electrical development committee, by R. B. Gerhardt.
2:00 p.m.—Report of educational committee, by L. F. Galbraith. Comments on safety committee work, by Walter Greenwood.

Friday

9:30 a.m.—Standardization committee report, by W. T. Snyder. Electric Overhead Traveling Crane Specifications, by F. W. Cramer. Report of subcommittee on illumination, by H. L. Kirshberg.
2:00 p.m.—Inspection trip.
7:00 p.m.—Fifteenth annual banquet.

Accountants of Malleable Castings Plants to Meet

The quarterly meeting of accountants of the American Malleable Castings Association will be held at Hotel LaSalle, Chicago, Sept. 12 and 13. The program has not been entirely completed, but consideration will be given to a number of new accounting subjects of general interest, the treatment of which promises to be of exceptional value.

One session will be devoted to papers and reports on machine methods of accounting. These papers and reports will cover the character of the information recorded by the use of the Hollerith tabulating machine, the Stromberg recorders and other makes of machines in use by certain members. The reports will show, in addition to the nature of the information recorded, the results secured and the savings effected.

Another session will be devoted to a presentation of the subject of graph charts designed to show how information can be pictured for the ready grasp of the executive who finds it difficult to read figures and get therefrom their significance. The program will include also papers of an allied nature on the subjects of "The Opportunity of the Cost Accountant to Do Analytical Work for the Executive," and "Daily Control Sheet for the Executive." Consideration will also be given to approved methods of distributing miscellaneous indirect overhead expense, as well as to a number of other important subjects.

Robert E. Belt, secretary-treasurer of the association, is chairman of these meetings.

The Greenville Steel Car Co. has secured new business that will keep the plant in steady operation for the next three months at practically full capacity. President F. L. Fay closed in New York recently a contract for repairing or rebuilding 500 steel cars for the Erie railroad.

The Machinery Club of Chicago will hold its annual picnic at Thatcher's Woods, River Forest, Ill., on Saturday, Sept. 10. A tug-of-war, a baseball game, and a number of races and contests will be features of the outing.

COMING MEETINGS

September

National Exposition of Chemical Industries. Sept. 12. Eighth Coast Artillery Armory, New York.

American Institute of Mining and Metallurgical Engineers. Sept. 12 to 19. Fall convention, Wilkes-Barre, Pa. Secretary, F. F. Sharpless, 29 West Thirty-ninth Street, New York.

National Association of Brass Manufacturers. Sept. 14 and 15. Fall convention, Cleveland. Secretary, W. M. Webster, 139 North Clark Street, Chicago.

National Association of Cost Accountants. Sept. 14 to 16. Fall convention, Cleveland Hotel, Cleveland. Session on morning of Sept. 15 on cost methods of trade associations. Offices of association at 130 West Forty-second Street, New York.

American Society for Steel Treating. Sept. 19 to 24. Annual convention and exhibition, Manufacturers Building, State Fair Grounds, Indianapolis. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South LaSalle Street, Chicago.

More building permits were issued in Chicago in August, 1921, than in any similar period in the last seven years. The total number of permits issued was 1051 and the cost of the buildings constructed is estimated at $13,165,000. In August, 1920, permits numbered only 308, and the cost of the buildings $5,525,000. Of the total number of permits for the month just closed, 656 were for residences, 195 for apartment buildings and 150 for factories.

The National Tube Co. has purchased from the Second Avenue Passenger Railway Co. a tract of land on Second Avenue, near Brady Street, just west of and adjoining the National Tube Co.'s Second Avenue plant, Pittsburgh. The sum involved in the transaction was $22,500. The plot has a frontage on the south side of Second Avenue of 77 ft. and a depth of 108 ft. The tract is improved with several brick buildings.

VALLEY OPERATIONS

Industrial Improvement Marked by Periods of Recessions

YOUNGSTOWN, OHIO, Sept. 6.—While industrial improvement in the Mahoning and Shenango Valleys continues to be mixed with periods of recessions, nevertheless the undertone is essentially strengthened. Iron and steel operations are scarcely in excess of 30 to 35 per cent of normal, varying with different interests. One of the principal fabricating interests in the district, for instance, is operating at 60 per cent and reports that incoming business may be expected to sustain this rate.

The fourth blast furnace in the Ohio Works group of the Carnegie Steel Co. will likely be put in blast in September, owing to the pig iron demands of this interest's open-hearth department. A number of stacks in the Shenango Valley will also be lighted this month, while the merchant furnace of the United Iron & Steel Co. at Leetonia, a Hanna interest, is now making iron.

In other industrial directions, there is a marked tendency toward improvement. For instance the Metropolitan Paving Brick Co. has recently started a unit at its Bessemer, Pa., plant which had been idle for fully 1½ years. A representative of the company says that demand for paving brick has shown substantial improvement of late and that the outlook is for a good run of business.

August shipments of the Bessemer Limestone & Cement Co. reached a new high level of 100,000 bbl., with production at 90,000 bbl. Both concerns report sustained betterment in demand from road and building construction interests.

Following a suspension of several months, the Falcon Steel Co. was scheduled to resume operations at its sheet mill plant at Niles this week.

New installations doubling the capacity of its sheet mills at Niles have been practically completed by the Republic Iron & Steel Co., and will be operated as soon as business conditions warrant. Some finishing work remains to be done.

The City of Youngstown has opened bids on cast iron pipe, valves and other materials to be used in connection with a proposed expenditure of $600,000 for a new water distributing system.

Wages in the steel industry, however, are at a low ebb and there is considerable dissatisfaction on this point. Many men are earning less than $100 a month in the face of high living costs, with an additional reduction in prospect.

The rolling mill at Charleroi, Pa., of the Electric Alloy Steel Co., Youngstown, Ohio, has resumed after a prolonged suspension. President L. J. Campbell states that August bookings exceeded those in July and the outlook is for continued good business. Manufacturers who have been out of the market for a long time are seeking material, he states.

Plant Operations

The smelting plant, Portsmouth, N. H., Navy Yard, in continuous operation the past seven years, has been closed. Old materials from most of the Navy yards and stations along the Atlantic Coast were reduced here.

The Ensign-Bickford Co., Simsbury, Conn., fuses, for the past six months operating a short-time schedule, is operating in full. Wages of employees have been cut an additional 10 per cent, making a total of 25 per cent within the past few months.

Four additional tin plate mills were put on at the Laughlin works at Martins Ferry, Ohio, of the American Sheet & Tin Plate Co. on Sept. 1. Of the 23 mills at this plant 16 now are under power.

Ten additional hot mills were put on at the Farrell, Pa., works of the American Sheet & Tin Plate Co., Sept. 2. This means that this plant is operating at 66-2/3 per cent as 20 of the 30 mills now are under power.

The Standard Steel Construction Co., of Port Robinson, Ont., has reopened after a shutdown of six months. The entire force has been re-employed.

The Page, Hersey Tubes, Ltd., Welland, Ont., which has been operating on a part time basis, has started on a six-day week schedule.

The shops of the Southern Railway at Somerset, Ky., have gone on full time basis. The shops which normally employ about 600 men, have been running on part time since last April.

New Driver-Harris Rolling Mill

E. Cooper Wills, who has been engaged as general superintendent of the hot mills and engineer of the Driver-Harris Co., Harrison, N. J., has been in Pittsburgh recently completing the purchase of equipment for the new rolling mill plant on which the company is about ready to start construction. The mill building, which is of all steel construction, 275 ft. long, 100 ft. wide and 22 ft. in the clear, is to be fabricated, erected and completed by the American Bridge Co. The building will be equipped with a 20-in. break down and plate and sheet train, one 9-stand 9-in. mill for wire rods and merchant mill products, four modern type heating furnaces and two electric annealing furnaces. The 20-in. mill is to be driven by an 800-hp. direct-current motor and the 9-in. mill by a 500-hp. direct-current motor. A motor generator set for converting alternating to direct current also is part of the equipment. The mills will run on 600 volts and have a speed ratio of 600 to 300, this flexibility being required on account of the character of the products the company produces.

The products include nichrome, Monel metal, brass and various carbon steels. M. Hoagland Sons & Co., Rockaway, N. J., has the contract for building the mills. The Westinghouse Electric & Mfg. Co. and the General Electric Co. will furnish the motors and generator sets and Fawcus Machine Co., Pittsburgh, the drive for the 20-in. mill. Mr. Wills formerly was general superintendent and engineer at the Rahway, N. J., plant of Nagle Steel Co., and the layout and design of the new plant of the Driver-Harris Co. is entirely in his hands. When completed he will become general superintendent of this plant. F. L. Driver is president of Driver-Harris Co. and Leon O. Hart general manager.

No Date Set for Hearings on Metric System Bill

WASHINGTON, Sept. 6.—No date has been set as yet for hearings which are to be held in connection with the bill of Senator Ladd, of North Dakota, which, after a period of 10 years, would compel the adoption of the metric system, though metal working machinery interests would be excluded from its operation. The latter, however, along with manufacturers generally who are strongly opposed to the metric system, feel that even if they are ostensibly exempted, they would sooner or later be compelled to adopt if it became established by law.

It is understood that the hearings will not begin until after Congress reconvenes. The subcommittee to conduct the hearings is headed by Senator McNary, of Oregon. The other members are Senator Weller, of Maryland, and Senator Jones, of New Mexico. Senator Ladd has stated that it is intended that both the proponents and opponents of the bill be given a hearing, after which the record would be circulated publicly and a subsequent hearing held to hear those whose interest had been aroused and a determination as to the desirability of such legislation be obtained. This is a similar claim that has been made with regard to previous hearings. The Ladd bill is identical with that of Representative Britten, of Illinois.

S. W. Platt, formerly Pittsburgh district manager for Luria Brothers & Co., Reading, Pa., engaged in the purchase and sale of iron and steel, recently filed a bill in equity in Pittsburgh claiming that the company owes him upward of $80,000 in commissions, and asking the court to direct the company to make an accounting with him and pay him the sum which shall be determined to be due.

For a Duty on Foreign Ferromanganese

Manufacturers Favor Free Manganese Ores and Ask 25 Per Cent Protection on Their Product —A Charge of Dumping from Great Britain

WASHINGTON, Sept. 5.—The brief before the Senate Finance Committee in support of a duty in aid of the domestic manufacture of ferromanganese was presented on behalf of the following four companies:

Lavino Furnace Co., furnaces at Sheridan, Lebanon and Marietta, Pa., and Reusens, Va.

E. E. Marshall, furnaces at Harrisburg and Newport, Pa.

American Manganese Mfg. Co., furnaces at Dunbar, Pa.

Southern Manganese Co., electric furnaces at Anniston, Ala.

The statement of these manufacturers was submitted by John J. Howard, general manager Levino Furnace Co., Philadelphia, and is as follows:

Ferromanganese is an alloy of manganese with iron, used for deoxidizing, scavenging and hardening steel. Ferromanganese in previous bills has been improperly classified chiefly because there was no ferromanganese industry in this country to request for proper classification. Ferromanganese is truly a finished product. It is used by the steel man to complete his operation on the purification of pig iron but he does not have to refine the ferromanganese in any way. He takes nothing out of it nor does he add anything to it.

This alloy in former tariffs has been classed along with what may be called raw materials in schedule 3, but the Ways and Means Committee of the present Congress recognized the fact that it was a distinct alloy and put it where it rightfully belongs.

Need of a Ferromanganese Industry

As this is a steel-producing country and we must have a steel industry in order to make any progress and to protect ourselves in time of need, it is also clear that to maintain the steel industry we must also have a ferromanganese industry. This was very clearly demonstrated in the great war when the supply from abroad was suddenly cut off from this country. As steel requires protection, it is self evident that ferromanganese equally deserves protection.

Unless the American producers of ferromanganese are given proper protection at this time they must go out of business and sacrifice the furnace plants they have equipped for this product, entailing the loss of millions of dollars to the owners, loss of earnings to the American employees and loss to the country of a vitally essential industry.

Wars such as the recent one break out suddenly, but an industry like the ferromanganese industry cannot be developed over night nor are the ores available on short notice.

Shortly after the outbreak of the European war and before this country entered it there was practically no ferromanganese available for steel makers in this country outside of that produced by the United States Steel Corporation for its own use, so that the foreign producers could not continue to supply the needs of this country in addition to the European requirements. Therefore it was only through the acquisition of furnace plants and knowledge of where to secure suitable manganese ore in the foreign ore markets by the American ferromanganese producer that the industry was developed here to meet the situation. For the proper protection of the country we should be independent of any other country for our supply of ferromanganese on account of its vital necessity in the production of steel.

New Limits on Manganese

To be in accordance with the custom of the trade, we recommend to have the wording in H. R. 7456, paragraph 301, schedule 3, which now reads:

Provided, that spiegeleisen for the purposes of this act shall not be an iron manganese alloy containing less than 45 per centum of manganese,

be changed so that it shall read:

Provided, that spiegeleisen for the purposes of this act shall be an iron manganese alloy containing less than 30 per centum of manganese,

and to have the wording in paragraph 302, schedule 3, which now reads:

Provided, that ferromanganese for the purposes of this act shall be such iron manganese alloys as contain 45 per centum or more of manganese;

changed so that it shall read:

Provided, that ferromanganese for the purpose of this act shall be such iron manganese alloys as contain 30 per centum or more of manganese.

This line of demarcation, having 44 per cent in manganese as the limit for spiegeleisen, is not in accord with the custom of the trade, as the standard grade of spiegeleisen is that testing from 18 to 22 per cent in manganese, although metal analyzing up to 30 per cent manganese is classed as spiegeleisen. By placing the maximum limit on spiegeleisen at 44 per cent manganese content it appears that some oversight was made, in view of the intention to give protection to the ferromanganese industry, and to correct the error the duty on ferromanganese should be applied on all metal containing over 30 per cent of manganese. It should be clearly understood, however, that metal containing 44 per cent of manganese should not be classed or considered as spiegeleisen.

Enormous quantities of manganiferous and ferruginous manganese ore exist in this country, therefore spiegeleisen does not need protection, whereas ferromanganese does. This will explain why a protective duty on ferromanganese is necessary and not necessary on spiegeleisen.

Domestic Ore Supply Insufficient

Due to our experience during the war, when we were unable to maintain an adequate ore supply for our furnaces, we became convinced that there was not a sufficient supply of domestic ore (a fact strongly supported by the independent steel interests in their testimony before the Finance Committee).

It is the consensus of opinion on the part of the steel interests and the American ferromanganese manufacturers, based on actual experience, that high-grade manganese ore of the quality necessary for the manufacture of ferromanganese does not exist in sufficient quantity or quality in the United States to support the ferromanganese industry, and even such small quantities as may be available occur in remote districts, principally in the Western States, from which the railroad transportation charges per ton alone to bring the ore to the Eastern States (where practically all the ferromanganese is manufactured and consumed) are in excess of the price at which high-grade foreign manganese ore can be landed at Eastern seaboard ports.

In other words, it is the contention of the independent steel interests and the American ferromanganese manufacturers that a duty of no less than 100 per cent on manganese ore will be necessary to afford any kind of protection to a few mining interests in the Western States who are laboring under the belief that with protection they will be able to produce and market high-grade manganese ore for the manufacture of ferromanganese.

An Exorbitant Duty

Even were we to assume that a certain tonnage of high-grade manganese ore could be produced in the

Western States, as was claimed by certain engineers and property owners who appeared before your committee, nothing short of an exorbitant duty on manganese ore would afford them sufficient protection to enable these Western mines to compete, since the American ferromanganese manufacturers will always be able to obtain their supplies of manganese ore in the foreign markets of the world at a lower price delivered at their plants on the Eastern seaboard, notwithstanding the duty they would have to pay thereon, as the railroad freight charges from the producing points in the West on domestic ore to Eastern points would exceed the duty that would have to be paid on imported manganese ore.

It seems to us that a duty on manganese ore will not serve the purpose desired, viz.: to protect the domestic miner, but only burdens the steel industry with a higher cost on ferromanganese, since the ferromanganese makers would naturally have to include in their cost of production the duty they would have to pay on the manganese ore.

The market price for high-grade foreign manganese ore to-day, delivered f.o.b. cars Eastern seaports, is between 20c. and 25c. per unit, which, calculated on an ore containing 50 units of manganese, is equivalent to from $10 to $12.50 per gross ton. On the other hand, the railroad freight rates on manganese ore from California common points, from the Butte and Phillipsburg, Mont., district, and from the Batesville, Ark., district (where limited quantities of high-grade domestic manganese ore are reported to exist) to Eastern consuming points (say Pittsburgh district) amount to $18.66, $14.18 and $16.02 respectively, per gross ton.

The above mentioned market price of 20c. to 25c. per unit for foreign high-grade manganese ore averaging 50 per cent and over in metallic manganese may be considered as a normal price and not a price necessarily due to the present depressed state of business. The average price of foreign high-grade ores over a period of ten years prior to the war did not exceed 25c. per unit, or $12.50 per gross ton, delivered Atlantic seaboard.

It is obvious from this comparison that unless a duty of over 100 per cent is placed on manganese ore no domestic ore will be produced.

The Steel Corporation's Policy

At the hearings before the subcommittee on metals of the Ways and Means Committee the question was asked of a representative of the United States Steel Corporation whether the corporation thought there was sufficient ore in this country to take care of the requirements. In replying he said the best answer to that question is that the Steel Corporation purchased a manganese mine in Brazil within the past year and its only regret was that it had not done so ten years ago. (The inference was that during the many years it had been purchasing the ore from Brazil it had paid enough in profits to the Brazilian mine owners to have paid for the mine.) This is conclusive evidence that the corporation concluded the ore did not exist in this country.

During the hearings before the Ways and Means Committee we asked for free manganese ore and a protective duty on ferromanganese. However, even though we knew the ore did not exist in quantity in this country, if Congress wished to impose a duty on ore for revenue purposes, we were satisfied if a compensatory duty was put on ferromanganese.

In filing this brief with the Senate Finance Committee we do not presume to know what form the final bill will take, but we are still convinced there is not an adequate domestic ore supply and that manganese ore should remain on the free list, and urge that a duty be imposed on ferromanganese of 25 per cent ad valorem, based on the American valuation. It must be borne in mind, however, that should your committee recommend a duty on manganese ore, there must necessarily be an adequate compensatory duty on ferromanganese, adhering to the ratio specified in H. R. 7456.

British Producers' Methods

The unfair methods practiced by the foreign producers in the past leads us to conclude that only an exorbitant specific duty would afford the American industry adequate protection. It is for this reason that we should have an adequate ad valorem duty, with the added advantages of the American valuation plan to meet the situation.

As the result of pernicious propaganda on the part of the American agents of the English ferromanganese producers the question has arisen why, when former tariff bills did not carry a higher duty than $4 a ton, it should now be necessary to impose a duty that would protect the manufacture of ferromanganese. We would like to emphasize again the fact that in former years there were no independent makers of ferromanganese in this country and consequently there was no industry that needed protection as there is at this time.

In the copy of the *Iron and Coal Trades Review*, the leading iron and steel trade journal of England, issue of Aug. 12, 1921, there appear on page 217 quotations on British made ferromanganese as follows:

76 to 80 per cent "for home consumption," £18 per ton.
76 to 80 per cent "for export," £14 per ton.

It is prefectly evident, therefore, that the members of the British pool are resorting again to their pernicious habit of dumping in this country to destroy the ferromanganese industry, in this case the differential being £4 sterling per ton lower than they will sell consumers in their own country.

Steel Companies Not Against a Duty

The steel interests admit that ferromanganese is one of the chief constituents and essential in the manufacture of steel, and it is therefore highly important that the United States should have its own ferromanganese industry by proper protection and that we should not be dependent on other countries for the supply of this most essential article.

The steel interests, as evidenced by their testimony before the Finance Committee, were not opposed to a duty on ferromanganese. They, however, oppose the high rate of duty of 2.2c. per lb. on the metallic contents, as proposed by the Ways and Means Committee, on the basis that it would add too much to the cost of their steel. The proposed duty on ferromanganese is necessarily high because it is burdened with a duty of 1c. per lb. on the metallic manganese in the ore.

The duty proposed in H. R. 7456 on ferromanganese carries protection to both manganese ore and ferromanganese in the proportion of about two-thirds for the ore and one-third for ferromanganese; therefore it is evident that if ore is permitted to remain on the free list and an ad valorem duty of 25 per cent imposed on ferromanganese, about 66 per cent of the high duty objected to by the steel producer will be eliminated and the necessary protection can be accorded to ferromanganese.

American Industry May Be Wiped Out

It would hardly be consistent for the steel interests to request that their own industry be protected and deny adequate protection to the ferromanganese industry. They assume that ferromanganese would cost them less if a small duty or no duty is placed on the product, overlooking the fact that unless a duty giving adequate protection is granted the American industry will cease to exist and they will have to pay the foreign producer an amount equivalent to the duty that would be necessary to protect the industry in this country. With the American industry out of the way the British producers would be able to fix the price for American consumption as has been their practice in the past.

We contend that the position of the American steel producer would not be changed, for in one case he pays a price for his ferromanganese which includes protection for the American industry and on the other hand, with no duty, he will pay the same amount to the foreign producer to sustain a foreign industry.

The dominating factor of the foreign producers is the British pool, whose avowed purpose is to reclaim the American trade and to drive the American maker out of business by unfair competition. This unfair

competition has already been brought to the attention of the United States Government and is in process of investigation by the Federal Trade Commission.

Output of Merchant Ferromanganese

The American producers of ferromanganese have at present ample furnace capacity to supply all the independent steel makers in this country even under war time consumption.

The accompanying table shows the production over a period, of only four of the producers, and as the output was governed by what was sold, it is only fair to say that this tonnage would have been materially increased had the demand been sufficient.

If the steel makers' memory were not so short, and if they would adhere to actual facts we feel sure they would all plead for protection for a ferromanganese industry. Just one illustration: When the war broke out the foreign supply was curtailed and stocks here rapidly diminished so that there threatened a famine in ferromanganese. The result was that the price of the small amount of ferromanganese available jumped to unheard of prices and threatened a shut down of practically every independent steel plant in the country. Shortly after this the American ferromanganese producers came to their rescue and with gradually increasing production the price was brought down to a reasonable war time level and remained there.

In conclusion, if the ferromanganese industry is permitted to survive, by reason of an adequate duty, then the steel producers would not be subjected to any undue hardship and the United States—the largest producer of steel in the world—by fostering a ferromanganese industry of its own would not be dependent on foreign countries for its supply of this vitally important element.

*Production of American Ferromanganese—Gross Tons**

	1915	1916	1917	1918	1919	1920	1921	Total
Lavino Furnace Co.		8,514	32,622	35,421	22,493	59,737	8,382	167,169
E. E. Marshall			9,603	32,108	2,249	19,900	None	63,860
American Manganese Mfg. Co.	10,059	2,892	None	2,293	9,345	9,991	None	34,580
Iroquois Furnace		7,684	19,771	17,312	None	17,329	None	62,096
Total	10,059	19,090	61,996	87,134	34,087	106,957	8,382	327,705

*The table represents the tonnage of ferromanganese produced exclusive of that produced by the United States Steel Corporation and other steel companies, and does not include the production of several other companies which operated during the war but went out of business immediately after the armistice was signed.

DUTY ON HIGH SPEED STEEL

Sheffield Manufacturers Present Their Views to Senate Committee

WASHINGTON, Sept. 6.—Essentially different points of view were apparent when high-speed steel manufacturers from Sheffield, England, through Arthur Balfour of Arthur Balfour & Co., presented their arguments on Tuesday of last week regarding the proposed tariff duties on their products carried in the Fordney bill. The hearing was referred to briefly in THE IRON AGE of Sept. 1, page 568. Naturally enough, they looked at the matter from the angle of producers who are apprehensive lest duties be imposed which would shut off the American market from their trade. While members of the Finance Committee accorded a courteous reception to the British manufacturers, it was evident that they looked at the matter with the domestic situation in mind. The hearing was not only unusual in that it probably marked the first time in the history of American tariff legislation that foreign manufacturers appeared in person to protest proposed rates, but it was significant of the development in the high speed steel industry of the United States and its competitive effect on an old source of supply. It denoted efforts of American manufacturers of tool steel to expand this industry, comparatively new for the United States and the striving of the British producers to maintain the important trade and long association they have had with the United States.

The vital interest which British manufacturers have in the domestic market was made plain when Mr. Balfour told the committee that probably 18 per cent of the output of Sheffield high-speed steel producers is shipped to the United States, and that some firms do practically all of their business with consumers in this country. He stated emphatically that the duties proposed in the Fordney bill would entirely shut off the American trade. He suggested that the proposed duty of 20 per cent ad valorem on steel valued above 40c. per lb. should be reduced to 10 per cent and that the compensating duty of 72c. per lb. on the tungsten and molybdenum content should be reduced to 35c. per lb. He also protested against the American valuation plan, stating that Sheffield makers have running contracts for 200 to 300 tons with American consumers, and that it would not be possible to determine what the prices would be until the duties are levied or known.

The committee, of course, already has approved and is studying the American valuation plan extensively and is to get further detailed reports from experts of the Treasury Department. But it is obvious that while it discerns difficulties that may arise in putting the plan into effect, it is the attitude of the committee that the present basis of levying duties on the foreign valuation will be virtually impossible of successful operation in the absence of having a very large corps of officials from the Treasury Department stationed in foreign ports throughout the world.

The soundness of the argument made by Mr. Balfour regarding the necessity of trade between the nations and of stabilized exchange was recognized by the committee. But the manner of doing this seemingly represented a difference of opinion, because those members who are desirous of aiding the domestic industry through a protective tariff do not want to sacrifice the interest of United States makers in order to stabilize international currency. Arguments of Mr. Balfour for the necessity of reviving the industry in England were replied to in substance by Senator Smoot by stating that the same thing might be said regarding the industry in the United States. But it was indicated to Mr. Balfour that the committee reciprocated his feelings that it is necessary for England and the United States to maintain business relations and that it is, of course, not desired to unfairly shut out foreign interests from the American market. They sympathized with him in his expressions concerning struggles of the English people to overcome the enormous strain of war.

"All that is asked is to let us live and pay you, because the only thing we can do is to trade goods with you," said Mr. Balfour.

But here again, it was shown that the American people also are under a heavy strain due to the war and that it is necessary to revive domestic industries. Mr. Balfour stated that the cost of melting is 400 per cent higher than it was in 1912 and that the British makers are paying wages which are about the same as those paid in America.

"We do not believe in retaliation in our country," said Mr. Balfour; "we are afraid it would cause mistrust between nations and all we ask is for you to give us what you can."

Mr. Smoot asked Mr. Balfour if he would be satisfied if the tariff made up the difference in the labor cost and equalized the difference in exchange. Mr. Balfour replied that that plan would be satisfactory, provided the so-called high tariff duties were not made permanent.

LOWERED FREIGHT CHARGES

Reduction Made on Iron and Steel Exports—New Pacific Rates Pending

WASHINGTON, Sept. 6. — Following permission granted by the Interstate Commerce Commission to railroad lines east of the Mississippi River, to reestablish export rates on iron and steel products through the Atlantic seaboard ports, amounting to a reduction of a little more than 20 per cent, transcontinental lines have filed an application with the commission asking permission to make reductions in rates on iron and steel products from all producing sections to Pacific coast terminals, the proposed cuts ranging from 25 to 40 per cent. The new application, which applies to all products, from pig iron to finished steel, calls for the establishment of flat rates to the points of destination, regardless of the differentials now obtaining from the nine rate-grouping districts into which the country is divided.

The request, which involves a departure from the so-called long-and-short-haul provision of the act to regulate commerce, is made in order to meet competition through the Panama Canal, though the proposed trans-continental rail rates still will be much higher than those applying to shipments to Pacific coast terminals by way of the canal. The railroads ask that the commission give the matter early consideration, the intention being to apply the reduced rates, if they are allowed to become effective, as soon as possible, and it is believed the permission will be granted to make the new rates operative on or before Oct. 3.

Typical of the present rates and the reduction proposed are those relating to steel bars, hoops, bands and cotton ties. The application seeks to lower rates on these products to $1 per 100 lb. The present rate from New York is $1.83½; from Boston $1.66½; from Pittsburgh and Chicago, $1.58½; from points west of the Mississippi River to the Missouri River, $1.50; and from points west of the Missouri River, $1.25½.

Some of the other major steel products listed in the application, and the proposed new rates, are as follows, rates stated per 100 lb., unless otherwise specified:

Pig iron, billets, blooms, etc., $1 west from Atlantic seaboard to Mississippi River and south of the Michigan-Wisconsin line; 90c from all other points. Bolts, nuts, etc., horse shoes, iron sheets and plates, No. 11 or heavier, welded or seamless pipe minimum weight, 60,000 lb.; boiler flues, not over 12 in. in diameter (minimum weight 60,000 lb.); large nails, spikes, etc., light rails and fastenings and angle bars, locomotive axles, wire and wire goods, wire rods and structural steel, $1.

Corrugated iron sheets, No. 12 and lighter, pipe fittings and connections, $1.15; rough castings and forgings, boiler flues not over 12 in. in diameter, and welded or seamless tubing (minimum 40,000 lb.); nails and horseshoes in boxes (minimum weight 50,000 lb.), $1.25; cast iron pipe and connections, $1 (minimum weight 60,000 lb.), and $1.25 (minimum weight 40,000 lb.); heavy steel rails $20 per gross ton, minimum weight 80,000 lb.

Representative of new rates, which become effective today on shipments from Pittsburgh and the Atlantic seaboard for export, are the following, the first column being stated in cents per 100 lb., and the others in dollars per gross ton:

Eastbound Export Rates Effective Sept. 6, 1921

Pittsburgh to—	Special Iron and Steel Articles	Billets	Pig Iron	Rails
New York	28½c.	$4.70	$4.60	$4.40
Boston	28½c.	4.70	4.60	4.40
Philadelphia	26½c.	4.30	4.20	4.20
Baltimore	25½c.	4.10	4.00	4.10
Norfolk	33½c.	5.50	5.30	4.60
Newport News	33½c.	5.50	5.30	4.60

The railroads had filed applications to make these rates effective last Thursday, but some of the tariffs were delayed and consequently the reductions did not become operative until today. The lowering of iron and steel freight rates on shipments for export has been well received by the trade, and it is expected that it will prove an element in hastening readjustment and the revival of the industry. At the same time, the trade is anxious that there be a general lowering of rates on purely domestic shipments as well.

TO IMPORT SWEDISH IRON ORES

New Agency at Philadelphia for the Famous Kiruna Product

The Trafikaktiebolaget Grangesberg-Oxelosund of Stockholm, Sweden, operator of the famous Kiruna iron mine and the largest and most important firm of iron ore miners and sellers in Sweden, announces that Albert Broden, Temple, Pa., formerly general manager of blast furnaces of the Reading Iron Co., who has been its representative in this country for the last 16 years, has severed his connections on account of his health.

Park & Williams, Inc., who have offices in Philadelphia and Pittsburgh, have been appointed to succeed Mr. Broden and in the future will look after the sales of this ore in the United States. Laird U. Park, president of Park & Williams, has just returned from a trip to Sweden in the course of which, he visited the various mines operated by the company and also went to Narvik, Norway, to inspect the new crushing plant and the modern steel ore dock, which can load three vessels at one time at the rate of about 2000 tons per hour each. A description of the Narvik ore dock appeared in THE IRON AGE of Jan. 9, 1908.

The Trafikaktiebolaget Grangesberg - Oxelosund mines two-thirds of the total of iron ore produced in Sweden, which in normal times has run up to 7,500,000 tons a year. In addition to mines and railroads it has blast furnaces and controls its own vessels. With vessels under construction the fleet will represent over 200,000 tons.

Operations at the company's Kiirunavaara iron mines in the north of Sweden have been considerably increased, and steam shovels are now at work on a sufficient number of benches on the outside of the mountain to permit of taking out over 14,000 tons per day. In the past year work on the Luossavaara iron mountain, located a short distance from Kiruna, has progressed until the mining rate is now 1000 tons per day. The ores in these deposits run 60 up to 69 per cent iron, natural, with phosphorus ranging from 0.05 to 3 per cent, the average ore mines carrying from 0.75 to 1.25 per cent of phosphorus.

Lake Iron Ore Shipments in August

Shipments of iron ore from the Lake Superior region in August were very light as compared with those for August, 1920. This year they were 4,329,158 gross tons, which compare with 9,270,763 tons in August 1920. The decrease from last year was therefore, 4,941,805 tons or 53.30 per cent. The totals by ports, with season shipments, and a comparison with 1920, are given below:

	August, 1921	August, 1920	To Sept. 1, 1921	To Sept. 1, 1920
Escanaba	309,111	1,277,561	758,173	4,394,838
Marquette	129,691	602,567	263,105	2,141,291
Ashland	468,283	1,327,294	1,429,308	4,933,402
Superior	917,693	2,266,497	3,508,928	8,961,424
Duluth	1,833,247	2,351,918	6,472,640	9,352,140
Two Harbors	671,133	1,444,926	2,315,918	5,566,779
Total	4,329,158	9,270,763	14,748,072	35,349,874

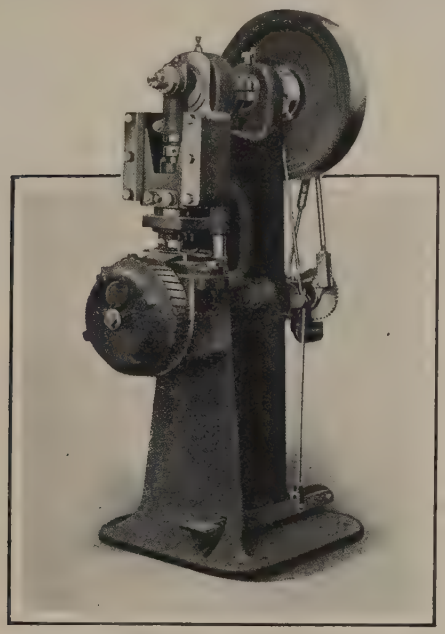
The decrease in season shipments to Sept. 1, 1921, has been 20,601,802 tons, or 58.27 per cent, as compared with an increase for the same period a year ago of 5,751,826 tons.

Of the season's total to Sept. 1, the Great Northern dock contributed only 0.99 per cent, as against 21.63 per cent a year ago. Duluth is credited this year with 43.89 per cent of this season's total as compared with 26.46 per cent a year ago.

Tie-Splicing Machine

A machine designed primarily for splicing short pieces of cotton ties but adaptable to other uses of a similar nature has been brought out by the Renaud Co., Cincinnati. The splices made are double riveted.

The press is of the same design as the ordinary upright press but modified to receive the positive power driven automatic rivet feed. It is operated by a foot lever, its operating features said to have been taken from the Willard power press. The dies are of the combination trimming and piercing type, consisting of a subpress held in adjustment and alignment by heavy guide posts. The lower half of the die is a single piece



The Slots in the Hopper Are Emptied and Refilled During One Revolution

of specially selected stock and has a hole in the center shaped to receive the shearing punch which is also a solid block of the same material. The upper and lower halves of the die are securely fastened to the corresponding halves of the subpress. The punch holes are bushed so that if they become broken or worn they may be replaced. The punches are also removable.

The rivet feed is obtained from the hopper, to be seen in the illustration, which contains the rivets and an auxiliary internal mechanism both of which are positively driven from the crankshaft, there being no chains or gears. The hopper is timed to index one slot at each stroke of the press. As one stroke is required to prepare the tie ends and one stroke to compress the rivets, two rivets are brought to an upright position in front of the operator in time for the next riveting operation. The slots are emptied and refilled during one complete revolution of the hopper, the rivets not used falling back into the hopper and causing no interference.

In splicing, the material is placed between the shear and punch blocks, the pressed tripped, and the pieces are prepared for riveting. The operator then takes one piece, places it over the two rivets standing upright in front of him in the slots, slides it under the hammer, places the other piece on top and then trips the press, compressing the rivets and completing the operation. The production claimed is 1500-2000, 11½ ft. ties per day, the finished splices being uniform and smooth. The machine weighs 1400 lb. net.

A small number of men employed in the drop department, North & Judd Mfg. Co., New Britain, Conn., automobile and carriage hardware, etc., last week walked out following a reduction in wages. Their places were promptly filled at the reduced wage. Wages of employees at this plant have been reduced 5 to 10 per cent.

WEEKLY COMMERCE REPORTS

Department of Commerce to Give Foreign Trade Information by Industries

WASHINGTON, Sept. 6.—Beginning yesterday, *Commerce Reports*, published by the Department of Commerce, became a weekly instead of a daily publication. This change is made as part of the general reorganization plan of the foreign trade service.

Commenting on plans of the Department, Secretary Hoover said:

It is proposed to place information with regard to foreign trade before American business men in more intelligible and constructive form. Heretofore a vast amount of material, which comes in from a staff of 600 foreign agents, including commercial attaches, consular agents, trade commissioners and special agents, has been presented in a daily mass of reports, unsystematized excepting for arrangement to some extent on a purely geographical basis.

The bureau of foreign and domestic commerce is being reorganized on a commodity basis, the object of which is threefold:

1. That specialists in the different great industrial divisions should be incorporated in the bureau for the purpose of giving expert direction to these many foreign agents as to the investigations and services that will be of importance and most useful to their particular branch of industry.

2. That they may, by maintaining close communication with trade associations in different industries, keep in touch with the character of service, information and investigation needed in these industries.

3. That the material coming in may be edited and prepared in such a manner as to be of the most practicable service.

The following divisions have so far been established:

Iron and steel.
Lumber.
Industrial machinery.
Electrical equipment and supplies.
Foodstuffs.
Automotive equipment.
Fuels.
Textiles.
Shoes and leather products.
Agricultural implements and vehicles.
Rubber products.

The men in charge of these divisions have been chosen from the industries themselves and in most instances have been selected in co-operation with their trade associations so that they may bring to the department not only specialized knowledge and sympathetic understanding of the problems of these particular industrial groups but in turn may interpret to the foreign staff the needs of these industries and, as stated above, develop the material received in such form as may be of the greatest use in the industry to which it is related.

In the above sense the weekly form will be departmentalized over the different industries as far as practicable.

In order that there may be the widest distribution and no delay in important information, special material will be released to the press immediately upon its arrival, in advance of the weekly publication.

The present form of the weekly is not final, and it is anticipated that changes and improvements will be made in succeeding numbers. The department will welcome suggestions and criticisms that will lead to making the *Commerce Reports* in this new form more useful to subscribers.

Steel Employment Slightly Better

WASHINGTON, Sept. 6.—Employment in the iron and steel industry finally has shown an upturn, though slight, according to the Employment Service of the Department of Labor, and made an increase of 6726 workers, or 2.2 per cent, in August when compared with July. The report indicates that 1428 firms, in 14 lines of industry, located in the 65 principal industrial centers, employed 1,510,210 workers on July 31, and the number was increased to 1,526,479 on Aug. 31, a net gain of 16,269 or 1.08 per cent. Industrial classifications showing increases in employment are iron and steel and their products; metals and metal products other than iron and steel; railroad repair shops; tobacco manufactures; food and kindred products; leather and its finished products, and stone, clay and glass products. Among the gains, by numbers and percentages, in addition to iron and steel, were railroad repair shops, 3423, or 5.7 per cent, and metals and metal products, 3877, or 5.4 per cent.

As pointed out by the report, at first glance the figures for August seem to show that the low point in the present severe depression has been reached and passed, and that the country has at last definitely set out on the road to normal conditions.

Of the 38 places reporting increased employment are the following important iron and steel towns, together with the percentages of gain: Youngstown, 27.7 per cent; Cleveland, 10.8 per cent; Johnstown, Pa., and Birmingham, 5.2 per cent; St. Louis, 3.3 per cent, and New York, 2.8 per cent. Pittsburgh, on the other hand, showed a decline of 4.4 per cent in employment in August.

Demand for Machinery in Spain

A review of the immediate and potential demand in Spain for machinery of various classes, coming from the commercial secretary to his Majesty's Embassy at Madrid and given in a recent issue of the *Engineer*, London, is summarized in what follows.

The opening for agricultural machinery is wide. Although Spain is primarily an agricultural country, the Spanish farmer has not kept pace with the times. New business often involves educating the buyer first. The tractor has not yet established itself definitely in Spain and although the market is more of the future than the immediate present, the time is opportune for manufacturers to lay the foundations of business by making their machines known.

The metal working industries have obtained a specially high protection, import duties amounting to between 100 and 250 per cent. In regard to screws and threaded nuts the demand has been supplied hitherto mostly from abroad but it is expected that with the present duties home production will increase.

In the Barcelona district it is expected that water turbines will be required for the numerous power plant projects in process. At present this trade is almost wholly in the hands of Swiss and German manufacturers but it remains to be seen what effect will follow a recent Royal decree obliging future holders of water power concessions to use Spanish machinery whenever possible. Centrifugal pumps are also largely required for irrigation purposes.

In machine tools business is temporarily at a standstill. In the Vigo and Corunna areas screws and files are in large demand, the Spanish product being reported as of very poor quality. In this connection the British Vice-Consul at Corunna is stated to have reported that the Germans in quoting prices to merchants in this district add the following clause: "If these prices are found dear, please make us a counter offer."

There is a demand for machine tools, for both metal and woodworking reported by the Vice-Consul at Castellon. In the carpentering and cabinet-making industries much work is done by hand which could with advantage be done by machinery. The manufacture of house furniture has developed considerably of late years and a large export trade has been established. In order to introduce the machinery, it is stated, manufacturers must send representatives or appoint agents with security of their appointment for a number of years, propaganda confined to sending of catalogs not being likely to lead to business.

The Spaniard, it is remarked, does not readily renew his machinery, and in the Barcelona district, at least, hardly any of the profits made during the war seem to have been invested in new installations. Some of the local textile factories are still using machinery that dates as far back as 1880.

South Africa's First Modern Blast Furnace

A brief description of the first modern blast furnace to be built in South Africa by the Newcastle Iron & Steel, Ltd., Newcastle, Natal, with main offices at Johannesburg, is furnished by the company as follows:

Prior to this another company built two small experimental plants during the war with a capacity of about 10 tons per day, which turned out a few thousand tons of pig iron from local ores, but these have now been closed down. The drawings for this company's new blast furnace were supplied by McClure & Sons, Pittsburgh, the dimensions being 70 ft. high, with bosh 14 ft. 6 in., and three stoves 20 ft. x 80 ft., with a provision for a fourth. Two stoves are completed and a third is in course of erection. There is also an iron and steel foundry being built, 92 ft. x 180 ft., equipped with a 20-ton open-hearth electric crane. A brick plant has also been erected for the manufacture of fire and common bricks and all the bricks required for the plant are being made on the spot.

The iron ores will be taken from the company's own mines in the district and are of a fairly high grade; the Hematite ore running from 60 to 67 per cent metallic iron, 0.03 phosphorus, 0.9 to 5 per cent silica with sulphur a trace. Our coke runs from 6 cent to 12 per cent of ash and sulphur 0.6 to 1.2 cent. The company has also its own coal prope two miles from the works, and dross or fine c suitable for coking is now being supplied at 3s. 6d. ton at the colliery.

It is proposed later to erect a steel plant for manufacture of heavy rails. The site of the wo consists of 200 acres on the main line about half w between Durban and Johannesburg with a frontage on the Incanda River.

Southern Raw Material Freight Cuts

BIRMINGHAM, Sept. 6.—Raw material rate reductions ordered to become effective on or before Oct. 1 have not been accepted. The state utilities commission which ordered them expects the carriers to comply, but they have not said whether or not they would appeal to the Interstate Commerce Commission. The rates are preferential. Coal and coke are not affected. Most favored furnaces see no more than 30 to 42 cents saving per ton of iron. These are in the 25-mile zone limit. In stone from over 50 miles from furnace the rate is increased.

The following shows new and old rates from mines and quarries to Alabama City, where the Gulf States Steel and Alabama Co. operate furnaces and general schedule of 25 and 50-mile zones:

To Alabama City From—		*Ore* Present Rate	Proposed Rate	Reduction
Shannon	75 miles	$0.80	$0.71	8.87 per cent
Steinman	77 miles	0.80	0.71	8.87 per cent
		Stone		
Spencer	64 miles	0.60	0.63	5 per cent*

	For Distances Under 25 Miles Present Rate	Proposed Rate	Decrease
Ore	$0.50	$0.37	26.0 per cent
Stone	0.40	0.37	7.5 per cent

	For Distances 25 Miles and Under 50 Miles Present Rate	Proposed Rate	Decrease
Ore	$0.60	$0.47	21.7 per cent
Stone	0.50	0.47	6.0 per cent

*Increase.

Southeastern Fabricating-in-Transit Privilege

BIRMINGHAM, Sept. 5.—Premature report from Atlanta last week was to effect that the Southeastern freight rate committee had approved the recommendation of Southern and Louisville & Nashville railroads for a fabricating in transit privilege on iron and steel products in Birmingham, Atlanta, Chattanooga and other Southeastern points. The committee took the matter under advisement according to custom. It is confidently expected that the action will be favorable, but no decision has been announced.

Plans for the reorganization of the Nickel Alloys Co., Clearfield, Pa., with plant at Hyde, near Clearfield, are under way, with proposal to form a $2,500,000 company and take over the assets of the present organization, which has been in the hands of a receiver for several months. William J. Webster and Leland Lyon are at the head of the reorganization committee; bonds for $1,000,000 will be issued to carry out the details and place the plant, now closed, in operation.

The American Steel Foundries, Chicago, according to a statement by its president, has no money borrowed from any source, and on the other hand, has $2,000,000 in cash, and over $4,500,000 invested in securities, mostly Liberty bonds and certificates of indebtedness. Surplus is over $10,000,000 and inventory has gone down $2,000,000 since the first of the year, although it was low at that time.

The Philippine district office of the United States Bureau of Foreign and Domestic Commerce, was opened in Manila, July 15, with temporary quarters in the Ayuntamiento, the executive building of the Insular Government. The office, in charge of George L. Logan, manager, purposes to cooperate with American business houses.

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Benefits of Export Trade

Apparently there is a clash between those who hold that to be prosperous the United States needs an export trade and those who contend that payment for the goods exported would bring us fresh trouble. On the one hand it has been argued that we have an excess of productive capacity, hence must have an "outlet" or be but indifferently employed, while on the other hand it has been urged that a large "favorable balance" in merchandise trade is calculated to produce a price inflation that will kill the business.

The more moderate view in favor of our doing an export business is that thereby our various markets are broadened and correspondingly stabilized. We have the same principle in the domestic market. The seller who distributes his goods widely over the country has a steadier market than the one whose trade is local. When domestic demand for a given commodity is good we can export less, and when the demand falls off we may be able to export more. Obviously that is altogether different from an attempt to export all goods when all demand is light in our own country. We know well enough now that as a rule such a thing cannot be done. When demand in general is poor in the United States it is likely to be poor practically everywhere.

The question has often been asked, what is the relative quantitative importance of our domestic and our export trade. The Federal Reserve Board has given the matter careful consideration and expresses the opinion that, very roughly, a normal export trade may be taken at 10 per cent of the whole. The board (in the August Bulletin) arrives at this by taking 1919, with a census estimate of $62,589,000,000 for all manufactured products and $16,013,000,000 for all crops, or a total of $78,602,000,000, while the exports were $7,920,000,000. The board points out that export trade has a stabilizing influence upon prices, because a small excess or a small deficiency in supplies may have a great effect upon the market price.

Obviously this is a totally different thing from planning definitely to export a certain percentage of each of a large number of products and then endeavoring to maintain that percentage, whether demand is good or bad at home or good or bad in the foreign market. It is distinctly the flexibility that is an advantage, and to endeavor to maintain a fixed percentage would be to renounce that advantage entirely.

Again, we should not seek to prevent importations. Tariffs are for the purpose of raising revenue and taking care of unevenness and divergence in legitimate costs of production here and abroad. The individual sells goods in order that he may buy other goods and as a nation we should do the same thing, within proper limits and with proper regulation.

Almost constantly since the armistice questions have been asked relative to the continuance of heavy exports as compared with much lighter imports. The favorable balance in merchandise trade rose to $635,463,660 in June, 1919, its high record, and then declined to $65,501,992 in July, 1920; but that was not the end, for the balance rose again to $454,379,696 in December, 1920, and the figures have given no clear indication of what we ought to expect. The Federal Reserve Board now gives an interesting fact bearing on this question. On the assumption, generally believed to be substantially correct, that there was an even break at the time of the armistice, it was computed that the unfunded balance resulting from our foreign trade amounted to $3,000,000,000 on July 1, 1920, and that this increased in the next fiscal year by $1,500,000,000, making about $4,500,000,000 on July 1, 1921.

Details of German steel exports for 1920 are published in the latest issue of *Stahl und Eisen* to reach this country, that for Aug. 11. They are interesting as giving some measure of the activity of the German steel industry as a whole despite the fact that production data are not yet made public. The 1920 exports were 1,750,601 metric tons, or 145,900 tons per month. This is about 30 per cent of the average of 1912 and 1913 exports which was 468,000 tons per month. For the last two months of 1920 the figures were 176,480

tons and 182,120 tons, respectively, or considerably above the year's average. Structural steel, plates and sheets, rails and pig iron in the order named constituted the principal exports, structural steel running about 25 per cent of the total and plates and sheets 13 per cent. Exports of rails at 152,016 tons exceeded British rail exports, which were 134,400 tons and Germany exported more structural steel than Great Britain, as well as more hoops and strips. It is noteworthy that Germany last year exported more than the combined steel exports of Belgium and France and that the total was more than 50 per cent of that for Great Britain.

Prices and Buying Power

In the early part of the industrial depression that began in 1873, and quite similarly in the case of the depression that began in 1893, the opinion expressed by some very able and intelligent observers was that the country was overdeveloped. Too many factories had been built, too many mines opened and too much railroad mileage constructed. Business was poor because there was not sufficient employment for the facilities.

The idea was not that the employment was deficient, but that the facilities were in excess; just as it might be said of human employment that there were too many men, not that there were too few jobs. In each case the sequel showed that such analysis was wrong. The fault did not lie with the productive facilities, for afterward when activity returned there was much further development, and the greatly increased facilities all found employment eventually.

Little was said in those days about prices being too high. Possibly they were somewhat higher than would have been well, but the decline that followed did not bring about activity. Unemployment had intervened and the buying power was so reduced that men found it impossible to buy freely. The decrease in the total of purchasing power was greater than the decrease in unit prices.

Of late a great deal has been said about commodity prices being too high. No doubt the mental attitude of many buyers was that of assigning the level of prices as a reason for abstention from buying, but it does not follow that this was the main reason. It would be absurd to assume that an economic law can be deduced from what chances to be in men's minds.

Inasmuch as prices needed to come down it was well to have sellers appreciate that buyers were objecting to them. Now, however, we have progressed to another stage. We shall be in error if we adhere blindly to the idea that activity was, is and will be absent through one cause only, that of prices being too high. If a man is guided solely by such philosophy he can have but one view—that as long as inactivity obtains prices are too high, no matter what those prices are.

The buying power is greatly reduced. There is much unemployment and with nearly all those still in employment the wage or salary rate is lower. The earnings of capital, which normally are reinvested, have dwindled greatly and many companies have seen profits turned into losses. For business revival the main point is the building up of buying power, obviously a slow process. An argument frequently made is in substance that capitalists must pull business over the dead center, by seeking investment in construction work. That would distribute some jobs, wages would be paid and the wages could be spent. This would bring about more spending, and so on. The plain difficulty about this is that with the general buying power at a low level capital would not see prospect of an early return on the investment, and therefore would be disposed to wait until the buying power was clearly increasing. That the capitalist does not invest is not conclusive proof that he thinks prices are still too high. He may, for all one knows to the contrary, be satisfied with the prices, but entirely dissatisfied with the immediate prospects for the investment.

The Inventor's Opportunity

The patent lawyers of the country are very busy. This almost always is the case in periods of depression following very brisk business, but this year the condition is even more marked than usual. A chief reason is the desire of manufacturers to secure new products for which there would be a quick demand, and in this way put to work men and machinery that otherwise would be idle. Consequently it is an advantageous time for the inventor who has something worth selling, providing he will listen to a reasonable proposition of purchase.

The war years gave little opportunity for the development of new ideas having to do with peacetime purposes. In the hectic months that followed most industries were too busy supplying their established products to give serious attention to changing them or adding to them, except, of course, that the draughting rooms turned their attention from war to peace. With the falling off in industry, managing officials began to look forward, first to the immediate future, in the effort to maintain the production of their plants, and then to the farther future, getting ready for the return of good times, lest their competitors might steal a march on them.

The patent attorney's clients who are inventors pure and simple and not producers, can profit by present situation, if they have useful patents or patentable ideas, for the attorneys constantly get requests from manufacturers for information pertaining to new products. Some of the machine tool makers are seeking new lines, not necessarily machine tools or mechanisms which go with them. They want something that will sell in a time when machine tool buyers are few—something requiring in its manufacture the precision work for which their shops are equipped. Not all such products will be permanent lines, yet some of them may continue as departments when machine tools again are in strong demand, at any rate until they can be sold to advantage.

Inventors change little in one respect—their inability to gage fairly the money value of their ideas. Occasionally they are too modest, but more often they are visionary in their anticipa-

tion of wealth, wanting tens of thousands where a correct measure would be thousands or even hundreds. Few inventions have a real commercial value until they have been put through a costly developing and refining process, and for that the buyer must pay.

The reputable attorney endeavors to give sound advice to his clients as to patent values, a common suggestion being something down in cash and a royalty based on a minimum annual production, thus insuring against the invention being put aside or produced in such small quantities that royalties would amount to little. A good test of an inventor's faith in his claims is his willingness to accept, through a sale on the royalty basis, a share of the risk of a disappointing demand. The inventor should be willing to back his claim, if necessary, by accepting, through a sale on the royalty basis, a share of the risk of a disappointing demand in the market.

On the Will to Work

The addresses made last week before the American Bar Association in Cincinnati by Attorney General Daugherty and by James M. Beck, Solicitor General, dealt with matters of the highest importance to the nation. They should set many men to thinking, and thinking is sorely needed in this country to-day.

Attorney General Daugherty talked very plainly and vigorously. He planted himself firmly on the platform of law enforcement, saying that as a citizen cannot choose what laws he will obey, so those charged with law enforcement cannot choose what laws they will enforce. The chief interest in the address was in the disclosure that the new Attorney General not only appreciates time-honored doctrine as to the enforcement of the law, but also knows how to apply that doctrine to present-day conditions. He made it perfectly clear that he is not for one minute deceived by those who are disseminating propaganda to dignify crimes committed during the war by disloyal men, nor is he led astray by the attempts of some business men and some labor leaders to evade the law, or by others who under pleas of personal liberty are anxious to see certain laws violated or debated.

Mr. Beck's address discussed present conditions without fear or favor. He spoke in detail of each of the five plagues which Pope Benedict has said afflict humanity: the unprecedented challenge to authority, the equally unprecedented hatred between man and man, the abnormal aversion to work, the excessive thirst for pleasure as the great aim of life, and the gross materialism which denies the reality of the spiritual in human life. We can refer only briefly to one of these plagues as commented upon by Mr. Beck—the aversion to work:

> The great evil of the world to-day is this aversion to work. As the mechanical era diminished the element of physical exertion in work, we would have supposed that man would have sought expression for his physical faculties in other ways. On the contrary, the whole history of the mechanical era is a persistent struggle for more pay and shorter hours, and to-day it has culminated in world-wide ruin; for there is not a nation in civilization which is not now in the throes of economic distress, and many of them are on the verge of ruin. In my judgment the economic catastrophe of 1921 is far greater than the politico-military catastrophe of 1914.

Mr. Beck went on to show that the statistics as to productive industry, particularly the loss of time due to strikes, are literally appalling. Even in Germany, where men are said to be working more generally than in most European countries, 46,600,000 working days were lost in strikes in 1919. In the State of New York alone in 1920 there was a loss due to strikes of over 10,000,000 working days.

Trying to explain the conditions he described, Mr. Beck declared that the present weariness and lassitude of human spirit and the disappointment and disillusion as to the aftermath of the war may have aggravated but they could not cause the symptoms of which he spoke. He knew of but one change in environment that is sufficiently widespread and deep-seated to account adequately for this malady of our time. He referred to the mechanical developments of steam, the gas engine and electricity, and said that in acquiring from the forces of nature almost illimitable power, man has minimized the necessity for his own physical exertion or even mental skill. A machine now not only acts for him, but almost thinks for him. In other words, a man who has had so much done for him by machinery is like the pampered child who cries for more to be done for him and is not willing to do anything for himself.

Perhaps Mr. Beck has loaded too much of our present ills upon the aversion to work which has been recognized as a world-wide malady following in the wake of the war and for much of which time will be the cure. But there will be no dissent from his plea for the rekindling in men of the love of work and for a new development of the spirit of individualism and of the spirit of discipline. In less academic phrase Vice-President Coolidge has just urged upon the country the obligation to "pay out and work out" of the burdens imposed by the war.

As we penetrate further into the period of industrial readjustment, legislative cures of one sort and another will be proposed, and there will be an increasing tendency to blame those in authority for delays in the return of prosperity. Such criticism, while largely symptomatic of the tendency to depend on laws instead of individual effort, may have its uses in sharpening discussion of the real causes at work, just as the two notable addresses at Cincinnati have done.

Data on wages and employment in the British steel industry are being published by the National Federation of Iron and Steel Manufacturers. Taking June, 1920, as 100 per cent, wages had fallen in May of this year to 65 per cent of the June, 1920, rate, the peak having been 107 per cent in September, 1920. Employment at the end of the same month, however, had fallen to 14.2 per cent of that prevailing in June, 1920, the peak having been also in September, 1920, at 101.9 per cent. The coal strike, of course, was the major cause of this slump. The interesting statement is also made that, taking the paid-up capital at the end of each

month as 100, the market value of the ordinary shares of 39 British iron and steel companies on Dec. 31, 1919, was 149.7, but by June 30, 1921, it had fallen to 97.1. The increases in capital are stated to have been only genuine additions due to extensions and amalgamations.

CORRESPONDENCE

Titanium-Treated Rails and Split-Head Failures

To the Editor: In connection with the admirable article beginning on page 393 of your issue of Aug. 18, where split-head failures of rails are discussed, may I call attention to the fact that practically seamless steel is available for rails through the simple expedient of thorough deoxidation by titanium treatment? Mr. Howard, in the article in question, mentions the probability that split heads would be unknown if this were the case and he evidently refers to internal seams in the head of a rail and not to surface seams in the flange in this statement.

Data have been accumulating for years in this laboratory showing that steel, properly treated with titanium produces rails practically free from internal seams, in decided contrast to nearly all A-rails of ordinary, untreated steel, and lately the conclusion of our tests has been reached from the service results of the rails in track, where the titanium-treated rails have shown less than half as many failures as the normal number. Mr. Howard's idea that fewer failures would result from the use of homogeneous steel is thus very strongly substantiated by this showing.

The report under discussion describes an accident, resulting in loss of life, due directly to the use in track of a segregated rail that developed a split head. A simple way has been known for years, through our researches and investigations, for practically eliminating the particular defect which causes this type of failure. This method consists merely in adding 0.10 per cent of titanium in the form of ferrocarbontitanium to the steel as the last addition in the ladle and allowing at least 10 min. for the reaction to be completed before any ingots are poured. Silicon or aluminum will also deoxidize or "kill" the steel completely but at the risk of producing streaks of non-metallic inclusions, while by the method noted both deoxidation and cleanness are secured.

What excuse is there for the railroads to continue to accept and place in their tracks rails that are not free from this defect of segregation when the preventive for it or insurance against it is so simple, inexpensive, and well known? It is to be hoped that this excellent report by Mr. Howard will be effective in calling attention to this matter so strongly that those who have the authority will see that the traveling public and railroad employees are no longer needlessly exposed to the danger of split-head rail failures which are so readily controlled by attention to the quality of steel used.

GEO. F. COMSTOCK,
METALLURGICAL ENGINEER.

TITANIUM ALLOY MFG. CO.,
NIAGARA FALLS, N. Y.
Aug. 26.

Latin American Criticism of United States Practices

To the Editor: In your issue of May 19, on page 1340, there is an article entitled "South American Prospects." I would like to refer to the paragraph wherein the statement is made that: "There is a feeling in South America that has been promulgated by European exporters and propagandists, that American exporters, after selling them goods, worked some kind of chicanery to change the rate of exchange and make them pay double for their goods, and it will take a long campaign of education to convince the South Americans that the Americans are in no way responsible for the present low rate of exchange."

The exchange question to which the writer of the above mentioned lines refers, although of recent discovery in the States, is as old as Latin American business, and to say that merchants believe that our exporters can influence it one way or the other, except in so far as it is influenced by our sales or purchases, is to accuse them of ignorance of one of the most important points of their business.

As a matter of fact, every importer in Latin America and every man in business in Latin America is acquainted with the fluctuations in the exchange of half a dozen countries. Take, for instance, any merchant importer. He buys in the States in dollars; in England in sterling; in France in francs and in Germany in marks. He has to pay his bills with drafts in these different moneys or the equivalent in his own currency. Furthermore he will have to meet import duties in the manner indicated by his Government, part in gold, part in currency and, possibly, part in drafts in foreign exchange. He, therefore, must know something about exchange and what influences it, since he is really doing business in various values, purchasing in foreign money and selling in the currency of his country.

However, there is a feeling in Latin America, unfavorable to our trade, fostered by European exporters and propaganda, but it can be charged against the short-sighted policy of some of our exporters and the failure on their part to appreciate foreign conditions.

Exporters who do not ship within the period promised when offering goods; who do not comply with shipping instructions; who substitute color, quality or size of articles ordered; who supply inferior goods; who refuse to allow just claims; who insist on cash with order when dealing with long established firms of unquestionable standing: these are responsible for a great deal of the ill feeling at present prevalent and supply the "talking points" for our competitors.

Trading with Latin America is going to be increasingly difficult, even for old established exporters, because buyers, so often deceived in recent years on the quality of our goods and angered by the treatment they have received, are again turning to European manufacturers and exporters. X.X.X.

Santiago, Chile, Aug. 1.

American Exports to Russia

Figures from the Bureau of Foreign and Domestic Commerce, Washington, show the extent of the erstwhile market which the United States had in Russia, compared with its present amount. They picture something of what may again be required by that country, once a stable government is set up and buying power re-established by general resumption of productive effort. The items of iron and steel products, as well as other metal products, and the grand totals of all products shipped to Russia by both seaboards, in the calendar years 1915 to 1920 and in the first six months of 1921, are shown in the following table:

United States Exports to Russia (European and Asiatic)

(Thousands of Dollars, in Calendar Years)

	1915	1916	1917	A	1921*
Agricultural implements	$349	$786	$6,120	$264	$192
Automobiles	24,503	13,793	4,678	140	29
Brass and manufactures	156	3,265	4,293	3	4
Copper, refined ingots, bars, etc.	6,165	14,513	19,148	..	..
Explosives	27,094	223,184	225,953	5,076	29
Firearms	3,056	16,797	55,859	5,585	18
Freight cars	8,018	12,106	2,027	551	..
Lead	1,392	3,352	2,755	27	2
Locomotives	7,440	3,727	11,281	1,862	25
Metal-working machinery	5,883	17,888	7,259	147	1
Nickel, nickel oxide and matte	1,877	3,478	65	..	..
Railway track material	6,939	4,407	5,865	601	..
Sewing machines	229	69	1	..	18
Structural iron and steel	195	68	86	..	..
Typewriters	833	891	236	19	3
Tinplate, terne plate, etc.	374	334	119	8	..
Wire	8,438	13,919	2,449	6	1
Zinc spelter	2,934	3,342	3,024	..	..
Total exports†	$170,232	$470,508	$424,510	$42,800	$12,603

*First six months. †Including many items not listed. A is average of 1918, 1919 and 1920.

GAIN IN IRON OUTPUT

August Production 2891 Tons Per Day Larger Than in July

Net Gain of One Furnace with Others to Blow in Soon

Returns of the output of blast furnaces in August indicate a turn for the better. While still very low, the total output was nearly 3000 tons per day larger than in July and for the first time in 11 months there has been a gain in furnaces blown in over those blown out.

The production of coke and anthracite furnaces for the 31 days amounted to 954,193 gross tons, or 30,780 tons per day, as compared with 864,555 tons or 27,889 tons per day in July. Apart from July, no lower production was made since January, 1904, when the total was 921,231 tons or 29,717 tons per day. In August, 1920, the output was 3,147,402 tons or 101,529 tons per day.

The total number of furnaces in blast on Sept. 1 was 70, as compared with 69 on Aug. 1, with 76 on July 1 and with 201 on Jan. 1. The 70 furnaces in blast on Sept. 1 had a capacity of 30,770 tons per day, as compared with 28,175 tons per day for the 69 furnaces on Aug. 1. In the case of several furnaces there was a distinct gain in operating rate in August as compared with July. Seven furnaces were blown out or banked in July and eight blown in, making the net gain for the month one furnace, as compared with a net loss of 250 furnaces in the 10 months preceding August.

The August output of ferromanganese and spiegeleisen was 3878 tons, as compared with 5524 tons in July. The August output was all ferromanganese, as against only 1509 tons in July.

Daily Rate of Production

The daily rate of production of coke and anthracite pig iron by months, from August, 1920, is as follows:

Daily Rate of Pig Iron Production by Months—Gross Tons

1920	Steel Works	Merchant	Total
August	72,740	28,789	101,529
September	74,908	29,402	104,310
October	77,214	28,998	106,212
November	71,669	26,161	97,830
December	66,037	20,135	87,222
January, 1921	62,327	15,618	77,945
February	58,060	11,127	69,187
March	42,691	8,777	51,468
April	33,854	5,914	39,768
May	33,054	6,340	39,394
June	29,444	6,050	35,494
July	23,086	4,803	27,889
August	26,037	4,743	30,780

The figures for daily average production, beginning with January, 1915, are as follows:

Daily Average Production of Coke and Anthracite Pig Iron in the United States by Months Since Jan. 1, 1915—Gross Tons

	1915	1916	1917	1918	1919	1920	1921
Jan.	51,659	102,746	101 643	77,799	106,525	97,264	77,945
Feb.	59,813	106,456	94 473	82,835	105,006	102,720	69,187
Mar.	66,575	107,667	104,882	103,648	99,685	108,900	51,468
Apr.	70,550	107 592	111,165	109,607	82,607	91 327	39,768
May	73,015	108 422	110,238	111,175	68,002	96,312	39,394
June	79,361	107,053	109,002	110,793	70,495	101,451	35,494
July	82,691	104,017	107 820	110,354	78,340	98,931	27 889
Aug.	89,666	103,346	104,772	109,341	88,496	101,529	30,780
Sept.	95,085	106,745	104,465	113,942	82,932	104,310	.....
Oct.	100,822	113,189	106,550	112,482	60,115	106,212	.....
Nov.	101 244	110,394	106,853	111,802	79,745	97,830	.....
Dec.	103,333	102,537	92,997	110,762	84,944	87,222	.....

Among the furnaces blown in during August were the following:

One Harriet furnace in the Buffalo district; one furnace of the Cambria Steel Co. in western Pennsylvania; No. 4 Ohio furnace of the Carnegie Steel Co. in the Mahoning Valley; Nos. 1 and 2 Gary furnaces of the Illinois Steel Co. and one Calumet furnace in the Chicago district and No. 3 Woodward furnace of the Woodward Iron Co. in Alabama. One furnace of the Columbus works of the American Rolling Mill Co. blew in Sept. 1

Among the furnaces blown out or banked during August were the following:

No. 4 Carrie furnace of the Carnegie Steel Co. in the Pittsburgh district; Nos. 3 and 11 Gary furnaces of the Illinois Steel Co. and No. 3 Iroquois furnace in the Chicago district and the furnace of the St. Louis Coke and Chemical Co. at Granite City, Ill., and the last two furnaces of the Colorado Fuel & Iron Co. in Colorado.

Production of Steel Companies—Gross Tons

Returns from all furnaces of the United States Steel Corporation and the various independent steel companies, as well as from merchant furnaces producing ferromanganese and spiegeleisen, show the following totals of steel making iron, month by month, together with ferromanganese and spiegeleisen. These last, while stated separately, are also included in the columns of "total production."

Production of Steel Companies—Gross Tons

	Total Production			Spiegeleisen and Ferromanganese		
	1919	1920	1921	1919	1920	1921
Jan.	2,430 022	2,232,455	1,932,159	32,787	23,957	22,228
Feb.	2 209,470	2,181,679	1,625,695	28 105	28,038	29,013
Mar.	2,277,507	2,480,668	1 323,443	26,644	35 275	41,294
Apr.	1,838,677	1 968,542	1,015,621	17,308	27,628	24,310
May	1,586,805	1,128,720	1 024,678	14,604	33,407	9 232
June	1,655,944	2,209,770	883,312	14,254	34 751	4.536
July	1,906,604	2,230,567	715,664	14 805	36,789	5,524
Aug.	2,108,566	2,254,943	807.144	17,419	36,985	3,878
Sept.	1,828,613	2,247,250	.....	20,631	39,546	.....
Oct.	1 295,690	2,393,644	.....	20,238	34,786	.....
Nov.	1,727,656	2 150,075	.....	19,964	26 944	.....
Dec.	1,916,249	2,047,167	.....	15,718	28,023	.....

Output by Districts

The accompanying table gives the production of all coke and anthracite furnaces for August, and the three months preceding:

Pig Iron Production by Districts, Gross Tons

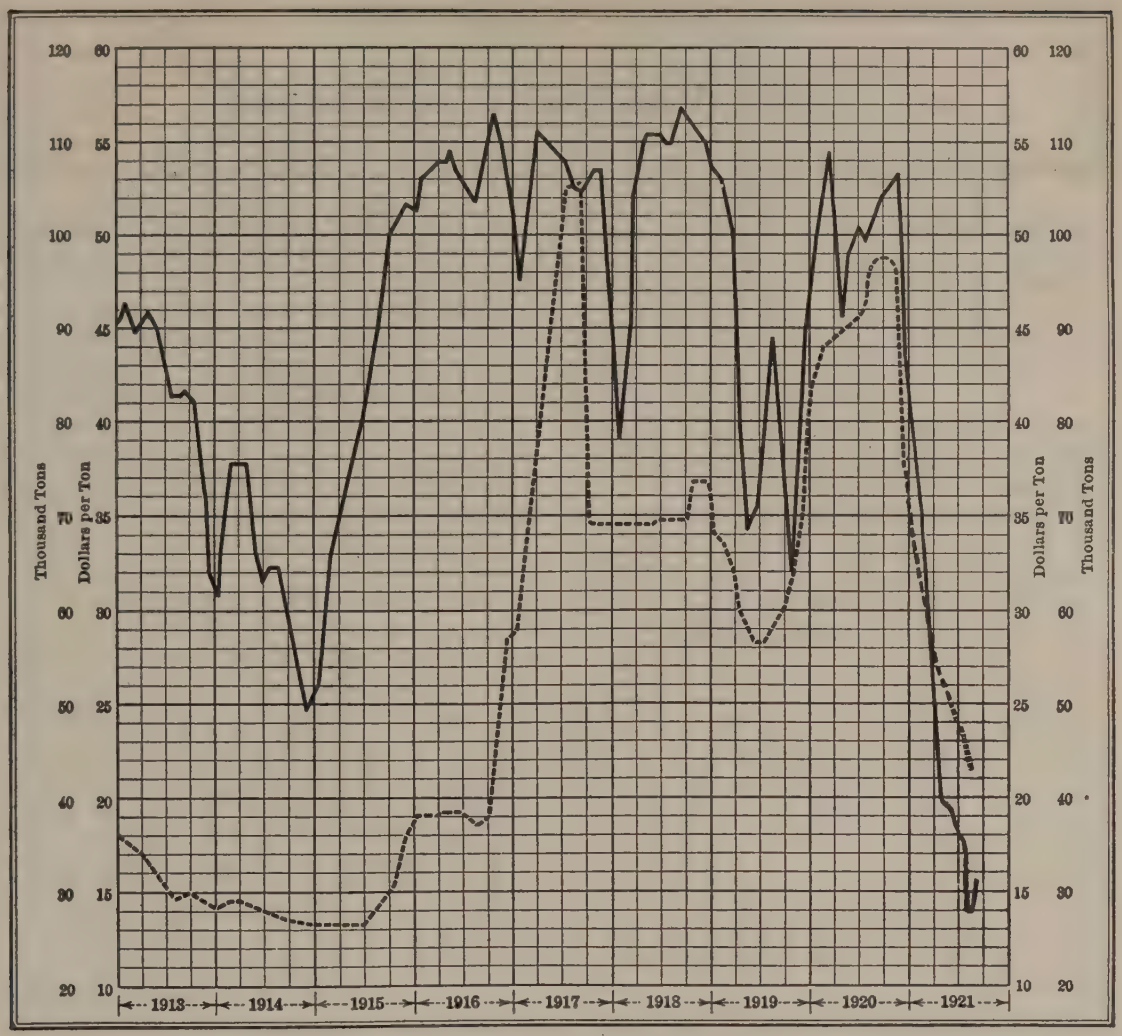
	August (31 days)	July (31 days)	June (30 days)	May (31 days)
New York	44,948	34,407	34,241	37,202
New Jersey	4,689	5,554	6,051	10,291
Lehigh Valley	33,014	24,059	29,929	42,289
Schuylkill Valley	20,735	19,210	21,172	24.471
Lower Susquehanna and Lebanon Valleys	23,939	20,401	25.809	26,491
Pittsburgh district	255,274	185,643	243,025	281,391
Shenango Valley	none	none	12,077	27,981
Western Penna.	47,565	47,680	63,802	73,661
Maryland, Virginia and Kentucky	15,470	14,201	15,289	20,781
Wheeling district	18,076	16,167	18,207	17,981
Mahoning Valley	111,722	92,305	88,515	87,090
Central and Northern Ohio	83,552	80,150	116,003	133,801
Southern Ohio	3,548	6,266	25,798	29,103
Illinois and Indiana	191,658	201,175	214,834	249,671
Mich., Minn., Mo., Wis., Colo. and Wash.	27,304	50,764	56,857	65,004
Alabama	72,699	66,573	93,224	94,013
Tennessee	none	none	none	none
Total	954,193	864,555	1,064,833	1,221,221

Capacities in Blast Sept. 1

The following table shows the number of furnaces in blast Sept. 1 in the different districts and their capacity, also the number and daily capacity in gross tons of furnaces in blast Aug. 1:

Coke and Anthracite Furnaces in Blast

		Sept. 1		Aug. 1	
Location of Furnaces	Total Stacks	In Blast	Capacity per Day	In Blast	Capacity per Day
New York:					
Buffalo	22	4	1,450	3	1,110
Other New York	4	0	....	0	....
New Jersey	4	1	150	1	180
Pennsylvania:					
Lehigh Valley	18	2	1,065	2	775
Spiegel	2	0	....	0	....
Schuylkill Valley	15	2	670	2	620
Lower Susquehanna	10	1	430	1	395
Lebanon Valley	8	2	345	2	260
Ferro	2	0	....	0	....
Pittsburgh District	55	16	7,750	17	7,000
Ferro and spiegel	4	1	125	1	180
Shenango Valley	19	0	....	0	....
Western Penn.	26	5	1,950	4	1,540
Maryland	6	1	400	1	340
Wheeling District	15	1	580	1	520
Ohio:					
Mahoning Valley	27	8	3,960	7	3,330
Central and Northern	26	6	2,950	5	2,650
Southern	16	1	115	1	100
Illinois and Indiana	42	11	5 900	12	6,125
Mich., Wis. and Minn.	11	1	485	1	510
Colorado and Missouri	6	0	....	2	775
The South:					
Virginia	16	1	100	1	110
Kentucky	7	0	....	0	....
Alabama	41	6	2,345	5	1,655
Tenn., Ga. and Texas	16	0	....	0	..
Total	418	70	30,770	69	28,175



The Full Line Represents the Daily Production of Pig Iron and the Dotted Line Is the Average of the Price Per Ton of No. 2 Southern Pig Iron at Cincinnati, Local No. 2 Iron at Chicago and No. 2X Iron at Philadelphia

Diagram of Pig Iron Production and Prices

The fluctuations in pig iron production from 1913 to the present time are shown in the accompanying chart. The figures represented by the heavy line are those of daily average production by months of coke and anthracite iron. The dotted curve on the chart represents monthly average prices of Southern No. 2 foundry pig iron at Cincinnati, local No. 2 foundry iron at furnace in Chicago, and No. 2X at Philadelphia. They are based on the weekly quotations of THE IRON AGE.

Production of Coke and Anthracite Pig Iron in the United States by Months, Beginning Jan. 1, 1917—Gross Tons

	1917	1918	1919	1920	1921
Jan.	3,150,938	2,411,768	3,302 260	3,015,181	2,416,292
Feb.	2,645,247	2,319,299	2,940,168	2 978,879	1,937,257
Mar.	3,251,352	3.213,091	3,090,243	3,375,907	1.595,522
Apr.	3,334.960	3,288,211	2,478,218	2,739,797	1,193.041
May	3,417,340	3,446,412	2,108,056	2,985,682	1,221,221
June	3,270,055	3,323,791	2,114,863	3.043,540	1,064,833
July	3,342,438	3.420,988	2,428,541	3,067.043	864.555
Aug.	3,247,947	3,389,585	2,743,388	3,147,402	954,193
8 mos.	25,660,277	24,813,145	21,205,737	24,353,431	11,246,914
Sept.	3,133.954	3,418,270	2,487,965	3,129 323	.....
Oct.	3,303,038	3,486,941	1,863,558	3,292.597	.....
Nov.	3,205,794	3.354,074	2,392,350	2,934,908	.....
Dec.	2.882,918	3,433,617	2,633,268	2,703,855	.....
Total, yr.*	38,185,981	38,506,047	30,582,878	36,414,114	.....

*These totals do not include charcoal pig iron. The 1919 production of this iron was 327,097 tons.,

Blast Furnace Notes

One of the four furnaces of the Rogers-Brown Iron Co., Buffalo, was blown in this week.

It is expected that Tuscaloosa furnace of the Central Iron & Coal Co., at Holt, Ala., will be blown in next week.

In the Shenango Valley the furnace of the Valley Mould & Iron Corporation, Sharpsville, Pa., and one furnace of the Shenango Furnace Co., also at Sharpsville, are scheduled for resumption in the coming week.

The Kalman Co., fabricating interest of Chicago, is preparing to proceed with construction of a plant at Youngstown, Ohio, to supply reinforcing material to its Eastern trade. Work of building a 1500-ft. railroad switch to connect the company's property on Poland Avenue in Youngstown with the Pennsylvania railroad has been started. The first unit will be a modern factory building 60 x 422 ft., and will be the first of three to be erected.

The Triumph Electric Co., Cincinnati, for nearly 30 years manufacturer of 40 deg. Triumph polyphase induction and direct current motors, has been forced to move its Philadelphia office to larger quarters, which are at 709 Arch Street. This territory is under the direction of Arthur H. Allen, district manager.

Iron and Steel Markets

INCREASE IN PIG IRON

August Production Shows a Gain of 90,000 Tons

Competition in Heavier Steel Products—Lighter Lines More Active

An upward turn in output, after nine months of steady decline, is shown in the pig iron statistics for August. The total was 954,193 tons, or 30,780 tons per day, against 864,555 tons in July, or 27,889 tons per day. Taken in connection with the larger buying of mid-August and the firmer tendency of prices, this increase in output confirms what has been said recently of a slight improvement in consumption.

While there was a net gain of but one furnace last month, the larger yield being due to the operation of many stacks at a better rate than in July, the outlook is for further improvement in September. Seven more furnaces have either gone in since the month opened or are scheduled to start up before Sept. 15.

The capacity of the 70 furnaces in blast as the month came in was 30,770 tons per day against 28,175 tons per day for 69 furnaces on Aug. 1, based on their performance in July. The gain of one furnace followed the loss of no less than 250 furnaces from the active list in the preceding nine months.

The slight upturn from the long decline in pig iron prices made consumers cautious. Buying has been less active in the past fortnight; at the same time considerable inquiry is up and the balance between supply and demand is being closely watched in view of the starting up of a furnace here and there.

In finished steel the rate of mill operations has not changed, yet there are not a few reports of better business in August than in July. Competition is rather sharper in the heavier products—plates, shapes and bars—and prices are more commonly 1.65c. and 1.70c. In the Chicago district a number of late transactions would figure out considerably lower if reduced to the Pittsburgh base.

In the Central West inquiries for 7000 tons of tank work are up, in addition to the 17,000 tons recently reported for Mexico.

Interest is being taken by pipe makers in the proposed 90-mile line, which Wyoming producing and refining companies may build, requiring 8000 tons. Manufacturers of iron pipe announced a reduction of $10 to $12 per ton effective Sept. 1, the fourth reduction since the opening of the year.

The lighter products, sheets, tin plate and wire, have made a better showing in the orders of the past two weeks. The leading sheet and tin plate interest showed a gain of 45 per cent last month over July orders and shipments, August being the best month since February. Its schedule this week calls for the operation of 50 per cent of its mills.

The Masonic hotel project in Detroit has been revived and fabricators have been asked to revise their bids on 7000 tons of steel. Pittsburgh has more structural work in sight, chiefly large buildings, than in several months.

The plans for starting up several blast furnaces in the Central West have brought a number of inquiries for 10,000 to 15,000-ton lots of Lake iron ore. The coke market also has grown considerably firmer in view of the expected increase in blast furnace operations.

Demand for tool steel, which is a reliable barometer of operations in metal-working shops, has picked up of late. Orders are coming from widely distributed sources after many weeks of dullness.

German ferromanganese, 76 to 80 per cent, is quoted at 4930 marks per ton, Baltimore, or considerably below the British price of $65, seaboard.

New cuts in the British steel market, as Continental prices stiffen, have given British steel makers a better position. German producers are no longer quoting on semi-finished steel, having orders filling their mills to the end of the year. There is an improved tone in the British market and greater activity is expected.

Pittsburgh

PITTSBURGH, Sept. 6.

Fundamental conditions in iron and steel show no particular change as compared with those of a week ago. The disposition of buyers to confine purchases to actual needs still is quite marked and only in spots are orders at all numerous. In the heavy tonnage products not much is doing, but there is a rather good business in sheets and tin plates, at least as far as the American Sheet & Tin Plate Co. is concerned, while jobbers and consumers are pretty persistent buyers of the wire products, notably nails. The American Sheet & Tin Plate Co. reports the past week to have been the best of any in several months in sheet orders and shipments and that the month of August showed a gain of 45 per cent over July and was the best month the company has had since last February. Its schedule for this week calls for the operation of 50 per cent of its sheet mills. This company also has been enjoying a brisk business in prompt shipment orders for tin plate and has under power 50 per cent of its mills. This is a clear gain of 10 per cent in a week and compares with an operating rate of less than 25 per cent only three weeks ago.

Another fairly bright spot in the situation is the fact that prospective structural business involves several good-sized tonnages which, it is believed, will be placed in the near future. Bids are to be opened Sept. 9 by Pittsburgh for the construction of the ramp for the Boulevard of the Allies which will take 1500 tons of steel, while the general contract for a 9-story addition to the present 11-story building of the Bell Telephone Co. in Pittsburgh and the construction of

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
No 2X, Philadelphia‡	$20.84	$20.84	$19.84	$53.51
No. 2, Valley furnace†	21.00	21.00	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	21.00	21.00	18.25	46.00
Basic, del'd, eastern Pa	19.00	19.00	20.26	51.26
Basic, Valley furnace	19.00	19.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	21.00	21.00	18.50	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	33.50	58.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. sheet bars, P'gh	30.00	30.00	32.00	68.00
Forging billets, base, P'gh.	34.00	34.00	35.00	75.00
O.-h. billets, Phila	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	*38.00*	40.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb	*1.70*	1.75	1.75	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	2.00	2.00	2.05	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	*1.65*	1.70	1.75	3.25
Steel bars, Chicago	*1.85*	1.88	2.03	3.63
Steel bars, New York	*2.03*	2.08	2.13	4.13
Tank plates, Pittsburgh	1.70	1.70	1.80	3.25
Tank plates, Chicago	*1.75*	2.00	1.98	3.63
Tank plates, New York	2.08	2.08	2.18	3.63
Beams, etc., Pittsburgh	*1.70*	1.75	1.85	3.10
Beams, etc., Chicago	*1.80*	1.85	2.08	3.48
Beams, etc., New York	*2.08*	2.13	2.23	3.48
Steel hoops, Pittsburgh	2.25	2.25	2.25	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 6, 1921	Aug. 30, 1921	Aug. 9, 1921	Sept. 7, 1920
	Cents	Cents	Cents	Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	3.00	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	4.00	9.00
Sheets, blue an'l'd, 9 & 10.	2.25	2.25	2.40	6.00
Wire nails, Pittsburgh	2.75	2.75	2.75	4.25
Plain wire, P'gh	2.50	2.50	2.50	3.75
Barbed wire, galv., P'gh	3.40	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	$13.75	$13.75	$12.50	$38.00
Carwheels, Philadelphia	17.00	17.00	16.00	42.00
Heavy steel scrap, P'gh	13.00	13.00	12.50	29.50
Heavy steel scrap, Phila	11.50	11.50	11.50	26.50
Heavy steel scrap, Ch'go	11.00	11.00	10.25	26.00
No. 1 cast, Pittsburgh	16.50	16.50	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	**13.25**	13.00	11.50	35.00
No. 1 RR. wrot, Phila	**14.50**	14.00	14.00	33.00
No. 1 RR. wrot, Ch'go (net)	**11.50**	11.00	9.75	24.50
Coke, Connellsville,				
Per Net Ton at Oven:				
Furnace coke, prompt	$3.00	$3.00	$2.75	$17.00
Foundry coke, prompt	4.00	4.00	3.75	18.00
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.00	12.00	12.00	18.75
Electrolytic copper, N. Y.	**11.75**	11.62½	11.75	18.75
Zinc, St. Louis	**4.20**	4.12½	4.20	7.90
Zinc, New York	**4.70**	4.62½	4.70	7.90
Lead, St. Louis	4.20	4.20	4.20	8.62½
Lead, New York	4.70	4.40	4.40	8.50
Tin, New York	**27.25**	26.75	27.75	45.00
Antimony (Asiatic), N. Y.	4.50	4.50	4.60	7.00

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 6, 1921, Finished Steel, 2.279c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Aug. 30, 1921,	2.293c.
Aug. 9, 1921,	2.364c.
Sept. 7, 1920,	3.974c.
10-year pre-war average,	1.684c.

a new 20-story structure by this company is expected to be placed Sept. 12. Meanwhile fabricating shops are figuring on an early award of 3600 tons for the construction of the Scott aviation field and airship hangar at Bellefield, Ill. Contracts for the construction of the 8-story addition to the store of Joseph Horne Co., Pittsburgh, which will take 3500 tons of steel, probably will be placed shortly. It has been some time since shops in this district have had so many good-sized prospects.

The general belief still is that the fall will show some improvement in business, but the more common prognostication is that it will be next spring before business really is good. Possibly, price cutting is a little less severe now than it was recently but at the same time few buyers yet are ready to admit that prices have struck bottom. Liquidation of labor has been pretty thorough and the claim of steel manufacturers that they are losing money on every ton of material sold to-day is not disputed, but the notion that railroad freight rates, more especially on raw materials, will be cut between now and the end of the year encourages hopes of lower selling prices. As yet there has been nothing in the way of a conference between shippers and railroad officials for the consideration of freight rates and it is hardly likely that the railroads will make a voluntary cut. Reports are current that a reduction on ore rates is to be made at the conclusion of the lake shipping season.

Pig Iron.—Business for the past week, though of rather moderate proportions, has served to substantiate the prices recently established. We note one sale of 500 tons of No. 3 foundry iron to a Pittsburgh melter at $20.50, Valley furnace, and a like tonnage of gray forge iron to the same melter at $20, Valley furnace basis. The ordinary differentials from the base grade are 50c. and $1 per ton, respectively, and this would mean $21 for No. 2 foundry on the recent sales made of No. 3 foundry and gray forge. Small sales of No. 2 foundry have been made at $21, furnace, both in the Valley and western Pennsylvania points. A few inquiries lately have developed for malleable iron with some makers quoting it at $21 and others at $20. A base of $20, Valley furnace, has been done on a lot of about 180 tons basic iron but this tonnage is too small to be regarded as having established the Valley basic market. A Pittsburgh district melter recently put out an inquiry for 2500 to 3000 tons of basic and probably will close for about 2000 tons this week at about $19, f. o. b. a western Pennsylvania furnace. No. 3 furnace, Shenango Furnace Co., Sharpsville, Pa., went into blast yesterday and will make Bessemer iron, the bulk of which will be taken by the Valley Mold & Iron Corporation. Cherry Valley furnace, Leetonia, Ohio, will be blown in to-morrow.

Average sales prices of Valley basic and Bessemer iron in August as compiled by W. P. Snyder & Co. show that business in Bessemer was at $20 and in basic at $18.33, as compared with $20.87½ and $18.802, respectively, in July.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—The market still is a limited affair with prices holding at about recent levels, but with the tendency in the buyers' favor. We note a sale of 100 tons of 80 per cent domestic ferromanganese to a West Virginia melter at $70 delivered, but also that a quotation of this price to a Valley steel maker seeking 100 tons was rejected as too high, and that a quotation of $65 delivered on British materials did not bring an order. Nothing recently has been done on spiegeleisen, which is quotable at about $30 to $31 delivered for sizable lots of 20 per cent material and $32 for small lots. Not enough interest is shown in 50 per cent ferrosilicon to determine where prices are.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent, $68; 78 to 82 per cent British ferromanganese, $58 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Not much business is being done and prices to a large degree are nominal. In view of the fact that 4-in. billets have sold as low as $29, there is considerable difficulty in getting buyers to pay more, although most makers are quoting $30. Reports are current that the price of sheet bars has been shaded $1 to $2 per ton, the reports associating an Eastern sheet maker with a purchase said to have been made at $28. Interest in slabs remains limited.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30 to $31; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demands still are few and small and the advantage in prices is with buyers. Recently it was noted that an order was lost against which $40 was quoted and it is now admitted that a quotation of $38 likewise failed to bring an order. Prices are not well established. While some makers are holding firmly to $42 for the base size of soft rods, others are willing to accept $38 and evidently some have gone even lower since the latter quotation failed to bring business. Prices are given on page 628.

Structural Material.—Formal award of the contract for the steel for the new Sixteenth Street bridge, Pittsburgh, has been made to the Fort Pitt Bridge Co., Pittsburgh, which bid $541,822, fabricated, delivered and erected for the 5000 tons which this bridge will require. This is the only important award recently placed here, but as the bids for the general contract for the construction of the 8-story addition for Joseph Horne & Co., Pittsburgh, are in, an award both of the general contract and of the steel is looked for shortly. The Bethlehem Steel Co. is quoting gray mill sections at 1.75c., Pittsburgh, and in view of the saving in the use of such sections standard beams to compete would have to sell, it is held, at 1.70c., Pittsburgh, or less. Plain material prices are given on page 628.

Iron and Steel Pipe.—Effective Sept. 1, the Reading Iron Co. and the A. M. Byers Co. reduced prices of standard wrought iron pipe, both butt and lap welded, $10 per ton. Lower wage and material costs have permitted this reduction. No change has been made in standard steel pipe prices, but observance of the July 7 card on line pipe is not rigid nor are full quotations always insisted upon for oil well pipe. Jobbers are steady buyers of standard pipe, but their purchases are largely to replace sales and there is no anticipatory buying, because of the expectations of price reductions. Discounts are given on page 628.

Nuts, Bolts and Rivets.—Several makers here are seeking higher prices than are quoted in other manufacturing centers and since there has been no material improvement in the demand and there is nowhere nearly enough business to go around, this step is tantamount to a withdrawal from the market by Pittsburgh makers. This action has been forced by reason of the fact that to meet competition on nuts and bolts, steel bars would have to be bought at 1.50c. or less, and makers serving this territory on bars are not inclined to go below 1.65c. Possibly the number of orders received has increased in the past few weeks, but the gain is too slight to occasion cheerfulness, especially as minimum prices have prevailed on such bookings. It is doubtful if operations of plants here average 15 per cent of capacity, as at least two of the larger units are down and others are running spasmodically. Prices and discounts are given on page 628.

Iron and Steel Bars.—Not much activity is noted in this district in soft steel bars, and 1.75c., base, seems to have quite generally disappeared, except as an asking price, and 1.70c. is the more common maximum. Business is reported to have been done down to 1.60c., base, and an Eastern maker, while not quoting bars in this district, is prepared to take small angles at 1.65c., Pittsburgh. No particular interest is shown in reinforcing bars and prices are nominal. The recent reduction in the puddling rate has had no effect yet on local prices of iron bars.

We quote steel bars rolled from billets at 1.60c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—The demand for spikes and other track fastenings reflects the fact that none of the railroads tributary to Pittsburgh is laying much track at present. Other sections of the country are doing better in this respect, but this does not help Pittsburgh makers of spikes and bolts because there is considerable shading of prices by makers East and West and only by absorbing some of the freight can local makers compete. Sales of standard spikes have been made elsewhere on the basis of the equivalent of $2.40, Pittsburgh. Jobbers serving the coal mines are fair buyers of small spikes. Prices are given on page 628.

Steel Rails.—Railroads tributary to Pittsburgh still are inclined to withhold specifications against their orders placed earlier in the year, and expected improvement in this direction so far has not materialized. The fact that standard rails are one product in which prices have had no decline over the past two years possibly is behind the attitude of the railroads and reports recently current that prices were to be reduced are believed to have emanated from railroad circles. Standard rails did not advance in keeping with the general market during 1920 and current prices are considered to be relatively reasonable. Moreover, a reduction at this time would involve considerably close to 2,000,000 tons which are on the books of makers, and only a few of which have been delivered. Light rails rolled from billets still are quoted at 1.75c., but this is more of an asking than a selling price, and attractive tonnages undoubtedly would develop a lower figure, especially as rerolled rails are readily available at 1.60c., mill.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—Although occasional sales of small tonnages are made at 1.75c., the real market is from 1.65c. to 1.70c. Inquiry for the most part is merely for the purpose of determining prices to establish bids against prospective structural and tank business.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.65c. to 1.75c. f.o.b. Pittsburgh.

Sheets.—The situation has improved to the extent that price cutting is not nearly so severe as it was a short time ago. There are suggestions that some mills have been willing to go to 2.70c., base, in black sheets and to 2.20c., base, on blue annealed, but these prices are only $1 per ton below the regular market quotations and there is some doubt that even this concession has been made, in view of the fact that the mills holding firmly to the regular quotation are getting some business. This is particularly true of the American Sheet & Tin Plate Co., which has experienced the best business in several months in the past two weeks, and is now operating at 50 per cent, the highest mark obtained in several months. This company recently turned down an order for 1500 tons of black sheets, calling for delivery over the remainder of the year. At a price of 2.75c., the company is not anxious for forward business at less than 3c. Prices are given on page 628.

Wire Products.—Buyers still are covering only their immediate requirements and while this means a steady demand, the volume is lacking and manufacturers cannot schedule mill operations very far ahead. Jobbers evidently are disposing of almost a normal amount of nails, as their orders in this product are better than they are in other wire products. Business undoubtedly would be much heavier if manufacturers were willing to guarantee prices, as it is the fear of lower prices that is making buyers confine their purchases so closely to actual needs. There seems to be no cutting of $2.75 base, per keg, on nails, but it is commonly gossiped that concessions of $1 to $2 per ton are being made in wire. Following up its recent announcement giving a Nov. 1 dating on current sales of woven wire fence, the American Steel & Wire Co. has notified the trade that it will guarantee fence prices against a decline until further notice.

We quote wire nails at $2.75 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.50 base per 100 lb., Pittsburgh.

Tin Plate.—Demands for early delivery are still strong with those companies which have their mills running, and no trouble is being experienced in obtaining $5.25 per base box, Pittsburgh, for standard cokes for domestic accounts. On a sale of 10,000 boxes for export to Japan, however, the price was slightly below the domestic base, because of competition from Welsh makers. Stock tin plate is selling for $4.50 to $4.75.

Boiler Tubes.—As is the case in practically all lines of finished steel demand for boiler tubes, both steel and iron, is purely hand-to-mouth and few makers have much business ahead. Recent reduction in wrought iron pipe has not yet extended to iron boiler tubes, but reports are heard that a downward revision, not only in prices of iron tubes, but also in those of steel is not far off. Observance of current discounts is said to be rather lax. Discounts are given on page 628.

Hoops and Bands.—The market is fairly steady at 2.25c., base, Pittsburgh, but this does not mean that the demand is good. There is a fairly good market in cotton ties and in hot rolled strips and this condition tends to restrain pressure to sell hoops and bands. It is probable, however, that if any sizable orders were presented in either product, competition would develop and that buyers would not have to go to 2.25c.

Hot-rolled and Cold-rolled Strips.—Conditions are much as they were a week ago. Consumers, who are not fastidious as to specifications and who can quite as well use plates or sheets, have succeeded lately in getting strip steel as low as 2c., base, Pittsburgh. It might be added also that to obtain supplies at this price a fairly large order has to be provided. In small lots the market is not quotable at less than 2.20c. and orders are going on the books to makers from this price up to 2.40c. from buyers who are exacting in the matter of analysis and cannot use anything which might be offered as strip steel. The general asking price on cold-rolled strips is 4c. and some business has been entered at that figure, but sizable orders are being accepted at 3.85c. and this is the more common price.

Steel Skelp.—The market is not especially firm at 1.75c., Pittsburgh, which recently has been the quotation of most makers. This price is being asked, but probably could be shaded on attractive orders. We note one export sale of 3000 tons for shipment to Scotland, at around 1.75c., Pittsburgh.

Cold Finished Steel Bars and Shafting.—The market has settled to 2.40c. base, Pittsburgh, this being the quotation of all makers. Business is fairly good as far as the number of orders is concerned but leaves much to be desired with regard to volume. Buyers are not anticipating their requirements and competition for such orders as are coming out is not keen enough to force much shading of the 2.40c. price. The Cumberland Steel Co. has announced a reduction of $5 per ton in ground shafting, the new prices being $2.75 per 100 lb., mill, for carloads and $3, mill, for less than carloads.

Coke and Coal.—The recent advance in coke prices is well held and on standard furnace fuel the market is not quotable at less than $3 per net ton at ovens. Labor troubles at one plant, which have resulted in the complete suspension of operations, have forced the customers of that company to seek other sources of supply and these purchases have been sufficient to absorb much of the surplus supply. Brokers have been paying $3 for spot and short contract tonnages and prices to consumers have ranged from 15c. to 25c. per ton higher. The spot market therefore is quotable from $3 to $3.25 and the market takes the same range on contracts. For 30 to 60-day contracts operators are quoting $3, while for shipment over the remainder of the year the going price is $3.25. The latter price about equals what could be done on coal. We note one contract involving 10,000 tons a month for September, October and November at $3. Foundry coke is firm at $4 to $4.50, according to quality, with the demand steady rather than active. Moderate purchases for stock by the railroads and industrial consumers have given the coal market a firm tone. Mine run steam coal, Pittsburgh vein, is quotable at $1.75 per net ton at mines, and occasionally commands more. Steam coal is available as low as $1.50 but it runs high in ash and low in heat value. Connellsville by-product coal is quotable at $1.80 to $1.90, mines, and gas coal at $2.25 to $2.50 from non-union fields. Union gas coal cannot be sold under $3 on today's labor costs.

Old Materials.—Business has slackened considerably in the past week in keeping with the slowing up in steel works operations, due to a falling away in orders. This development, however, has found no reflection in scrap prices, which with one or two minor exceptions are just where they were a week ago. We note the sale of 10 cars of machine shop turnings at $8.35 per gross ton, delivered, Brackenbridge, and of two cars of the same material to the same buyer at $8.25. These tonnages, however, had to be sold and the buyer made the prices. On a round tonnage it is doubtful if less than $9 could be done, for the principal users are ready to pay $8.50 for such lots. Dealers will not go short of the market at that price because they fear smaller offerings for a time and it is noted too, that the Dodge Brothers turnings, sold Aug. 26, brought the equivalent of $9, Pittsburgh. Borings offered by Dodge Brothers sold at the equivalent of $10.50, Pittsburgh. Odd lots of heavy melting steel are bringing only $13 to $13.50, but contracts cannot be placed at less than $15, if indeed that low. One large steel company is reported to have paid $15 per gross ton for the steel offered in the last list of the Pennsylvania Railroad, central region.

We quote for delivery to consumers' mills, in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$13 00 to	$13.50
No. 1 cast cupola size	16.50 to	17.00
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	16.00 to	16.50
Compressed sheet steel	10.50 to	11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.00 to	9.50
Railroad knuckles and couplers	14.00 to	14.50
Railroad coil and leaf springs	14.00 to	14.50
Railroad grate bars	11.00 to	11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to	17.50
Railroad malleable	13.00 to	13.50
Iron car axles	19.00 to	20.00
Locomotive axles, steel	18.50 to	19.00
Steel car axles	14.50 to	15.00
Cast iron wheels	14.00 to	14.50
Rolled steel wheels	14.00 to	14.50
Machine shop turnings	8.25 to	8.50
Sheet bar crop ends at origin	12.50 to	13.00
Heavy steel axle turnings	10.00 to	10.50
Short shoveling turnings	9.50 to	10.00
Heavy breakable cast	15.00 to	15.25
Stove plate	12.00 to	12.50
Cast iron borings	9.00 to	9.25
No. 1 railroad wrought	12.00 to	13.00

Claims on Bethlehem Steel Co. Disapproved

WASHINGTON, Sept. 6.—Approval has been given by Secretary of War Weeks, it was announced to-day, of the recent decision of Assistant Secretary Wainwright that the War Department has no authority to pay claims of 38,000 former machinists and electricians employed by Bethlehem Steel Co. in connection with the award by the National War Labor Board, amounting to $1,500,000. Secretary Weeks will present a written report to Congress declaring his belief Congress should take cognizance of these claims.

Chicago

CHICAGO, Sept. 6.

The steel market remains quiet, but the business outlook has improved. For August shipments from a prominent local mill were twice those of the previous month. As July was exceedingly dull, the improvement was not great; it was an indication of a slow but cumulative betterment in demand. There are multiplying evidences of the exhaustion of consumers' stocks, which is brought home to the mills by repeated requests for prompt delivery, and here and there are indications of expanding industrial activity. Tool steel, which is regarded as a fairly reliable barometer of the operations of metal-working shops, was practically a drug on the market only a few weeks ago. To-day orders for tool steel are being received in increasing number from widely distributed sources. It is also to be noted that railroad traffic has been steadily growing and while earnings are not yet what they should be, a continuation of the present rate of increase in business would soon put the carriers in a satisfactory position.

Notwithstanding these signs of industrial revival, demand for steel, particularly for plates, structural material and bars, is still far below normal. While this may indicate that buyers still believe that the process of price deflation has not yet been completed, there are some consumers who are inclined to view it as not far away and their judgment is confirmed by recent developments in the local market. An open letting by the Burlington Railroad last week brought out quotations of 1.68c., Chicago, on 1500 tons of plates, and 1.75c., Chicago, on 334 tons of shapes. In fact, current going prices are so low that one local producer is seriously considering shutting down its plate mill until prices take a turn which will permit operation without loss.

Pig Iron.—An inquiry has been received from the American Rolling Mill Co. for 12,000 tons of basic iron. Local sellers are given to understand that the company is undecided as to whether it will buy this tonnage outside or start up its own furnaces and that much depends on the character of the quotations received from other stacks. In view of a freight of $3.50 from Chicago to point of delivery, it is not deemed likely that the business will be placed here. The local market has shown a fairly active condition during the past week or ten days. Just prior to the advance announced in our last issue, a local melter closed for 3000 tons of foundry iron. Individual sales since the advance have covered as much as 500 and 1000 tons. In some cases buyers have bought for delivery over two, three and four months ahead. Furnaces are not disposed to quote on first quarter business. The inquiry for that delivery reported a week ago has been expanded to include 600 tons of malleable iron. Other inquiries current include one from a Southern melter for 600 tons of malleable for delivery over the remainder of the year and another calls for 100 tons of low phosphorus iron. Noteworthy among recent sales may be mentioned 1000 tons of foundry, bought by a South Bend, Ind., melter, and 400 tons of foundry, purchased by a Kewanee, Ill., concern. Local producers are holding firm at present prices and another advance of $1 a ton is looked for in the near future.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil.

1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	21.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	21.00
Northern high phos.	21.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	21.00
Basic	21.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—The market has been devoid of interest.

We quote 78 to 82 per cent ferromanganese, $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The Northern Pacific has awarded repairs on 500 freight cars to the Pacific Car & Foundry Co. Of this number 125 are all-steel coal cars and the remainder miscellaneous types. The Baltimore & Ohio is inquiring for 1000 all-steel 50-ton hopper cars and 1000 steel underframe box car bodies. Inquiries for tires, axles and wheels are increasingly numerous, but individually small.

Structural Material.—The demand for structural shapes is light and quotations of 1.85c., Chicago, are not uncommon, while attractive business can be placed at a lower figure. Fabricating work is light, the only new inquiry of size being a plant building for the Standard Underground Cable Co. at St. Louis, involving 1000 tons. Recent lettings include:

Frost National Bank Building, San Antonio, Tex., 382 tons to Mosher Mfg. Co.

Masonic Temple, Sioux City, Iowa, 350 tons to Rock Island Bridge & Iron Co.

Atlas Life Insurance Co. Building, Tulsa, Okla., 500 tons to St. Louis Structural Steel Co.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—The Missouri Pacific has placed 3000 kegs of track spikes with a local mill at a price reported not to exceed 2.40c., Pittsburgh. While confirmation of this quotation is lacking, it has become apparent that ruling prices on standard railroad spikes and track bolts are not higher than 2.50c. and 3.50c., Pittsburgh, respectively. There is little demand for tie plates.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.50c., Pittsburgh; track bolts with square nuts, 3.50c., Pittsburgh; tie plates, steel and iron, 2c. to 2.25c., f.o.b. makers' mills.

Plates.—At an open letting by the Chicago, Burlington & Quincy Railroad on Sept. 2, the low bid on 1558 tons of plates and 8 tons of bars was 1.68c., Chicago, and the low figure on 334 tons of structural shapes was 1.75c., Chicago. In both cases the prices were named by local mills. As the total tonnage involved was attractive, it is improbable that small orders could be placed at the figures named. It is unlikely, however, that buyers will find it difficult to place even small tonnages at 1.85c., Chicago. The plate market is exceptionally weak and rather than continue to incur losses at present prices, one maker is seriously considering shutting down its plate mill indefinitely. In this connection it is pointed out that it costs $2 to $3 a ton more to roll plates than structural material and yet, owing to the present market situation, plates are selling for no more and sometimes for less than shapes. The extent to which the Pittsburgh basing practice has been affected by the decline in demand is indicated by prices submitted to the Southern Pacific on Aug. 23, for San Francisco delivery. On the plates inquired for one producer quoted 1.85c., f.o.b. Chicago mill; another 2.015c., Chicago; three Pennsylvania makers, 1.75c., f.o.b. mill; another mill 1.75c., Cleveland; while four others quoted 1.75c., Pittsburgh. On the structural material the quotations were 1.85c., Chicago mill; 1.915c., Chicago; 1.65c., Pennsylvania mill, and 1.70c., Pittsburgh. There were similar variations in the quotations on soft steel bars, but on the sheets most mills adhered to the ruling market quotations and quoted f.o.b. Pittsburgh. Railroad purchases of plates in this territory are principally for immediate needs. For example, the Rock Island is inquiring for three carloads and the Chicago Great Western for one carload, while the Illinois Central wants three carloads of plates and bars.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Demand continues light and prices remain soft. So far as can be determined the discounts published in this paragraph two weeks ago are as close to the ruling market as any which might be selected. It is to be noted, however, that there are wide variations in quotations and nothing approaching price stability is in sight.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ¾ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ¾ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Sheets.—This commodity is far more active than plates, structural shapes or bars. Demand is widely

distributed—jobbers, railroads, roofing manufacturers and sheet metal shops being among the purchasers. Although shading has been reported here and there, the prices announced last week are holding rather generally. The upturn in demand has enabled the local independent to put on two additional hot mills, 16 out of 18 mills now being in operation.

Mill quotations are 2.75c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Bars.—There has been no material improvement in the demand for mild steel bars and the ruling market lies between 1.85c. and 2c., Chicago. Buying of bar iron is still unsatisfactory, as is evidenced by the intermittent operations of mills. Hard steel bar mills also continue to operate on a hand-to-mouth basis.

Mill prices are: Mild steel bars, 1.85c. to 2c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Cast Iron Pipe.—Detroit has awarded 1500 tons to the Lynchburg Foundry Co., after taking figures twice. The United States Cast Iron Pipe & Foundry Co. is low bidder on 255 tons for the city of Chicago. The American Cast Iron Pipe Co. is low on 600 tons for Cedarburg, Wis. Prospective business includes:

North Platte, Neb., 940 tons of 6-in., bids in Sept. 6.
Table Rock, Neb., 205 tons, Sept. 9.
Fremont, Neb., 250 tons, Sept. 12.
Springfield, Ohio, 80 tons of 6-in.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—Outside of a purchase of a few thousand tons of heavy melting steel by a local user at $11.50 per gross ton, delivered, and an additional purchase of No. 1 railroad wrought by an iron mill at a reported price of $12 per net ton, delivered, there has been no buying of consequence by users. One consumer is offering $14 per gross ton for railroad malleable, but dealers will not consider that price and are buying from the railroads at from $14.50 to $15 per gross ton. There are few changes in quotations to be noted, but such as have developed have been mainly upward. To a large extent market activity is still confined to the dealers. Railroad offerings include: the Grand Trunk (Battle Creek yards), 4500 tons; the Pennsylvania Northwestern Region, 1500 tons; the Pere Marquette, 2500 tons, and the Geat Northern, 2000 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Relaying rails	27.50 to 30.00
Car wheels	13.75 to 14.25
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft.	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.25 to 10.75
Low phos. heavy melting steel	13.25 to 13.75
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.00 to 7.50
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.00 to 14.50
Iron car axles	18.50 to 19.00
Steel car axles	13.00 to 13.50
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.00 to 10.50
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.25 to 13.75
No. 1 railroad cast	12.25 to 12.75
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	10.00 to 10.50
Brake shoes	11.00 to 11.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	12.50 to 13.00
Country mixed	8.50 to 9.00

Wire Products.—Prices are firm and trade is satisfactory. Although neither the jobbers nor the railroads will abandon their cautious policy of buying only for immediate needs, orders from them are numerous and in the aggregate represent a substantial tonnage. Railroad buying is usually limited to carload lots. Thus the Rock Island bought one car of fencing and the Illinois Central and the Omaha, one car of barbed wire each. Perhaps the most encouraging development is the fact that manufacturers are commencing to take an interest in the market. One manufacturing consumer has placed an order for 500 tons of wire. For mill prices, see Finished Iron and Steel, f.o.b. Pittsburgh, page 628.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.38 per 100 lb.; No. 9 and heavier bright basic wire, $3.53 per 100 lb.; common wire nails, $3.48 per 100 lb.; cement coated nails, $2.90 per keg.

Warehouse Prices.—Jobbers have reduced their prices on cold rolled steel bars and shafting to 4.20c. for rounds and 4.50c. for flats, squares and hexagons.

New York

NEW YORK, Sept. 6.

Pig Iron.—Quite a number of inquiries developed over the holidays, mostly for small amounts and for delivery in the next two or three months. No distinct change appears in the rate of foundry operations, the buying being due to the fact that melters are running out of iron. Prices are not uniformly firm, some business having been done at a little under the figures prevailing ten days ago. The New Jersey heating furnace company that inquired for 1500 tons for first quarter is believed to have closed for its January and a part of February requirements. Blast furnace companies, as a rule, do not care to sell for 1922 delivery at present prices. Several inquiries for 500-ton lots and one for 1000 tons are pending. The recent pig iron inquiry from abroad, supposed to be for several thousand tons, appears to be little more than an attempt to sound out this market, the real objective being the sale of iron produced in India. There are reports not readily traced of the sale of Belgian pig iron in this market in lots amounting to about 1000 tons. Buffalo sellers have been quoting $20 at furnace for No. 2 foundry iron. Nothing has been done in Virginia iron, which is still quoted at $22 at furnace for No. 2.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$22.52 to $23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.02 to 22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	21.52 to 22.52
Buffalo, sil. 1.75 to 2.25	24.46 to 25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—A representative of a German producer of ferromanganese has been authorized to quote 76 to 80 per cent ferromanganese at 4930m., seaboard, which at the prevailing exchange value is equivalent to about $59 to $60, seaboard. This compares with the British price of $65, seaboard, and with the American quotation of $70, delivered. The market is quiet and the only sale that is reported is one of 50 tons of domestic alloy. The spiegeleisen market is quiet at prevailing quotations with the sale of two carloads reported. There is no demand for high-grade foreign manganese ore and the 50 per cent ferrosilicon market is inactive but firm at prevailing quotations. We quote as follows:

Ferroalloys	
Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$65.00
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $27.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	.48c to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50
Ores	
Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—The sudden demand for the small sizes, together with the slight stiffening of pig iron

prices, has increased the price about $5 a ton. Last week several inquiries and orders for small tonnages came in rather unexpectedly until some manufacturers have enough work to last until Dec. 1. Makers in this district are now operating at from 40 to 70 per cent capacity. Some of the orders are attributed to the desire of municipalities to give work to the unemployed. Two sets of bids will be opened Sept 9: 100 tons of 6-in. and 10-in. pipe for Essex Fells, N. J., and 50 tons for Troy, N. Y. We now quote per net ton, f.o.b. New York, carload lots as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—No notable developments in respect to business conditions are to be reported, but one mill has stiffened in its prices by refusing to make further quotations at levels below current quotations. Some of the bar business taken at 1.60c., Pittsburgh basis, has covered material rolled from billets which failed to pass billet purchase specifications and which would otherwise have been sold as scrap. In structural lines an addition to Haddon Hall, Atlantic City, is to be noted, involving 1000 tons, and the following work has been awarded or is about to be settled: Grain elevator for the Western Maryland, at Baltimore, 300 tons, to James Stewart & Co.; Chelsea National Bank, Atlantic City, 350 tons, to the American Bridge Co.; apartment at Madison Avenue and Eighty-fourth Street, New York, 700 tons, to the Paterson Bridge Co.; an addition to the Home Club, West Forty-fifth Street, 400 tons, to George A. Just Co. The Turner Construction Co. is to build a reinforced concrete warehouse in the Brownsville district of Brooklyn. The New York Central is in the market for a round tonnage of material for its shops, including axles, tires, frogs and switches, sheets, bars, plates and shapes.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.03c.; plates, 2.08c. to 2.13c.; structural shapes, 2.13c. to 2.23c.; bar iron, 2.08c. On export shipments the freight rate is now 28.5c. per 100 lb, instead of 38c., the domestic rate.

High Speed Steel.—Quotations of domestic producers are unchanged and continue nominally at about 90c. per lb. for 18 per cent tungsten high speed steel. Steel of foreign origin is also quoted by the importers at 90c. to $1 per lb., no effort for the present being made to shade the American market.

Old Material.—Brokers are finding it increasingly difficult to buy at present prices and the price tendency is upward, though very gradual. Purchasing by mills is slight and confined chiefly to steel, pipe, stove plate and wrought.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to	$7.50
Heavy melting steel, rails or equivalent	8.50 to	9.00
Rerolling rails	10.50 to	11.50
Relaying rails, nominal	37.50 to	40.00
Steel car axles	10.00 to	11.00
Iron car axles	16.00 to	17.00
No. 1 railroad wrought	11.00 to	11.50
Wrought iron track	8.25 to	8.75
Forge fire	5.00 to	5.50
No. 1 yard wrought, long	9.00 to	9.50
Light iron	3.00 to	3.50
Cast borings (clean)	5.50 to	6.00
Machine-shop turnings	3.00 to	3.50
Mixed borings and turnings	3.00 to	3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.00 to	8.50
Stove plate	9.50 to	10.00
Locomotive grate bars	8.50 to	9.25
Malleable cast (railroad)	8.50 to	9.00
Car wheels	11.00 to	11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to	$17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to	16.00
No. 1 heavy cast, not cupola size	14.00 to	15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to	10.50

Warehouse Business.—The situation is unchanged as far as volume of business is concerned, but prices continue to show a slight weakness. Swedish iron bars, which can be brought into New York in large lots at about 6c. per lb., are now quoted at 10c. per lb. out of warehouse and a fair sized order would probably bring out an even lower quotation. Blue annealed sheets have been quite generally brought down to a basis of 3.28c. per lb. for No. 10 gage and galvanized sheets are now being quoted by practically all warehouses at 5c. per lb. for No. 28 gage. Prices of brass and copper are down ½c. per lb., corresponding with a recent reduction of wages in the brass and copper mills. Rumors of official reductions by independent mills on prices of bars and plates as high as 10c. per 100 lb. are noted by warehouses and may effect another reduction of warehouse quotations. We quote prices on page 642.

Birmingham

BIRMINGHAM, Sept. 6.

Pig Iron.—Several sales of 1.25 to 1.75 per cent silicon iron in yards of one Birmingham maker sold for $18.50. A 300-ton lot of 3.75 to 4.25 per cent silicon sold for $21. The base of $19, silicon 1.75 to 2.25 per cent, was not shaded during the week so far as is known, and all the differentials were exacted at 50c. each. This applied below as well as above base. Clifton iron of the Alabama Co. has sold $2.50 above usual grades. The state of one maker at the end of the week was this: 2000 tons on yards, of which all had been sold but a few hundred tons; orders given for shipment of 1000 tons. This practically put this concern out of the running at the beginning of this week, as it has no stack going. Turning down customers, some of them old and tried, on account of not having the grades of iron wanted, has become both disagreeable as well as usual. The situation needs but a little more demand to increase production. One experienced maker said: "We have received several inquiries for first quarter. I begin to detect more interest in first quarter than in fourth quarter. Melters seem to be convinced that iron is going high gradually, but are apparently willing to take chances with the movement prior to Jan. 1. We are not quoting for 1922." Another maker has sold a small quantity of fourth quarter iron to regular customers taking other iron. The week's transactions embraced small consignments for the Middle West, but the total was not great.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Finishing Mills.—The Gulf States Steel Co. issued from August with 40 per cent increase of active production capacity over that of July and a finishing mill production of 45 per cent compared with average of 20 per cent for first six months of year. Better demand comes from improved feeling in Southern farm circles. The Tennessee company continues operation of 6 of the 9 open hearth furnaces, rail mill, tie-plate mill, car works and Bessemer rolling mill. Some departments of American Steel & Wire Co. are on 6 days a week. Finishing steel plants generally are much busier than a month ago.

Coal and Coke.—Standard foundry coke has come down to the $6 base again following competition.

Cast Iron Pipe.—It was a rather quiet market in high pressure pipe. Base remains firm at $35 for 6 in., but prices are shaded for larger sizes where contracts are especially desirable. Outlook is better than current business. The Stockham Pipe & Fittings Co. has gone on 60 per cent turn following one of a 30 per cent average.

Old Material.—Cast scrap is quite active owing to increased use at pipe shops. Steel scrap is moving somewhat more actively, but prices have not changed. Some advances are momentarily expected.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$10.00 to	$11.00
No. 1 steel	9.00 to	10.00
No. 1 cast	15.00 to	16.00
Car wheels	15.00 to	16.00
Tramcar wheels	12.00 to	13.00
No. 1 wrought	13.00 to	14.00
Stove plate	9.00 to	10.00
Cast iron borings	6.00 to	7.00
Machine shop turnings	6.00 to	7.00

Boston

BOSTON, Sept. 6.

Pig Iron.—A Connecticut melter during the past week purchased 100 tons of eastern Pennsylvania No. 1X foundry iron, September delivery, at $19.50 furnace or $23.56 delivered. Figuring differentials at 50c would bring this furnace's price back to an $18.50 base. In this instance, however, the furnace's base is $19.50, and, in order to secure the business, differentials were ignored. Any weakness in the market for eastern Pennsylvania irons, therefore, appears in higher silicons only. One Buffalo interest heretofore quoting No. 2 plain at $20, No. 2X at $20.50 and No. 1X at $21 has signified its willingness to waive the differential on the No. 1X grade when round tonnages are involved. A sale of 125 tons of Buffalo No. 2X iron was made to a Massachusetts foundry at $20.50 furnace or $25.95 delivered. Otherwise sales of eastern Pennsylvania and Buffalo iron reported this week have been confined to scattered car lots of No. 2X and No. 1X at $20 and $21 on the Pennsylvania irons and $20 to $21 for Buffalo No. 2X. A local foundry purchased two 150 ton lots of Northern charcoal at an indicated full market price. Northern charcoal has been offered here, however, at $28 furnace. Delivered pig iron prices follow:

East. Penn. sil. 2.25 to 2.75	$24.06 to $25.06
East. Penn. sil. 1.75 to 2.25	24.06 to 24.56
Buffalo sil. 2.25 to 2.75	25.46 to 26.46
Buffalo sil. 1.75 to 2.25	25.46 to 25.96
Virginia sil. 2.25 to 2.75	31.08 to 33.08
Virginia sil. 1.75 to 2.25	30.58 to 32.58
Alabama sil. 2.25 to 2.75	30.16
Alabama sil. 1.75 to 2.25	29.66

Finished Materials.—McClintic-Marshall Co. is awarded 600 tons structural steel for a Pawtucket, R. I., theater; the Lehigh Structural Co., 162 tons for the Ford, Green Island, Hudson River power plant; and the Shoemaker-Satterthwait Bridge Co., 123 tons for a Far Rockaway, L. I., power house. Structural awards otherwise were confined to less than 100 ton lots the past week. The 480 tons for the Cornell University building went to interests outside New England. The city of Boston is in the market for 100 tons ⅞-in. and ¾-in. deformed bars. Local mill representatives report a falling off in bookings since last reports, due to the holidays, and a tendency to shade prices on practically everything. Local warehouses have reduced prices on blue annealed sheets 10c per 100 lb. to $3.73 for No. 10; 50c on black to $4.25 for No. 28; and 25c on galvanized to $5.25 for No. 28. Otherwise warehouse prices remain unchanged, with consumption just about holding its own.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Coke.—New England producers of foundry coke are quoting as they did last month—$10.66 delivered where the local freight rate does not exceed $3.40. Several foundries resumed operations this week after periods of inactivity, but on reduced working schedules. The number is not sufficient to warrant an increased movement of foundry coke from ovens. Not enough Connellsville foundry coke is offered here to be a market factor.

Ferromanganese.—Small lots of lump ferromanganese sold this week at as low as 3¾c per lb. and ground at as low as 4½c. f.o.b. Pennsylvania shipping point. These quotations represent the bottom of the market, some small lots having changed hands at as high as 9c.

Old Material.—Without a noticeable increase in actual transactions, the market on machinery cast is firmer due to slightly freer inquiries from foundries. The largest inquiry comes from a Massachusetts textile machinery interest, for 200 tons of strictly No. 1 textile cast, for which the market is around $19.50 to $20, as against $17 to $18 on regular machinery cast. Car-lot sales of stove plate are reported this week at $15.50 delivered Norwood, Mass. The available supply of this material is more or less limited. Pennsylvania mills are sounding out the market on heavy melting steel, but their idea of prices and those of holders of material are still considerably apart. The market for railroad and yard wrought is softer, due to continued offerings and a lack of demand. Interest in turnings has dried up. One dealer is offered seven cars of bushy turnings at $1.50 f.o.b. shipping point, but has no market for same. Quotations on other old materials are inclined toward softness.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $20.00
No. 2 machinery cast	15.00 to 16.00
Stove plate	15.00 to 15.50
Railroad malleable	11.50 to 12.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.00 to $6.50
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.50 to 8.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.50
Machine shop turnings	2.00 to 2.50
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.00 to 2.50
Forged scrap and bundled skeleton	4.00 to 4.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.50
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 6.

Iron Ore.—Shipments of Lake Superior ore during August amounted to 4,329,158 gross tons, making the total movement for the season up to Sept. 1 14,748,072 tons, as compared with 35,349,874 tons during the same period last year. August shipments in 1920 were 9,270,763 tons. The August movement showed a slight gain over July, when shipments were 4,047,687 tons, but no increase is expected in September and a number of the ore firms are planning to clean up their shipments by Nov. 1. Present indications are that the season's shipments will barely reach the recent estimates of 25,000,000 tons. In only one year since 1904 have the season's shipments gone below 30,000,000 tons. That was in 1908, when the lake and rail shipments amounted to 26,014,987 tons.

A few merchant furnace interests that are considering the blowing in of their furnaces have put out inquiries for ore in lots of 5000 to 15,000 tons and some of these inquiries are expected to result in the placing of orders a little later.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales fell off last week as compared with the previous week, but the volume of business was somewhat better than the average for the past few weeks. With the recent stiffening in prices by some makers there is a spread of $1 a ton in prices on foundry iron. One Valley furnace which recently advanced its price to $21 for No. 2 foundry iron reports small lot sales aggregating 2000 tons at that price. Other interests operating Cleveland and other Lake furnaces and western Pennsylvania furnaces are still quoting $20, but in some cases are making sales at $20.50 to $21, the higher prices usually being for nearby delivery or where competition is largely eliminated. One selling agency reports sales aggregating 6200 tons this month. These include 500 tons of gray forge iron at $20. This seller was offered an additional lot of 1200 tons of forge iron at the same price but declined to take the order. One producer reports sales in the week aggregating 3500 tons of foundry iron, including 700 tons to an Indiana melter and 600 tons to a Michigan furnace builder. Another producer booked 1000 tons in small lots. A 200-ton lot of 2.75 per cent silicon foundry iron brought $21.50, the high silicon differential being figured at $1.50. We note the sale of 200 tons of basic iron at $20. However, $19 is still regarded as the market on this grade for a round tonnage, although most producers are asking $20. A few car lot sales of Southern iron are reported at $19. Sales during August by local interests showed a fair gain over previous months this year. One producer sold over twice as much iron in August

as in any previous month this year and its shipments were 60 per cent greater than in any previous month of the year. With recent improvements in sales September shipments are expected to show a gain over August. Two furnaces are being added to the active list, one River furnace in Cleveland and Cherry Valley at Leetonia, Ohio.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnce	36.00 to 36.25

Finished Iron and Steel.—The volume of business for the week was rather light and lots of any size are still bringing out low prices. Quotations as low as 1.65c., Pittsburgh, are reported on steel bars, plates and structural material for desirable orders, although some of the mills are not going below 1.70c. While steel bars have sold as low as 1.60c., there are indications that 1.65c. is perhaps now the minimum. Inquiry for 25,000 tons of plates for tank work has come out, including a Mexican inquiry for 18,000 tons, noted in our issue of last week. A Cleveland mill has taken 1000 tons of tank plates for Eastern shipment at about 1.65c., Pittsburgh. A Cleveland consumer has placed 800 tons of steel bars, plates and shapes at lower than 1.70c. The New York Central Railroad has placed repair work on 10,000 cars with car builders and repair companies but it is expected that the greater part of the material required will be supplied from the railroad company's present stock of material. The Lima Locomotive Corporation has taken 5 locomotives for the Clover Leaf Railroad, for which it has placed 160 tons of plates and structural material. In the building field inquiry for small lots of structural material has improved. The Masonic hotel project in Detroit, requiring 7000 tons of steel, which was recently held up, has been revived and bidders have been asked to revise their bids. The stadium for the Detroit baseball park, requiring 700 tons of steel, has been held up indefinitely. The National Iron & Wire Co. has taken the Rawlings school building, Cleveland, requiring 200 tons of steel.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 4c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Old Material.—There is moderate activity in small lots of steel making scrap and the market continues firm with no price changes. Dealers are offering $12.35 for heavy melting steel and $8.25 to $8.50 for borings for Canton delivery. Sales of heavy melting steel at $13.50 are reported to a western Pennsylvania mill. Another mill that recently bought considerable scrap will make additional purchases shortly. The local demand is very light. Local dealers are offering $12 for heavy melting steel for delivery to a Cleveland mill, but little is to be had at that price.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails, under 3 ft	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in	5.50 to 6.00
Drop forge flashings, under 10 in	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Sheets.—Inquiries and sales are light. Most mills are quoting 2.75c. for black, 3.75c. for galvanized and 2.25c. for blue annealed sheets, but there are unconfirmed reports of shading $1 to $2 a ton on black and galvanized sheets.

Bolts, Nuts and Rivets.—Some of the bolt and nut manufacturers report that August sales were larger than in any previous month this year. Orders continue to show some gain but the demand is for small lots. The rivet market continues dull with prices unchanged. Minimum quotations reported are 2.25c. for structural and 2.35c. for boiler rivets.

Coke.—The demand for carload lots of foundry coke has improved. Standard Connellsville makes are quoted at $4 to $4.50 per net ton.

Buffalo

BUFFALO, Sept 6.

Pig Iron.—Scattered sales of pig iron are the rule in this market. The total business of producers and agencies for the week was less than 10,000 tons and the largest individual sale in this total was one for 750 tons. One furnace has turned its attention to producing malleable iron to fill old contracts, and some small demand just developed. Brokerage competition has apparently been eliminated. All the iron produced by one furnace in August was shipped out. There is some talk of an interest blowing in a furnace but no decision has been reached. Requests for tonnages for delivery beyond 60 days find no interest here and the same policy not to sell on any other than immediate or delivery within two months is still in force. One producer is out of the market by virtue of the needs of its own and subsidiaries, and while they have sold scattered lots at $20 base, they are not anxious for business at present prices.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil	$21.75
No. 2X foundry, 2.25 to 2.75 sil	20.75
No. 2 plain, 1.75 to 2.25 sil	20.00
Basic (nominal)	21.00
Malleable(nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Desirable inquiries for billets and wire rods—1400 tons of the former and 800 tons of the latter, the first to appear in this territory in several months represent the sole new development. Bar business is apathetic and while the price of 1.75c. Pittsburgh is maintained on small orders, it is by no means dominant where desirable specifications are presented. Tubular and wire products show better movement than any other material. Generally the optimistic undercurrent has not abated but there is little to base it on. Bar sales are small but sheet piling which has kept one mill busy for some time continues at a fair average. Some export business out of Canada to points in possessions of Great Britain and for finished materials has given rise to a better feeling in the Dominion. Structural business has not brought out any new projects. It is the general belief that any sizable business in this field will be deferred to next year.

Warehouse Business.—While no general falling off in sales is manifest the improvement noticed each succeeding week in August has spent itself, to all appearances. Increase in mill operation has not affected warehouse business as near as can be determined. Inquiry for structural shapes indicates that a fair business is in prospect.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.50c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10 gage, 3.30c.; galvanized steel sheets, No. 28 gage, 5.05c.; black sheets, No. 28 gage, 4.05c.; cold rolled strip steel, 6.40c.

Coke.—Several inquiries for more than the average tonnage have appeared and indicate a livelier market. There is some difficulty in finding tonnages to fill this unusual demand, as producers are reluctant to increase operation, not knowing the stability of this business and figuring on a possibility of later curtailment. Prices are firm.

Old Material.—About 13,000 tons of heavy melting steel has been sold here by a group of dealers. Most of the tonnage was taken by a steel interest, which has been quite inactive for eight months and lately

has found sufficient business to increase operation in a few departments. A price of $13 was maintained on this business. Larger inquiry has appeared. Several dealers are selling material for the same price as they pay for the stock.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

Cincinnati

CINCINNATI, Sept. 6.

Pig Iron.—While the market was not especially active last week, there are quite a number of inquiries being figured on. One of these calls for 3000 tons of iron for shipment over the remainder of the year, the inquirer having a number of plants scattered throughout the country. A Michigan melter is in the market for 2000 tons of malleable iron and a Chattanooga interest is inquiring for 600 tons of malleable. A central Ohio melter is in the market for 400 tons of foundry iron and a Knoxville melter for a similar tonnage. There is also an inquiry for 700 tons of Southern iron for first quarter. Some sales were reported during the week, including one of 1000 tons of foundry iron to a northern Indiana melter and 350 tons of high silicon iron to a Cleveland district melter. A local melter bought 200 tons of Southern iron and a nearby melter 200 tons of Northern iron. Chicago furnaces have advised the trade that prices will be advanced to $22 on Thursday of this week and announcement of an advance in southern Ohio iron will also likely be forthcoming. Sales made in the week were generally on the basis of $20 to $20.50 for Northern and $19 for Southern iron. It is reported that a Southern furnace has advised melters with contracts for high-priced iron for first half delivery that it will sell this iron at the market and charge the difference to the buyer, if settlement is not made at once. The Marting Iron & Steel Co. will light a stack at Ironton on Sept. 15.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	22.52
Basic, Northern	21.52
Malleable	22.52

Finished Material.—An Indiana rolling mill in the week bought 1000 tons of sheet bars. The order is reported to have gone to a Chicago district mill at a price at $30, f.o.b., mill. This would be the equivalent of about $28, Pittsburgh. The inquiry for 1000 tons of plates and 500 tons of structural material, reported some weeks ago, is still pending, it not having been decided whether the project for which this material was required, will go ahead. Something definite is expected within the next week or so. Business in finished materials during the past week has been confined almost exclusively to carload lots, although one order for 120 tons of wire fence was placed by a railroad with the leading interest. The usual quotation on plain wire is now $2.25 per 100 lb. Nails, however, are holding firmly at $2.75, there being no evidence of price shading. There is a fair demand for sheets and the recent prices of 2.25c., 2.75c. and 3.75c. for blue annealed, black and galvanized, respectively, are holding firmly. On plates and shapes, 1.75c. is now commonly quoted and on larger tonnages these prices probably could be bettered. No new projects have come up in the structural field. The King Bridge Co. has been awarded the contract for track elevation work at Indianapolis for the Big Four Railroad, taking close to 900 tons. The Pan-American Bridge Co., Newcastle, Ind., has been awarded the contract for a power house at Frankfort, Ind., 165 tons being involved. Plant operations will show little change. The East Side works of the American Rolling Mills will be running practically at capacity in the week. The schedule calls for six open-hearth furnaces and 18 sheet mills. The plants of the Andrews Steel Co. and the Newport Rolling Mills at Newport, Ky., and the Whitaker-Glessner Co. at Portsmouth, will be idle.

Warehouse Business.—Local jobbers report a slow but steady improvement in orders. Tonnages inquired for are becoming larger and the number of buyers is increasing. Local jobbers of sheets have reduced their prices, following the recent changes made by the mills. No. 28 black sheets are now quoted at 4.25c. and No. 28 galvanized, at 5.25c. No other price changes have been made recently. Jobbers quote:

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Tool Steel.—Some manufacturers of tool steel have reduced prices approximately 10c. per pound and 18 per cent tungsten steel is now quoted at 90c. per lb.

Coke.—Inquiries in the coke market run all the way from 200 to 5000 tons. Buyers are apparently willing to cover for first quarter at to-day's prices, but operators are not willing to commit themselves more than a month or two ahead. The market is firmer than has been the case recently, though prices have not been advanced noticeably. Several sales of 500-ton lots were made last week, but in the main transactions are confined to one and two-car lots for immediate shipment.

Old Material.—While there is very little activity in this market, the price situation is showing a stronger tendency and advances of from 50c. to $1 a ton have been made in the week. Some inquiries are being received for borings and turnings. Mills in other districts are also feeling the market on heavy melting steel. Dealers are of the opinion that mills would be ready to buy if they were convinced that the market had touched the bottom and are confident that the next 30 days will see a substantial improvement in the scrap market. The supply of borings and turnings is particularly light, as most of the manufacturing plants turning out this material are running at greatly reduced operations. Most dealers have advanced quotations on practically the entire list and the following quotations represent the market today:

We quote dealers' buying prices:

Per Gross Ton	
Bundled sheets	$4.00 to $5.00
Iron rails	12.00 to 12.50
Relaying rails, 50 lb. and up	25.00 to 26.00
Rerolling steel rails	10.50 to 11.50
Heavy melting steel	9.00 to 9.50
Steel rails for melting	9.00 to 10.00
Car wheels	11.50 to 12.50
Per Net Ton	
No. 1 railroad wrought	8.50 to 9.50
Cast borings	2.50 to 3.00
Steel turnings	2.00 to 2.50
Railroad cast	12.00 to 12.50
No. 1 machinery	12.50 to 13.50
Burnt scrap	7.00 to 8.00
Iron axles	15.00 to 16.00
Locomotive tires (smooth inside)	9.50 to 10.00
Pipes and flues	4.00 to 5.00

St. Louis

ST. LOUIS, Sept. 6.

Pig Iron.—Selling slowed up somewhat, following the recent advance of $1 a ton, but the market is firm and producers are maintaining $21, f.o.b. Chicago. Inquiries involve about 4000 or 5000 tons of various grades of foundry iron, the bulk of which is for last quarter, first quarter or first-half delivery. The interest in distant delivery indicates that buyers have confidence in the present price and are anticipating needs. One inquiry covers 5000 to 10,000 tons of basic iron for shipment over the next 90 days. The permanent closing of the Sligo furnace at Sligo, Mo., whose output of 25,000 to 30,000 tons of pig iron was taken care of by the

American Car & Foundry Co., is a noteworthy development. There was an inquiry out for a carload of 14 to 16 per cent ferrosilicon. Sales of Granite City by-product coke in the week were about 1200 tons.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham.

Northern foundry, sil. 1.75 to 2.25	$23.88
Northern malleable, sil. 1.75 to 2.25	23.88
Basic	23.88
Southern foundry, sil. 1.75 to 2.25	24.74

Finished Iron and Steel.—Prices are not being well maintained on plates and shapes, and some concerns who quoted less than the market price of 1.85c., f.o.b., Pittsburgh, have not obtained the business because someone else had quoted lower. The Missouri Pacific Railroad bought 3000 kegs of track spikes and 125 to 150 tons of plates at concessions, the exact amount of which could not be learned. The market is holding firm, however, on bars. Galvanized sheets, No. 29 gauge, are in better demand, although there is only a light demand for blue annealed sheets. Some sales are being made to local jobbers to round out their stocks. The railroads are not opening up, but they are going into the market to supply their actual needs. Warehouse business is slightly better.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.50c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—A slight improvement in demand but no orders of consequence placed describes the situation, scattering sales involving a slightly larger tonnage. The coke ovens of the St. Louis Coke & Chemical Co. at Granite City are still operating, although no pig iron is being produced. What sales are being made are on a basis of immediate delivery. Domestic coke is in increased demand. Standard Connellsville foundry coke is quoted at $4.50 to $5 per net ton at ovens.

Old Material.—There is no change in the prices of old materials. Consumers are not interested at present and dealers were forced to lay down in their yards all stocks recently bought from the railroads. Railroad lists before the market this week follow: Cotton Belt, 300 tons, and Pennsylvania, 2500 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton		
Iron Rails	$13.00 to	$13.50
Steel rails, re-rolling	12.00 to	12.50
Steel rails, less than 3 ft.	11.00 to	11.50
Relaying rails, standard section	29.00 to	30.00
Cast iron car wheels	12.00 to	12.50
No. 1 heavy railroad melting steel	10.50 to	11.00
No. 1 heavy shoveling steel	9.50 to	10.00
Ordinary shoveling steel	9.00 to	9.50
Frogs, switches and guards, cut apart	10.50 to	11.00
Ordinary bundle sheet	4.00 to	4.50
Per Net Ton		
Heavy axle and tire turnings	5.50 to	6.00
Iron angle bars	11.00 to	11.50
Steel angle bars	9.00 to	9.50
Iron car axles	16.50 to	17.00
Steel car axles	12.50 to	13.00
Wrought iron arch bars and transoms	13.00 to	13.50
No. 1 railroad wrought	10.00 to	10.50
No. 2 railroad wrought	9.50 to	10.00
Railroad springs	10.50 to	11.00
Steel couplers and knuckles	10.50 to	11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to	9.50
No. 1 dealer's forge	6.00 to	6.50
Cast iron borings	5.50 to	6.00
No. 1 busheling	9.50 to	10.00
No. 1 boilers cut in sheets and rings	6.00 to	6.50
No. 1 railroad cast	12.50 to	13.00
Stove plate and light cast	11.50 to	12.00
Railroad malleable	9.50 to	10.00
Agricultural malleable	9.00 to	9.50
Pipes and flues	7.00 to	7.50
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.00 to	3.50
Railroad grate bars	8.50 to	9.00
Machine shop turnings	4.00 to	4.50
Country mixed iron	7.00 to	7.50
Uncut railroad mixed	8.00 to	8.50
Horseshoes	10.50 to	11.00
Railroad brake shoes	8.50 to	9.00

San Francisco

SAN FRANCISCO, Aug. 31.

Pig Iron.—In view of actual business, the Coast market has been very quiet of late, and few if any large transactions have been made in the past week or two. There has been, however, a small volume involving 50 and 100-ton lots. Recently the Southern Pacific Co. rejected the first bids on 800 tons of domestic material, and called for 500 tons and 300 of Nos. 1 and 2 foundry iron (2.25 to 2.75 and 2.75 to 3.25 per cent silicon). Foundry activities at present continue very greatly restricted, but reports of increased inquiry are current, leading some to anticipate better conditions in the near future. The market is more or less nominal as respects prices.

Coke.—This market reflects the dormant condition of pig iron. A few cars have been reported sold, at steady prices, but there is nothing of consequence to state at this time.

Old Material.—The most conspicuous transaction in scrap in the last week or ten days was the placing of around 2000 tons of heavy melting steel, it being understood that the price was in the neighborhood of $10 per gross ton, delivered at the consuming works. Cast iron scrap is moving in small volume at around $20, some prices being slightly above this figure, but buyers' ideas range lower. An inquiry from China for a quantity of scrap shearings was received and probably will be filled.

Finished Iron and Steel.—On Aug. 29, the Building Trades Council's opposition to a prolongation of the strike dissolved, and workers were permitted to seek employment under the so-called American plan for which the Builders' Exchange has been contending. At present it is estimated that about 8000 of the 11,000 men employed in May when the strike was called have returned to work, which is taken to mean that conditions are rapidly reaching their normal. It seems rather early to expect the effects of this change to become evident at this moment, but it is reported that the inquiry for concrete reinforcing bars already has increased, and fabricators are looking for a better condition in the succeeding weeks. Jobbers report a greater movement of stocks and increased replacement buying. Actual transactions of a conspicuous nature have been few in the past fortnight, perhaps the most notable being the sale of 3000 to 3500 tons of high power transmission towers by the Pacific Coast Steel Co. to the Pacific Gas & Electric for its Cordelia-Oakland and Pitt River line. There are two inquiries at present for 75 to 600 tons of relaying rails for a lumber company. A Los Angeles interest is in the market for a quantity of galvanized sheets. The Market Street Railway, San Francisco, is inquiring for 500 tons of girder rails. The Consolidated Steel Co. is figuring on 4000 tons of 60-lb. rails. Plates and sheets are being taken by the Southern Pacific Co. It has been reported that standard section T rails of foreign fabrication were offered the Western Pacific Co. for $37.50, duty paid, delivered alongside, San Francisco, at which figure domestic makers are greatly handicapped. There has been, likewise, a slight stir in the Oriental situation of late, and local interests are now figuring on a transmission tower contract for Japan, which will involve from 1600 to 1700 tons. Japan is also in the market for steel rails and black sheets. Market prices appear to be settling somewhat, but stability has not yet been attained.

Cast Iron Pipe.—A much improved situation is reported throughout the State, especially in southern California, where quite an active municipal business is being done at various points from Los Angeles to San Diego, inclusive. Indications point to an increasing business in waterworks betterments. The city of Alhambra is in the market for 150 tons of the smaller sizes of pipe, and Lancaster received bids a day or two ago for 250 tons of 4 to 8-in. pipe. Public service corporation activity is also better, gas companies extending lines. Prices are on the point of being stabilized, but present prices show a range of from $36 to $40, base. Nearly all shipments of pipe for Pacific Coast points are being made by vessel.

Philadelphia

PHILADELPHIA, Sept. 6.

Though the past week has been quieter in the steel and pig iron trades than preceding weeks in August, partly on account of the Labor Day holidays, there is a general expectation here that a gradual improvement will set in shortly. There has been a tendency during the past week to postpone action on pending projects until after Labor Day. Fair buying of pig iron has continued but prices have remained where they were a week ago. The improvement in buying during August sets that month out as the best of the year in the pig iron trade, with sales in this market totaling 75,000 tons or more.

Pig Iron.—August was the best month of the year so far for the Eastern pig iron trade, with sales by Philadelphia offices aggregating at least 75,000 tons, possibly more. The past week's total sales were smaller than in the two or three weeks preceding. Prices on foundry iron remain at $19.50, furnace, as a minimum for No. 2 plain. A new factor has entered into the pig iron situation, that being the strength of the coke market. Two inquiries by Eastern blast furnaces for coke for the last quarter brought out quotations of about $4 a ton. Offers of $3 and $3.25, Connellsville, for forward delivery were refused by representative bee-hive operators. If coke prices advance there will be an added cost for pig iron manufacture, which can only be offset by reduced freight rates. An appeal for a reduction in transportation rates has been made by Eastern pig iron interests but a considerable period of negotiation is probable before any action can be taken by the Trunk Line Association and the Interstate Commerce Commission. Swedish iron ore is now being offered by a local firm at 9c. per unit, Atlantic seaboard, as compared with about 15c. per unit for Lake Superior ore delivered at nearby furnaces. However, most of the Eastern furnaces still have large ore piles which they will attempt to liquidate before making new purchases. Pig iron sales during the week have been mostly in lots of a few hundred tons each. A New Jersey melter bought 800 tons, which was divided between two furnaces. A fair volume of inquiry is pending, part for immediate shipment and the remainder for the last quarter. Some inquiries for first quarter of next year have been made but sellers are not willing to quote that far ahead. The Robesonia furnace, which has been making low phosphorus iron, turned over to foundry on Tuesday, making four eastern Pennsylvania makers of foundry iron, with prospects that another furnace may blow in shortly.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	29.24 to 29.74
Basic deliv. eastern Pa.	19.00
Gray forge	20.00 to 21.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Ferroalloys.—Small sales of domestic ferromanganese are being made at $70 delivered in Eastern territory and $75 for shipment west of Pittsburgh. Spiegeleisen is not in demand but is quoted at $27 to $28, furnace, for 18 to 22 per cent grade.

Semi-Finished Steel.—Rerolling mills do not find it possible to buy billets at $30, Pittsburgh, and sell bars at current market prices, hence the demand for rerolling billets is practically nil. Neither is there demand for forging billets because of the low condition of the forging industry. Prices are unchanged.

Railroad Equipment and Supplies.—The Baltimore & Ohio Railroad, reported last week as in the market for the repair of 2000 cars, is now asking for bids for repairing 3000 freight cars of six different types. A better demand from the railroads for tires, wheels and axles is noted. The Pennsylvania Railroad has bought 4850 kegs of spikes at a price reported to be 2.50c. per lb., Pittsburgh.

Plates.—Further weakness in plate prices is apparent, though business of importance is lacking. Sales have been made at 1.70c., Pittsburgh, with every indication that a buyer with a fair-sized tonnage could place it at 1.65c., Pittsburgh. On carload lots or less the price is usually 1.75c. Aside from a little railroad buying for repair work the market is flat.

Structural Shapes.—The nominal price for shapes in small lots is 1.80c., Pittsburgh, but any sizable tonnage commands a better price. As low as 1.65c., Pittsburgh, has been quoted. The Dupont Engineering Co. has awarded about 1000 tons for fabrication to the McClintic-Marshall Co. for a pier at Wilmington, Del. The same project requires about 500 tons of reinforcing bars. The Viscose Building, Roanoke, Va., 1800 tons, is reported to have been awarded to a Philadelphia fabricator. A number of projects which were to have been decided last week were postponed until after Labor Day; hence may be awarded this week.

Bars.—Steel bars continue to show a degree of strength. Soft steel is being sold at 1.75c., Pittsburgh, and there appears to be very little shading on this grade, though reinforcing bars are generally obtainable at 1.70c., Pittsburgh. Bar iron is quoted at 1.65c., Pittsburgh.

Sheets.—The new prices on sheets, announced last week by the leading interest, are generally quoted by all manufacturers, namely 2.25c. for No. 10 blue annealed, 2.75c. for No. 28 black and 3.75c. for No. 28 galvanized, all f.o.b. Pittsburgh.

Wire Products.—Attempts have been made by buyers to break the wire nail price of 2.75c. per lb., Pittsburgh. Offers of 2.50c. have been refused by the mills.

Warehouse Business.—A fair gain in sales from jobbers' stocks is reported, business being much more satisfactory than it was a month or so ago. Prices have not been changed during the week.

Coke.—Foundry coke is quoted at $4 to $4.50, Connellsville. Offers of $3 and $3.25 for furnace coke for forward shipment have been refused by Connellsville operators, $4 having been quoted in one instance.

Old Material.—It is reported that the prices received by the Pennsylvania Railroad on its recent large list of scrap averaged fully $1 a ton above the prices received by the same road a month ago. This reflects in a general way the slight but steady improvement in the scrap trade, but there is still much to be desired as the volume of business continues at low ebb. Each purchase of importance puts prices up slightly on the particular grade in demand. Heavy steel scrap, however, is not in demand because of the lack of steel business and prices remain at $11.50 to $12 per ton. A slight advance in wrought scrap is noted. Cast borings are also slightly firmer. We quote for delivery in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	17.00 to 18.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	14.50 to 15.00
No. 1 yard wrought	13.00 to 13.50
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.00 to 9.50
Cast borings (for rolling mills)	9.25 to 9.75
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.00
Stove plate (for steel plant use)	12.00 to 12.50
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.75c. to 1.80c.

Wire Products

Wire nails, $2.75 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.50 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.50; galvanized wire, $3; galvanized barbed wire, $3.40; galvanized fence staples, $3.40; painted barbed wire, $2.90; polished fence staples, $2.90; cement-coated nails, per count keg, $2.35; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.35 to $2.50
Large boiler rivets ..... 2.45 to 2.60
Small rivets ....65, 10 and 10 to 65, 10, 10 and 5 per cent off list
Machine bolts, small, rolled threads,
70, 10 and 7½ per cent off list
Machine bolts, small, cut threads,
65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer,
65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads .....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts .....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads .....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60 and 5 per cent off list
Larger and longer sizes.....60 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped..... 4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts..... 4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E.,
70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts .....65, 10 and 10 per cent off list
Track bolts .....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38 to $42; chain rods, $38 to $42; screw stock rods, $43 to $47; rivet and bolt rods and other rods of that character, $38 to $42; high carbon rods, $46 to $54, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.40 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.75 base; 5/16-in., $2.75 base. Boat and barge spikes, $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.60c. to 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+3½	+22½
¼ to ⅜	53½	27	½	36½	18½
½	58½	44	¾	42½	27½
¾	62½	50	1 to 1½	44½	29½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	39½	25½
2½ to 6	60½	48	2½ to 6	42½	29½
7 to 12	57½	44	7 to 12	40½	27½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+4½	+37½
¼ to ⅜	49½	32	½	35½	23½
½	55½	44	¾	42½	28½
¾	60½	49	1 to 1½	44½	30½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	40½	27½
2½ to 4	58½	47	2½ to 4	43½	31½
4½ to 6	57½	46	4½ to 6	42½	30½
7 to 8	53½	40	7 to 8	35½	23½
9 to 12	48½	35	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45	No. 28 (base)	2.75
Nos. 22 to 24	2.50	No. 29	2.80
Nos. 25 and 26	2.65	No. 30	2.95
No. 27	2.70		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75	Nos. 25 and 26	3.45
Nos. 12 to 14	2.85	No. 27	3.60
Nos. 15 and 16	3.00	No. 28 (base)	3.75
Nos. 17 to 21	3.15	No. 29	4.00
Nos. 22 to 24	3.30	No. 30	4.25

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55	No. 28 (base)	2.75
Nos. 17 to 21	2.60	No. 29	2.80
Nos. 22 to 24	2.65	No. 30	2.80
Nos. 25 to 27	2.70	Nos. 30½ and 31	2.85

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Zinc	
		Electro-	Tin New	New	St.	New	St.
Aug.	Lake	lytic	York	York	Louis	York	Louis
31	.....12.00	11.62½	26.87½	4.40	4.20	4.65	4.15
Sept.							
1	.....12.00	11.75	26.75	4.40	4.20	4.70	4.20
2	.....12.00	11.75	26.75	4.50	4.30	4.70	4.20
3	.....12.00	11.75	....	4.50	4.30	4.70	4.20
6	.....12.00	11.75	27.25	4.50	4.30	4.70	4.20

NEW YORK, Sept. 6.

The tone of all the markets is better but the amount of buying is still light. Elimination of most of the cheap lots has strengthened the copper market. The tin market is quiet and firm. Demand for lead is steady and prices are higher. The zinc market is a little more active and stronger.

Copper.—There has been a perceptible strengthening of the market as the new month opens, which is analagous to the conditions which prevailed at the beginning of July and August. In every case the end of the previous month has witnessed the necessity of some sellers to dispose of weakly held lots of electrolytic copper and, as these have been eliminated, the market has turned stronger. It is doubtful whether electrolytic copper for early delivery could be bought for less than 11.75c., New York, or 12c., delivered, and even then in limited amounts. Most large producers are not willing to meet this level and are asking from ⅛c. to ¼c. higher. Inquiry is fairly good and it is reported that demand from Europe is improving. It is also stated that sales to foreign countries were made last month at concessions under prevailing domestic prices. The market for Lake copper is largely nominal.

Copper Averages.—The average price of Lake copper for the month of August, based on daily quotations in THE IRON AGE, was 12c., New York. The average price of electrolytic copper was 11.70c., New York.

Tin.—With the exception of one day last week when buying was fairly brisk, the market has been quiet but firm. On Thursday, Sept. 1, about 300 tons was purchased by two or three dealers. It appears that the publication on that day of the monthly deliveries of tin showed for August deliveries larger than expected, which is pointed to as the cause of the spurt in demand. Later the market slowed down and there was more metal offered than there were buyers. An explanation of the August deliveries is that one large consumer shipped tin held in warehouses to its mills. Deliveries in the month of August are returned as 3320 tons, with the quantity in stock and landing Aug. 31 at 1761 tons. Imports for the first eight months of the year have been 12,978 tons against 36,688 tons for the first eight months of 1920. Spot Straits tin is quoted to-day at 27.25c., New York, with the London market about £5 per ton higher than a week ago at £161 5s. for spot standard, £163 15s. for future standard and £162 per ton for spot Straits, with total sales reported as 700 tons.

Lead.—The market is firm with a quiet and steady demand. Early on Friday, Sept. 2, the American Smelting & Refining Co. advanced its price 10 points to 4.50c., New York and St. Louis. The outside market is quoted at 4.50c., New York, or 4.30c. to 4.35c., St. Louis. There is a fair demand for future lead and there have been sales with prices at $2 to $3 per ton under those prevailing for early delivery.

Zinc.—Attempts to offer the market down have evidently disappeared and quotations are firmer, but demand has not improved particularly. Prime Western for early delivery is quoted at 4.20c., St. Louis, or 4.70c., New York, and this appears to be the minimum at which it can be bought.

Antimony.—Wholesale lots for early delivery are quoted at 4.50c., New York, duty paid.

Aluminum.—The leading producer still quotes virgin metal, 98 to 99 per cent pure, in wholesale lots for early delivery at 24.50c., f.o.b. plant, and importers of the same grade are asking 19c. to 20c., New York, duty paid.

Old Metals.—The market is firmer with a tendency toward higher prices. Dealers selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.50
Copper, heavy and wire	10.75
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.50
Lead, heavy	3.75
Zinc	3.00
Lead, tea	3.00

Chicago

Sept. 6.—The metals have been generally quiet but the exceedingly low levels to which tin had fallen aroused some speculative interest, which caused it to rebound. Lead has also advanced slightly, although buying is light. Numerous bids have been received at slightly below the market, but lead producers refuse to accept them. Galvanizers are buying spelter more freely and that metal has recovered after slipping down a few points last week. Old metal prices are unchanged. We quote in carload lots: Lake copper, 12.25c. to 12.50c.; tin, 28.50c. to 29c.; lead, 4.40c.; spelter, 4.30c. to 4.35c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

Sept. 6.—The trade in all non-ferrous metals is dormant. Lead at 4.25c., carlots, is unchanged, while zinc is slightly higher at 4.20c. We quote Lake copper at 12.73 1/2c., to 12.73 5/8c., carlots; tin, 27.86c.; and antimony, 5.23 1/2c. In old metals, we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Foundry Association Bulletin

The American Foundrymen's Association has issued from the office of the secretary, C. E. Hoyt, 140 South Dearborn Street, Chicago, the first number of an eight-page bulletin which is designed to keep the members informed on association activities, to report committee progress and furnish abstracts of current foundry literature. Announcement is made of the election of Robert E. Kennedy, formerly foundry superintendent of the University of Illinois, as assistant secretary. He will act as chairman of the committee on papers and as secretary of all technical committees. Mr. Kennedy is at present in charge of the sand research work of the association. It is announced also that by an arrangement for exchange of papers with the Institution of British Foundrymen, George K. Elliott, chief metallurgical engineer of the Lunkenheimer Co., Cincinnati, has prepared a paper for the annual meeting of the British association, and F. J. Cook, of Rudge & Littley, Ltd., West Bromwich, Staffordshire, will prepare a paper for the next meeting of the American Foundrymen's Association.

The American Pig Iron Association will hold its monthly meeting in Philadelphia on Friday, Sept. 23. After the usual business session the members will be guests of the Alan Wood Iron & Steel Co. at a nearby golf club.

The Truscon Steel Co., Youngstown, Ohio, has received an order for one of its standard steel buildings, to be 80 x 200 ft., to be erected at Beirut, Syria.

PERSONAL

William Chambers, representative of the National Service Corporation, Chicago, and affectionately known as "Uncle Billy" throughout the foundry and foundry supply trade, is recovering from a serious illness at the Presbyterian Hospital, Chicago. He is one of the oldest salesmen in the foundry field.

George P. Hansen has been appointed superintendent of blast furnaces for the American Rollling Mill Co. at Columbus. He was formerly in charge of blast furnaces at the Republic Iron & Steel Co., Youngstown.

Gus F. Ziv, formerly manager of the Chicago branch of A. Milne & Co., announces entry into business for himself as president and treasurer of the Ziv Steel & Wire Co., 4423 West Kinzie Street, Chicago. The company will engage in handling tool and solid drill steel, including hollow drill steel made in Sweden. Norman J. Hyslip has been appointed general sales manager.

Walter Price, Eastern sales manager of the Pawling & Harnischfeger Co., Milwaukee, Wis., manufacturer of electric cranes, hoists and excavators, severed connections with the company Sept. 1, to engage in his own business as an agent for Ford cars in Philadelphia. He has been associated with the Pawling & Harnischfeger Co. for more than 19 years, the greater portion of this time in charge of the Philadelphia office. During the past few years he has been manager of both the Philadelphia and New York offices. He is succeeded by T. E. Gallagher, formerly erecting engineer of the company.

Hugh E. Myers has resigned as chemist with the United Engineering & Foundry Co., Pittsburgh, after 24 years' service and will make an extended tour across the continent.

The appointment of Henry C. Morris, Washington, to head the new fuel division of the Bureau of Foreign and Domestic Commerce, has been announced by the Department of Commerce. He is a graduate of the Massachusetts Institute of Technology. He has had experience as a mining engineer in Colorado, Nevada, California, and in examination work in Mexico, Canada, and Missouri. In 1917 entered the Fuel Administration as a mining engineer, serving until May, 1918, when he was transferred to Bureau of Mines where work included membership on the Capital Issues Advisory Committee and related applications and on the War Minerals Investigation. He was nominated by Secretary Lane as representative of the Bureau of Mines on the economic liaison committee at its inception and served continuously until his resignation, June 1, 1920.

Paul A. Billings has been appointed district sales manager in Michigan and Toledo, Ohio, by the Falcon Steel Co., Niles, Ohio. Mr. Billings will be located at 2306 Dime Bank Building, Detroit.

Walter Graham, who in the war period made investigations for the United States Fuel Administration and the Ordnance Department of the Army, and has also done research work for the Bureau of Standards and the Tariff Commission, is now connected with the Technical Credit Association, 2 Rector Street, New York. It is announced that investigations will be made in chemical, mining, mechanical, metallurgical and other lines.

C. B. Cole has opened a consulting engineer's office at 546 West Washington Boulevard, Chicago, specializing on tools, gages, interchangeable manufacture and inspection systems.

A. G. Sherman, Detroit Vapor Stove Co., at a meeting of the Detroit chapter of the Society of Industrial Engineers, was elected president of the chapter for the ensuing year. F. C. Shafer, Penberthy Injector Co., was elected treasurer.

Chairman John A. Topping of the Republic Iron & Steel Co. is spending September in Canada.

Ross R. Harrison has been made assistant general manager of the Manufacturers Iron & Steel Co., New Brunswick, N. J. The company operates the Neverslip Works at New Brunswick, the Canadian Neverslip Works at Montreal and the Bryden Horseshoe Works at Catasauqua, Pa.

Chairman E. H. Gary of the United States Steel Corporation has gone to Mexico on a vacation trip.

Harry W. Bishop, Jr., who was with LaBelle Iron Works sales department for 10 years and later connected with the Pittsburgh office of the Wheeling Steel Products Co., has become associated with the sales department of the Superior Pipe Co., Pittsburgh, mills of which are at Columbia, Pa.

E. W. Pelton, manufacturing superintendent of the Stanley Works, New Britain, Conn., has recovered from an operation for appendicitis and has returned to his desk.

John B. Smiley, president Poldi Steel Corporation of America, will sail for a two months' stay in Europe on Sept. 20.

Laird Park of the pig iron firm of Park & Williams, Real Estate Trust Building, Philadelphia, has returned from an European trip.

J. R. Stroh has been appointed manager of traffic and mining operations of the Brier Hill Steel Co., Youngstown, Ohio, owing to the retirement of C. H. Haynes as traffic manager. Heretofore Mr. Stroh has been in charge of the mining department.

F. R. Eldridge, Jr., general manager of the Far Eastern Division, Department of Commerce, who accompanies the San Francisco Chamber of Commerce party on a tour to the Orient, sailing from San Francisco on Oct. 1, will make an extended visit to India after the tour of Japan, China, the Philippines and Dutch East Indies. Manufacturers and others who would have Mr. Eldridge make inquiry as to the opportunities in India for trade in their particular products are asked to communicate with him at Washington.

OBITUARY

DANIEL BAKER, president Standard Lime & Stone Co., died on Aug. 8, at his home in Baltimore. He had been in declining health for more than a year. He was born in Frederick county, Maryland, in 1858, and received his education in the public school of that county, later graduating from Western Maryland College. Mr. Baker began his business career as a clerk in a country store. Later he became associated with the business conducted by his father under the name of Daniel Baker & Sons. He continued with that business until 1888 when, with his brothers, William G. and Joseph D. Baker, he organized the Standard Lime & Stone Co. About a year later the brothers organized the Washington Building Lime Co., of which he was president. He also was a director in numerous financial and charitable institutions.

CHARLES H. FOOTE, well known in the steel trade as an officer of the Illinois Steel Co. for a number of years, died Aug. 28 at Burlington, Vt., aged 79 years. Mr. Foote was first vice-president of the Illinois Steel Co. under the John W. Gates régime in the late eighteen-nineties, and had the same connection after the company was taken over by the Federal Steel Co. He was also first vice-president in the early years of the Steel Corporation. His brother, F. H. Foote, was blast furnace manager at South Chicago during a portion of his incumbency. Charles H. Foote was one of the organizers of the Pocahontas Coal & Coke Co., and after the organization of the United States Steel Corporation was president of its Southwest Connellsville Coal & Coke Co. and the Eureka Fuel Co. Mr. Foote leaves two daughters and a son, Thomas W. Foote of Cleveland.

FRANK B. BLAUVELT, vice-president R. K. Carter & Co., New York, iron and steel purchasing agents, died Aug. 31 at Bretton Hall Hotel, that city, at the age of 59. He was born in New York and entered the employ of the Carter company at the age of 12.

JAPANESE INQUIRY GOOD

Tin Plate, Structural Steel, Sheets and Rails Specified—German Ferromanganese at $57, Atlantic Port

NEW YORK, Sept. 6.—Small orders for various kinds of material are reported from South American markets and Japanese purchases continue on about the same level as for some time, neither increasing nor decreasing in their total. Competition from German bidders continues a phase of the South American markets. One exporter in New York, quoting on railroad material for Equador, recently received two small turnouts at about $250 each, but lost the rail portion of the order calling for 5 kilometers of 55-lb. rails, to a German mill. German manufacturers, however, are apparently filling up their books rapidly.

It is reported that German mills are referring foreign orders for gas and water pipe to the United States, claiming that they are unable to quote prices in competition with the American mills. The representative in this country of a large German interest recently received notice that no deliveries on locomotives of any type could be promised under nine months. According to the American commercial attache at Buenos Aires, Argentine, although German competition is keenly felt there in small manufactured articles, they are less effective in bidding on locomotives, machinery and rails. German ferromanganese, 76 to 80 per cent, can be put down on the Atlantic seaboard at a price probably better than 4930 m. (about $57, with the mark equal to 1.15c.). A New York export house during the past two months has placed about $200,000 worth of business in Europe for delivery to its foreign customers.

Inquiries from Japan, although steady, have been rather light lately, particularly in structural material and heavy sheets. There has been some activity in tin plate of oil can size and weight and black sheets as heavy as No. 18 gage, but chiefly up to No. 31 gage, as well as light tonnages of steel bars and light and medium weight rails. A Japanese export house recently booked an order for a total of 700 base boxes of oil can tin plate and another exporter with an inquiry for 1000 base boxes of tin plate approached an independent mill, which refused to accept the order as it had just booked a 9000-box order from the Orient. An inquiry still pending from Japan calls for about 4000 tons of 60-lb. rails and there is a tender, bids on which will be opened in Japan about Sept. 9, which specifies 610 transmission towers involving about 2500 tons of structural material for the Tokio Electric Light Co., Tokio. A bridge inquiry on which bids were recently submitted totals about 650 tons of structural steel. A Japanese contracting company has issued an inquiry for about 1800 tons of 60-lb. rails and a few black sheets of light gage, the order, later to be increased to about 2500 tons. The rails are for an extension to a Japanese railroad line, for which this company received the contract, but a credit basis of part payment and the balance on notes of the company, to be paid when the contract is completed, is requested.

The recent reduction of Swedish prices by about 20 per cent has brought quotations on Swedish iron down to a point where it can be put down in New York, duty paid for about 6c. per lb., and probably a lower price on a large tonnage. High-speed steel of Swedish make is still maintained at from 90c. to $1.15 per lb., depending upon the quality. There is evidently an effort on the part of importers of foreign steel, particularly high-speed steel and other high-grade materials, to maintain the American domestic price pending the settlement of the tariff.

ASK RATE REDUCTIONS

Eastern Pig Iron Manufacturers Petition for Relief from High Freight Rates

Eastern manufacturers of pig iron, principally those in eastern Pennsylvania, but including also a few New York and New Jersey furnaces, have made a joint appeal to the Traffic Executive Committee, Eastern Territory, Trunk Line Association, 143 Liberty Street, New York, for relief from present high railroad freight rates on iron ore, coke, limestone, etc. It is stated that transportation costs for assembling raw materials to make one ton of pig iron are to-day $14.50 for Eastern furnaces, which is approximately 70 per cent of present selling prices, whereas in 1914, when iron sold for $14 a ton, transportation charges for assembling materials for a ton of iron were only $7, or 50 per cent of the selling price. It is stated that present railroad rates are higher than the industry can stand in view of the trend of market prices downward during the past several months. A hearing on the petition will probably be held about Sept. 15. It reads as follows:

As manufacturers of pig iron, operating blast furnaces in Eastern territory, we hereby request your committee to give prompt and favorable consideration to a reduction in transportation charges on the raw materials used in furnace operations, viz.: iron ore, bituminous coal, coke, limestone and dolomite.

We are moved to make this request under the conviction that a substantial reduction is absolutely necessary to permit the operation of the furnaces, and is the prerequisite to a return to activity in pig iron production, which is the basis of the iron and steel industry. Operations at the present time and for several months past have been on a very low level and many plants have suspended entirely.

Liquidation in both labor and prices has progressed to a marked degree. Labor rates have been reduced 40 to 45 per cent from the maximum and tonnage wage rates proportionately. In this respect we have gone much farther than other industries, and yet our cost of production is nowhere near matching up with the price that we obtain. Prices have declined from $30 to $50 per ton prevailing three or four years ago, and in more recent times to to-day's prices of $18 to $20 per ton; and during the period that this decline in the price of pig iron has taken place transportation charges have correspondingly increased, so that we now find ourselves burdened with an abnormally high and prohibitive freight level.

The extent to which the present high cost of transportation affects existing conditions will be apparent to your committee from the fact that in 1914 pig iron was made and sold at $14 per ton delivered, and the furnaces were able to operate. At that time freight assembling costs were about $7 per ton, or 50 per cent of the selling price, whereas to-day transportation charges alone on materials necessary to produce one ton of pig iron (including rail haul on ore from mines to lake port, water and rail transportation to furnaces) and delivery charge amount, in a representative case, to approximately $14.50 per ton, or over 70 per cent of the current pig iron price, leaving less than 30 per cent of the selling price to cover the cost of the ore, coke and other raw materials, as well as labor and general manufacturing expenses.

Freight charges on the commodities we use have advanced since 1917 from 55 per cent in case of iron ore to over 100 per cent on fire brick, with total advance since 1914 of over 100 per cent. The transportation charges alone on inbound raw materials required for a ton of pig iron are to-day greater than the selling price of pig iron in Belgium, and with the prevailing low ocean rates we are confronted with competition from that source which menaces our ability to operate and may result in the extinction of heavy tonnages of raw materials that yield large revenues to the railroads.

The raw materials used in the manufacture of pig iron are low grade commodities. They are transported by the carriers in great bulk and generally in trainload lots, with minimum liability as to loss and damage, all of which tend to low operating costs. Furthermore, the considerable changes that have taken place in our industry have thrown out of all proportion what might be regarded as a normal ratio between prices and transportation charges on the commodities on which we are seeking reductions, and it is quite apparent to us that the rates now in effect are greater than the traffic can bear and certainly higher than the industry can stand. We are all aware that there must be liquidation and we firmly believe that the steel industry, in both labor and selling price, when considering the value of the dollar to-day as compared to its pre-war value, has been fully liquidated. Surely transportation charges must undergo the same process.

Under these conditions we are compelled to ask relief, and we respectfully urge your immediate consideration of the question so vital to us and of no little importance to the welfare of the railroads as well.

Detroit's Back to Normal Convention

The Detroit committee on arrangements for the "Back to Normal" credit convention of the Motor Accessory Manufacturers Association, soon to be held in Detroit, will consist of C. W. Dickerson, vice-president Timkin-Detroit Axle Co., chairman; E. R. Ailes, treasurer Detroit Steel Products Co.; M. A. Moynihan, secretary Gemmer Mfg. Co.; William Hendrie, secretary Detoit Gear & Machine Co., and Thomas M. Simpson, credit manager Continental Motors Corporation.

British Iron and Steel Market

Continental Price Margin Narrowing—British Steel Again Competitive—Demand Improving Slightly

(By Cable)

LONDON, ENGLAND, Sept. 6.

There has been no further increase in the production of Cleveland pig iron, but it is anticipated that three more furnaces will be blowing within a few days. Increased interest is being shown in foundry iron, but prices are still too high, and supplies of No. 3 G. M. B. are practically unobtainable. No. 4 foundry iron may be had in fair quantities and prices are easier.

Hematite position is improving. Six furnaces are now blowing, but makers generally are awaiting the advent of cheaper fuel before making a general resumption of activity. Home demand is increasing. East Coast mixed numbers have been reduced. Foreign ore is quiet and it is difficult to name an exact price, owing to the various freights ruling. Nominal quotations on Bilbao Rubio are 27½s. to 28½s. ($5.09 to $5.27) ex-ship Tees.

British semi-finished steel is now competing with that from the Continent. Welsh sheet bars have been sold at £7 7½s. ($27.29) delivered, and British 2-in. billets are being done at £7 10s. ($27.75) delivered Midlands. Belgium is now quoting billets at £6 15s. ($24.97) f.o.b.; sheet bars at £6 15s. f.o.b. German works are full up to the end of the year and are not now quoting.

Continental finished steel prices are also hardening. Belgian merchant bars are being sold at £8 10s. (1.40c. per lb.) f.o.b., and £8 15s. (1.45c. per lb.) is now being asked. German plates are being done at £9 (1.49c. per lb.) c.i.f. Bombay, and £9 5s. (1.53c. per lb.) c.i.f. is now quoted. German merchant bars of rod sizes are being done at £9 12½s. (1.59c. per lb.) f.o.b. Ordinary sizes are quoted up to £8 15s. (1.45c. per lb.) f.o.b., for December delivery.

British home trade quotations are unchanged, but export figures are generally easier. Demand is showing signs of slight improvement.

Tin plates are quiet and easier. For prompt delivery, 23s. basis ($4.25) is quoted f.o.b. December, and January call for 22s. ($4.07) f.o.b. The Far East is still buying fairly steadily, but other markets are dull. Stocks of wasters are becoming scarce. Sellers of 28 by 20 in. are asking 39½s. ($7.31) f.o.b. Quarter wasters are nominally 16s. ($2.96) f.o.b.

Galvanized sheets are weaker There is some inquiry, but business is done only in meager parcels. Black sheet quotations have been reduced in hopes of attracting buyers, but the Continent is under-cutting in thick gages. Demand from the Far East has fallen off.

We quote per gross ton except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.70 per £1 as follows:

Durham coke, delivered...	£1	15						$6.47		
Cleveland basic	7	7½	&	7	10*			27.29	&	$27.75
Cleveland No. 1 foundry...	7	0						25.90		
Cleveland No. 3 foundry...	6	15						24.97		
Cleveland No. 4 foundry...	6	5						23.12		
Cleveland No. 4 forge.....	5	17½						21.74		
Hematite	7	0*						25.90		
East Coast mixed.....	7	0						25.90		
Ferromanganese	18	0	&	14	10*			66.60	&	53.65
Rails, 60 lb. and up.....	10	0	to	14	0			37.00	to	51.80
Billets	7	10	to	8	0			27.75	to	29.60
Sheet and tin plate bars, Welsh	8	0	to	8	10			29.60	to	31.45
Tin plate base box.....	1	2	to	1	3			4.07	to	4.25
								C. per Lb.		
Ship plates	13	0	to	14	0			2.15	to	2.31
Boiler plates	18	0	to	19	0			2.97	to	3.14
Tees	13	0	to	14	10			2.15	to	2.39
Channels	12	5	to	13	15			2.02	to	2.27
Beams	12	0	to	13	10			1.98	to	2.23
Round bars, ¾ to 3 in.....	12	0	to	12	10			1 98	to	2.06
Galvanized sheets, 24 g....	20	0	to	20	10			3.30	to	3.39
Black sheets	16	0						2.64		
Steel hoops	17	0						2.81		
Cold rolled steel strip, 20 g.	26	10						4.38		

*Export price.

Prices Being Gradually Reduced—Resumption in Blast Furnaces Slow

LONDON, ENGLAND, Aug. 25.—The situation does not show much improvement. Economic conditions are at last being more clearly recognized by most sections of the community and that is at least a step in the right direction. Wage earners see the advantage of a low wage in preference to none at all, and the general tendency of prices is towards that low level without which no revival in trade is possible. A hopeful feature is the downward tendency of fuel prices. This has already made marked progress, and "slack" has been offered in certain directions at 21s compared with fully 52s last year.

In iron and steel, the resumption of pig iron production has been slow, but more furnaces are gradually being put into operation. In the Cleveland district about 15 are now working, but some of these are producing pig iron for certain steel works and not for the open market. Durham coke is now obtainable at 30s at the ovens, but the ironmasters apparently do not see their way yet to any wholesale reductions in pig iron prices. There is little demand, however, and when supplies of No. 3 foundry are wanted, producers ask the buyers to take an equal quantity of No. 4 foundry. For this mixture they ask a price of 132s 6d per ton, while No. 4 foundry alone is obtainable at 125s. As these figures are above continental rates, the latter iron must continue to be imported. Hematite shows little change, but makers seem to have sold fairly well, and are firmer for export which is now quoted at 155s with the home trade at 160s. The production of pig iron last month was 10,200 tons against 750,600 tons in July of last year.

In finished iron and steel, trade improves only very gradually and makers are realizing the necessity of cutting their prices. At the end of last week steel manufacturers in Scotland and the north east of England reduced the home trade quotations of steel generally by 20s per ton, while for export they appear to be willing to book business at lower figures. There is a general disposition on the part of buyers to hold off however until the market has stabilized itself.

A gratifying feature has been the settlement of the disastrous ship joiners' strike. An arrangement has been made under which there will be an immediate reduction of 6s per week and one of 3s in October, while in December another 3s reduction will be considered. The strike has lasted since the beginning of December last, and had its origin in the proposed withdrawal of the 12s a week bonus granted in the Spring of last year. The strike has been a most unfortunate one having retarded ship building and driven much repair work out of the country.

The Commercial Shearing & Stamping Co., Youngstown, Ohio, has completed a new plant for the production of steel stampings and shearings with a capacity of 3500 tons per month. It is located on a site of 13 1/2 acres. This plant is now producing shearings of plates and blue annealed sheets, cut to size, sketch or design. The products of the plant include steel parts pressed cold up to 1/2-in. in thickness and to dimensions of 48 1/2-in. wide and 120-in. in length, some for the automotive and agricultural implement trades.

The new fabricating plant and warehouse recently completed by the Fred A. Tarrier Co., Columbus, Ohio, is now in full operation. The plant has a capacity of 20 tons of fabricated steel daily and a large stock of steel bars and structural shapes is carried in stock. The company has plans in contemplation for the erection of a new fabricating shop, 60 ft. x 300 ft., but it is not expected that anything will be done on it until next year.

IRON AND INDUSTRIAL STOCKS

Lessening of Liquidation Caused Prices to Turn Upward Last Week

A change for the better is noted in the market for iron and industrial stocks. Higher prices for securities presumably are not due so much to any material increase in investment buying as they are to a lessening of liquidation. The sharp upturn in the raw cotton market has been a contributing factor as well to the better market for securities. Further cuts in prices quoted for automobiles the past week were far less unsettling than when initial reductions were announced. Reports of softness in the market for certain steel products likewise are less disturbing than heretofore, presumably because more people believe a turn for the better has come in the consumption. Certain it is the consumption of copper metal is on the mend and the strength of lead suggests a larger demand for that metal. The proposed reduction in freight rates on iron and steel products from eastern manufacturing points to the Pacific coast is generally construed as constructive. The decrease in the number of idle freight cars is reassuring. While available funds are by no means plentiful, the money situation continues to gradually improve.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis Chalm. com.	29½ - 32¾	Lack. Steel	37 - 39
Allis-Chalm. pf.. ..	- 71	Midvale Steel ...	23 - 24¼
Am. Can com...	25½ - 26⅞	Nat.-Acme	14 - 14½
Am. Can pf.....	79¾ - 81	Nat. E. & S. com.	31¼ - 33⅞
Am. C. & F. com.	122 -125¾	N. Y. Air Brake.	48⅝ - 51
Am. Loco. com..	84¾ - 87½	Nova Scotia Steel	24¼ - 25
Am. Rad. com...	67¾ - 68½	Pittsburgh Stl. pf ..	- 79
Am. Stl. F. com.	22 - 24	Pressed Stl. com.	51 - 53¼
Am. Stl. F. pf... ..	- 80	Ry. Stl. Spg. com.	75½ - 80
Bald. Loco. com.	74½ - 79	Replogle Steel ..	20 - 25
Beth. Stl. Cl. B..	47¾ - 50¾	Republic com. ..	45 - 47⅜
Beth. Stl. 8% pf. ..	- 98	Republic pf.	81 - 83
Chic. Pneu. Tool	47¾ - 48	Sloss com.	32⅞ - 35
Col. Fuel	22⅝ - 24¾	Trans.-Williams.. ..	- 31
Cruc. Steel com..	54 - 57½	U. S. Pipe com..	12¼ - 14
Cruc. Steel pf...	79½ - 80	U. S. Pipe pf....	41 - 42
Gen. Electric ...	118½ -125	U. S. Steel com.	73¼ - 76
Gt. N. Ore Cert..	27¾ - 29	U. S. Steel pf....	109 -109¼
Gulf States Steel	31¾ - 33¼	Vanadium Steel .	27 - 31½
Int. Har. com...	72 - 77	Va. I. C. & Coke ..	63
Int. Har. pf.....	100 -101	West'ghouse Elec.	42 - 44

Industrial Finance

The United States Auto Gearshift Co. of Eau Claire, Wis., manufacturer of hydraulic gearshifting devices for motor vehicles, has filed a voluntary petition in bankruptcy. Schedules reveal liabilities of $278,424.45 and assets of $749,258.42.

Creditors of the Ogren Motor Car Co., 674-702 National Avenue, Milwaukee, manufacturer of passenger automobiles, have assumed charge of the affairs. Informal statements by Clarence J. Richards, 425 East Water Street, attorney for the company, admit liabilities of $125,000 and claim assets of $150,000.

Owing to unsatisfactory earnings, further curtailment or abandonment of dividends on common stock by iron and steel producers in the Mahoning Valley is predicted. For the second quarter, the Youngstown Sheet & Tube Co. paid 50c. per share on its junior issue, while the Trumbull Steel Co. declared 15c. per share. The common dividend was omitted by the Brier Hill Steel Co. and Sharon Steel Hoop Co.

An involuntary petition in bankruptcy recently was filed in the United States court in Pittsburgh against the Sligo Iron & Steel Co., Connellsville, Pa., by the McCairns Foundry Co. which has a claim of $58.33, the Connellsville Machine & Car Supply Co., with a claim of $683.42, and the First National Bank, Greensburg, Pa., on a note for $7,267.68.

A voluntary petition in bankruptcy recently was filed in the United States court, Pittsburgh, by the West Penn Fuel Co. Liabilities were listed at $260,629 and assets at $400,645, of which the principal amount, $394,228, represents debts due on open accounts.

The report of the Canadian Locomotive Co., Kingston, Ont., for the year ended June 30 last makes, as far as earnings are concerned, a very favorable showing, but like some other Canadian industries, the outlook for the current year is not as good as it might be, according to Aemilius Jarvis, chairman of the board of directors, who proceeded as follows: "Net profits for the year were $767,891, which the addition of interest from the company's investments of $59,200 brought up to a total of $827,091. Deductions from this were $90,900 for bond interest, $125,000 for depreciation, the same amount was so appropriated in the previous year, and $6,800 writing down of investments to market value, making total appropriations of $221,800, leaving $605,291 to be added to credit balance of $1,210,983, bringing the total up to $1,816,275. Of this, sinking fund provisions total $15,000 and stock dividends $265,000 or a total of $280,000 in all, leaving a credit balance to carry forward of $1,536,275.

A special stockholders' meeting of Peck, Stow & Wilcox Co., Southington, Conn., small tools, etc., has been called for Sept. 23, to act on a motion to authorize an increase in the capital from $1,500,000 to $2,000,000.

Gross earnings of the Colorado Fuel & Iron Co. for the three months ended June 30, last, were about half those for the corresponding period last year: $7,990,093, as against $14,239,347. Net earnings for the quarter amounted to $682,490, contrasted with $2,130,273 last year. After interest charges, taxes, depreciation, etc., there was a deficit of $273,752. In the corresponding quarter last year there was a surplus of $1,162,571.

The Union Tool Co., Orange, Mass., of which Emory E. Ellis is president and treasurer, has voted to issue 3000 shares of 8 per cent cumulative preferred stock, par $100.

Bankers announce that the recent issue of $3,000,000 8 per cent first mortgage Keystone Steel & Wire Co. sinking fund bonds, recently offered for public subscription, have been sold.

Arrangements have been made for the purchase and retirement of 80,000 shares Motor Products Corporation capital stock at $50 a share. Each shareholder has the right for a period of 14 days from Aug. 23, to sell to the corporation his pro rata of stock, not exceeding 40 per cent, deposit of same to be made with the Empire Trust Co., New York.

The operating net earnings of the Todd Shipyards Corporation for the year ended March 31 last, amounted to $7,359,444, contrasted with $15,224,630 for the previous year, and $12,292,767 for the year before that. Net profits were $3,094,327, $6,617,139 and $1,134,582, respectively, while dividends paid in those three years were $1,540,502, $794,198 and $667,673, respectively. The company ended the past year with a surplus of $1,553,824, whereas the surplus for the previous year was $5,822,941, and for the year before that $456,909.

A receiver has been appointed for the Composite Metal Lath Co., Hobart, Ind. The plant of the company was only recently constructed.

The Valley Forge Steel & Tool Co., 118 North La Salle Street, Chicago, has increased its capital stock from $12,000 to $20,000.

The Ireland & Matthews Mfg. Co., Detroit, manufacturer of automobile parts, mostly metal stampings, announces that it will increase its capital stock by $700,000. The company was organized in 1889 with a capital of $30,000. At present a total of $2,000,000 worth of products is being manufactured annually. The new issue is to provide for greater facilities and the development of several new products.

Walden-Worcester, Inc., to Be Reorganized

The business of Walden-Worcester, Inc., Worcester, Mass., manufacturer of wrenches, will be reorganized under the ownership of a new corporation of which J. Verner Critchley, founder of the Critchley Machine Co., will be president and Warren S. Bellows, formerly general manager of the Walden-Worcester, Inc., general sales manager. The new board of directors will represent the interests of the stockholders of the old company as well as the bank and merchandise creditors. Under an arrangement with the creditors it is believed the company's indebtedness will be paid in full and a going business left in prosperous shape.

The business has been operating under the management of receivers for almost a year, and much of the time has been running on a normal basis of production, a condition which still continues. The details of the new corporation will not be settled until the claims of creditors have been turned in to the depository, and an order of sale secured from the court which appointed the receivers.

Sharp Decline in Earnings

Although production generally increased in the plants of the Lake Superior Corporation, Sault Ste. Marie Ont. during the year ending June 30, last, conditions developed, especially in the last half of the fiscal year, which resulted in a large reduction in the net earnings from operations of subsidiary companies. These earnings in the annual report just sent to the shareholders are shown to be $1,541,293, compared with $3,722,152 in the previous year. "Your directors very much regret," stated President Wilfred H. Cunningham, "that results for the fiscal year, together with the requirements of the Steel Corporation and other subsidiary companies, prohibit the payment of interest on the income bonds."

Machinery Markets and News of the Works

BUILDERS RESUMING

Attractive Orders Have Enabled Some Plants to Re-Open for Three Months

Automotive Industry Improving—Used Tools in Good Demand

The encouraging features of the week are the re-opening of some of the Middle Western shops and the improvement among the automotive industries. One plant in the Cincinnati district has secured an order for special machinery which will take three months to complete, thereby causing the shops to be reopened and 400 men to be put to work. Another shop was scheduled to resume with 50 per cent of its force Sept. 6 because of a new order for 60 machines for several railroad shops. According to the report of the Seventh Federal Reserve district both the passenger automobile industry (eliminating the biggest producers of low-priced cars) and the farm implement business operated in July, 1921, at about 60 per cent of the capacity of the same month the year before. New England reports that the automotive fields furnish the chief source of buying.

Small shops are buying more than the larger plants, taking the cheaper types and often trading in old machinery in part payment for new. In some centers used tools are more active than new, particularly in New England. There a dealer sold 24 tools during the week, 19 of which were second hand.

The Chicago, Rock Island & Pacific Railroad inquiry for about 10 tools is the only new railroad asking of importance. The city of Lynn, Mass., bought 13 tools, 10 of which were lathes, from a Boston concern. At an auction sale of machines of the Burgess Co. & Curtis, aeroplane manufacturers, Marblehead, Mass., on Sept. 1 prices made were comparatively low, but much higher than those at the last previous auction sale in that district.

Formal price reductions include: Ten per cent on a popular line of riveting machines; 15 per cent on a Cincinnati line of grinding machines; 15 per cent by a St. Louis manufacturer of upright drilling and milling machines.

Inquiries have come from the following foreign districts: England, South Africa, Australia, Japan and Mexico. A Cincinnati builder was asked to quote by a New York exporting house which is rumored to represent a syndicate which was recently authorized to develop important resources abroad. It is said that the syndicate will secure bids on $100,000,000 worth of various equipment.

New York

NEW YORK, SEPT. 5.

Though there is but little change in the machine-tool situation the tendency is toward optimism, based on more inquiry and the revival of feelers on propositions which have long laid dormant while prospective purchasers awaited lower prices. Buyers are very thorough in their shopping, spreading inquiries broadcast. As an example, one New York representative received an inquiry for a certain tool from four different sources, which at casual glance would appear to be a demand for four machines, but which he recognized as being for but one. The New York Central is in the market for two engine lathes and one drill press for its shops at Avis, Pa. The Department of Education, New York, is expected to buy considerable equipment this month, including small lathes and milling machines.

The crane market shows but slight change from the preceding weeks. Buyers have little inclination to place orders and several inquiries that have been in the market for some time are still pending. Specifications for the 34 gantry cranes of 3-tons capacity for the piers being erected at Stapleton, S. I., by the city of New York for the Pan American Terminal & Dock Co., have been issued. Bidders are required to deposit $25 for blue prints and drawings. A tender has been issued by the New York State Barge Canal Commission, specification No. 119, calling for bids on a 3-ton burtening crane for erection at the Mott Haven terminal. George P. Coulter, 1713 Sansom Street, Philadelphia, who recently inquired for a 10-ton capacity electric crane for the American Chemical & Sugar Machinery Co., has purchased a used 10-ton crane. The Shepard Electric Crane & Hoist Co., has sold a 6½-ton, 80-ft. span electric crane with 2½-cu. yd. bucket to the Standard Wholesale Phosphate Co., Curtis Bay, Md., and a 3-ton, 21-ft. span underhung traveling crane to the Chapman Valve Co., Indian Orchard, Mass.

C. A. Carey, 247 West Sixty-fourth Street, New York, manufacturer of automobile wheels, has leased the three-story building, 50 x 100 ft., at 221-23 West Sixty-fourth Street, for a new plant. The present works will be removed to this location. C. A. Carey, Sr. and Jr., head the company.

The Air Cooling Corporation, New York, has been incorporated with a capital of $50,000 by R. Purdue, J. C. Bettinson and J. P. Broomell, 17 East Forty-second Street, to manufacture refrigerating machinery and parts.

The Perkins Machine & Foundry Co., Amsterdam, N. Y., has filed notice of change of name to the Collins Loom Works, to specialize in the manufacture of textile machinery.

The International Paper Co., 30 Broad Street, New York, has commenced preliminary construction for its new hydro-electric generating plant on the Saranac River, near Cadyville, N. Y., estimated to cost about $250,000. It will be used for paper mill operation in this section.

The Sinclair Militor Corporation, New York, has been incorporated under Delaware laws with capital of $1,100,000 to manufacture automobiles and parts. It is represented by the United States Corporation Co., 65 Cedar Street.

The Gryphon Rubber & Tire Corporation, Bailey Avenue and 192nd Street, New York, has filed plans for the erection of a two-story addition, 102 x 103 ft., to cost about $75,000. D. M. Whipple is president.

The Pennsylvania Car Co., New York, has been incorporated under Delaware laws with capital of $1,000,000 to manufacture railroad cars and equipment. The incorporators are J. H. Van Moss and James H. Durbin, New York, and L. B. Coppinger, Sharon, Pa. The company is represented by the Corporation Trust Co. of Delaware, Dover, Del.

The Northold Garage Corporation, New York, recently organized, has leased the six-story building, 50 x 100 ft., at 518-20 West 147th Street, for a new automobile service and repair works.

The Morgan Harvester Co., New York, has been incorporated under Delaware laws with capital of $11,000,000, to manufacture harvesting machinery, plows and other agricultural equipment. It is represented by the United States Corporation Co., 65 Cedar Street.

The Safety First Auto Lock Corporation, Brooklyn, has been incorporated with a capital of $250,000 under Delaware laws by Samuel L. Seider, Warner Howard and Chester Clark, Brooklyn, to manufacture special locks and locking devices. It is represented by Woodburn Martin, Georgetown, Del.

The Malcolmson Briquet Engineering Co., 39 Cortlandt Street, New York, has been merged with the St. Louis Briquette Machine Co., St. Louis, under the name of the Malcolmson Engineering & Machine Corporation. The consolidated company will manufacture roll-type briquetting presses, fluxers and other special machinery, parts, etc.

The Ambro Stores & Garage Corporation, 512 Fifth Avenue, New York, has filed plans for a three-story auto-

mobile service and repair plant, 149 x 184 ft., at 527-37 West Eighteenth Street, to cost about $150,000.

The Pyrene Mfg. Co., 17 West Forty-ninth Street, New York, manufacturer of fire extinguishers, has purchased the six-story, reinforced-concrete factory at Belmont Avenue and Peddie Street, Newark, N. J., heretofore owned and occupied by the Aluminum Goods Mfg. Co., to be used as its main works in the Eastern district. The New York plant on East Thirty-second Street will be removed to the new location. The Aluminum Goods Company will remove its plant from Newark to its main works at Manitowac, Wis.

The Florence Pipe Foundry & Machine Co., Florence, N. J., will commence the immediate erection of a new one-story forge shop and works building to cost about $25,000.

The Erie Railroad Co., 50 Church Street, New York, will install considerable mechanical equipment at its new pier to be constructed at the foot of Twelfth Street, Jersey City, N. J., estimated to cost about $1,000,000. R. C. Falconer, company address, is engineer for the work.

Fire, Aug. 28, destroyed the plant of the Rex Novelty Works, Inc., 1421 Grand Street, Hoboken, N. J., manufacturer of composition products, with loss estimated at about $150,000, including machinery.

The Monarch Mfg. Co., Jersey City, N. J., has been incorporated with a capital of $50,000 by Joseph P. Montagne, H. B. Watson and Frederick C. Henn, 665 Newark Avenue, to manufacture pumping machinery and parts.

The State Poultry Producers' Association, Vineland, N. J., has preliminary plans under way for the erection of a new cold storage and refrigerating plant.

Fire, Aug. 31, destroyed the building occupied by the Cooper Hewitt Electric Co., Adams Street, Hoboken, N. J., manufacturer of electrical equipment, with loss estimated at close to $100,000. The company was recently taken over by the General Electric Co.

The Rafter Machine Co., 579 South Grove Street, Irvington, N. J., manufacturer of marine engine parts, etc., has acquired property at Joralemon and Stephen Street, Belleville, N. J., 112 x 164 ft., for a new machine shop. Preliminary plans are being prepared.

The Ampere Boiler & Tank Co., East Orange, N. J., has filed notice of organization to manufacture boilers, tanks, etc. It is headed by Elwood B. Hendricks, 645 Springdale Avenue, East Orange, and associates. The same interests have organized the New York Zinc Co., and the New Jersey Lead Co., both to operate at Newark.

The Celluloid Co., 290 Ferry Street, Newark, will soon take bids for the erection of a new one-story works building, 73 x 210 ft., at Niagara and Wescott streets, estimated to cost about $200,000.

Philadelphia

PHILADELPHIA, SEPT. 5.

S. W. Evans & Son, 4623 Paul Street, Philadelphia, manufacturers of metal products, have awarded a contract to the William Steele & Sons Co., Sixteenth and Arch Arch Street, for an addition to their plant to cost about $125,000.

The Philadelphia Piston & Grinding Co., Philadelphia, is being organized by Harry J. and Earl J. McClees, and Harry D. Weightman, to manufacture automobile engine cylinders, pistons, etc., and operate a general repair works. The company is represented by Thomas H. McCaffrey, 1418 Walnut Street. Application for a State charter will be made Oct. 6.

The Universal Flying Machine Corporation, Philadelphia, has been incorporated under Delaware laws with capital of $50,000 by Emil Sitte and Charles Pampe, Philadelphia, to manufacture airplanes and parts. It is represented by the Capital Trust Co., Dover, Del.

The Franklin Sugar Refining Co., 125 South Orianna Street, Philadelphia, will make extensions and improvements in its power house at Reed and Meadow streets to cost about $20,000.

Ovens, boiler equipment, conveying machinery and other mechanical apparatus will be installed in the new three-story brick and steel plant, 125 x 130 ft., to be erected by the Mayer Baking Co., Sixtieth Street and Hazel Avenue, Philadelphia, estimated to cost $140,000. Contract has been let to the Wark Co., 231 South Broad Street.

Charles Wacker, 1345 West Cumberland Street, Philadelphia, manufacturer of wagons and parts, is taking bids for an addition at 1304-8 West Cumberland Street.

The J. W. Paxson Co., 1021 North Delaware Avenue, Philadelphia, Pa., manufacturer of foundry equipment, has filed plans for a new one-story building at Algon Avenue and Luzerne Street, to cost about $35,000.

The Columbia Steel Equipment Co., Third and Annsburg streets, Philadelphia, manufacturer of steel filing cabinets, etc., has acquired property, 100 x 102 ft., for the erection of an addition.

The Chamber of Commerce, Widener Building, Philadelphia, Sheridan Taylor, secretary, is in negotiations with H. P. French, representative in this country for Anthony H. G. Fokker, Holland, manufacturer of aeroplanes, for the establishment of a branch plant at Philadelphia.

L. M. Davis, 1616 Chancellor Street, Philadelphia, is taking bids for a two and three-story addition to his automobile service and repair building, 60 x 60 ft., to cost about $75,000. Ralph N. Priest, 1627 Sansom Street, is engineer.

The John A. Roebling's Sons Co., Trenton, N. J., manufacturer of wire rope and other wire products, has preliminary plans under way for a new one and two-story addition, 500 x 850 ft., for the production of copper and other wire, estimated to cost about $150,000. H. C. Tomilson is company architect.

The Read Machinery Co., Inc., 231 North George Street, York, Pa., has completed plans for a new two-story machine shop, 40 x 100 ft., to cost about $16,000.

The Harrisburg Corporation, Harrisburg, Pa., operating the plant of the Harrisburg Foundry & Machine Works, is planning to establish a department to manufacture an oil burner, known as the Wat-R-Oil Burner.

The Harrisburg Machine & Electric Welding Co., Harrisburg, Pa., is being organized by John Fox Weiss and Elmer R. Erb, Harrisburg, and associates, to manufacture machinery and parts, and operate a general repair works. Application for a State charter will be made Sept. 15.

The Pennsylvania Supply & Mfg. Co., Allentown, Pa., has been incorporated with a capital of $50,000, to manufacture metal products. Harvey L. Kuhns, Allentown, is treasurer.

Electric light and power companies, operating in Pennsylvania, have made application to the Public Service Commission, Harrisburg, for permission to issue bonds and stocks for extensions and improvements as follows: Metropolitan Edison Co., Reading, bonds, $50,000; Sayre Electric Co., Sayre, $40,500; Bradford Electric Co., Bradford, $379,000 in bonds; Penn Central Light & Power Co., Altoona, stock, $547,863; Eastern Pennsylvania Railway Co., Pottsville, bonds, $39,000; and Weisenberg Township Electric Light & Power Co., Topton, stock, $20,000.

The Susquehanna River & Western Railroad Co., New Bloomfield, Pa., is completing plans for a new local machine shop for locomotive and car repair work.

Buffalo

BUFFALO, SEPT. 5.

The Lamson Co., Boston, Mass., manufacturer of pneumatic tubes, conveying machinery, etc., has commissioned J. T. Cowley, Lowell, Mass., architect and engineer, to prepare plans for its new works at Eastwood, near Syracuse, N. Y., estimated to cost close to $1,000,000. The company will remove its plant at Lowell, Mass., to the new location. William F. Merrill is president.

Fire, Aug. 30, destroyed a portion of the plant of the Delaney Forge & Iron Corporation, 300 Perry Street, Buffalo, with loss estimated at about $200,000.

The following electric light and power companies have filed notices of increase in capital, the proceeds to be used for plant extensions, improvements, etc.: The Hannawa Falls Water Power Co., Potsdam; from $300,000 to $1,000,000; Potsdam Electric Light & Power Co., from $22,000 to $75,000; Ogdensburg Power & Lighting Co., from $50,000 to $150,000; and the Massena Electric Light & Power Co., from $50,000 to $150,000.

The Philips Lens Corporation, Rochester, N. Y., has filed notice of change of name to the Phillips-Werth Optical Co.

The Birk-Notman Motor Co., Buffalo, has been incorporated with a capital of $75,000 by R. and F. H. Birk, and W. J. Notman, to manufacture automobile parts and equipment. The company is represented by J. P. Schaus, Curtiss Building.

The Fleman-Gilbert Motor Car Co., Syracuse, N. Y., has been incorporated with a capital of $200,000 by B. Fleman and M. Gilbert, to manufacture automobile equipment and parts. The company is represented by L. O. Grossman, attorney, Syracuse.

New England

BOSTON, SEPT. 5.

Business was spotty in the local machine-tool market the past week. Collectively, it shows considerable improvement, but more used than new tools have changed hands. The most encouraging feature is that buying the past week evidently is not a flash in the pan, for, with few exceptions,

dealers report more new inquiries and considerably more looking about the market for the purpose of getting a line on prices. Elsewhere in New England reports by dealers are not as optimistic. The most active source of inquiries at the moment appears to the automotive field. The more important machine tool houses here are banking on a few of the large industrial plants covering certain requirements this month.

One local dealer reports sales of two dozen tools this week, consisting of six used automatic screw machines, two new No. 4 screw machines, one used hand miller, three used bench milling machines and one used 14-in. lathe to a Greater Boston firm, and one used 24-in. Hendey shaper, one used 16-in. x 8-ft. Prentice lathe, one used 16-in. x 7 ft. Reed lathe, one used LeBlond milling machine, one used six-spindle drill, one new Garvin die slotting machine, one new Carter & Hakes miller, one new Automatic Machine Co. press, one used 20-in. upright drill, one used No. 2 Cincinnati universal grinding machine and one used 8-in. Boynton & Plummer shaper to various New England manufacturing interests. The J. H. Spaulding & Sons Co., North Rochester, N. H., has purchased two Gould & Eberhardt and one Hendey shaper, one 3½-in. radial drill and pipe machine, all rebuilt, part of which will be used in its New York State subsidiary plant.

W. H. J. Fitzgerald & Co., Boston, report sales of two new Standard 16-in. lathes to nearby garage interests, as well as miscellaneous equipment to local dealers. The Southworth Machine Co., Portland, Me., printing machinery, has taken Heald internal grinding machine equipment, while a Worcester, Mass., firm purchased a single grinding machine costing in the neighborhood of $3,000. The Amoskeag Mfg. Co., Boston, has closed on a 12-spindle multiple drilling machine and a 60-ton Northern crane for its Manchester, N. H., plant. Lynd-Farquhar Co., Boston, has sold to the city of Lynn, for a vocational school, the following equipment: Nine 9-in. lathes, one 14-in. lathe, one sensitive drill, one hack saw, one wet tool grinder, all standard belt driven tools, one gas furnace and chucks for the lathes.

Prices for both new and used tools sold the past week are reported as soft and in certain instances liberal terms are offered prospective customers. List prices on one popular selling line of riveting machines have been cut 10 per cent. and those on a Cincinnati line of grinding machines nearly 15 per cent.

Inquiries heretofore referred to come from outside as well as in New England. For instance, a Cleveland threading tool manufacturer is inquiring for horizontal drilling machines of the Garvin type adapted to drill ⅝-in. holes and larger, and a vertical milling machine of the Becker No. 2, No. 2A and No. 2B type, as well as vertical milling machines of the Garvin No. 20 type, only without rotary table and power feed. The same firm is looking for 18 x 24-in. plain milling machines of the Cincinnati Milling Machine Co. type and thread milling machines for short internal and external work. Canadian interests are inquiring for a shear, 72-in. between housings, with a 30-in. throat. One of the largest New England inquiries comes from St. Albans, Vt., and concerns used 5-ft. plain universal radial drills, pulley drive, and three-spindle drill presses.

Both manufacturing interests and dealers were well represented at the auction sale at the plant of the Burgess Co. & Curtis, Marblehead, Mass., aeroplanes, on Sept. 1. While prices paid were comparatively low, they were very much better than those realized at the last New England auction sale. Wood-working machinery sold at good prices, due to keen competition between Boston and New York interests. A Rivett bench precision lathe, with a 47-in. bed, sold at $337.50; a manufacturers' bench precision lathe, with a 42-in. bed, made by the same company, at $275; another with a 42-in. bed at $190; a similar tool at $150; while a bench precision milling machine, made by this firm, brought $85.

A Rahn Larmon 20-in. x 11-ft. screw cutting engine lathe changed hands at $487.50; a 16-in. x 9-ft. Greaves-Klusman screw cutting engine lathe at $300; Bilton plain milling machine, $375; Sipp quick change four-spindle sensitive drill, $237.50, and a Charles G. Allen four-spindle upright drill, $187.50. An F. E. Wells & Sons Co. tool, cutter and reamer grinder, went for $90; a Standard Machinery No. 7-6 inclinable power press, with 1½-in. stroke, $105; H. G. Barr four-spindle sensitive drill, $55; Boynton & Plummer crank and gear shaping machine, $50; Champion Blower & Forge 15-in. upright drill, $45; Grays No. 1 sheet metal cutter, $150, and a sister tool, $165. The rest of the metal-working equipment offered sold on about the same basis.

The city of Boston is erecting a four-story, 43 x 142-ft. chemical and laboratory research building on Harrison avenue, to cost $370,000.

Bids have been taken on a one-story plant, 60 x 100 ft., contemplated by the Williams & Anderson Co., 33 Broad Street, Providence, R. I., jewelry manufacturer.

Coxter's Toy Shop, Collinsville, Conn., is erecting an extension and installing new machinery in the original quarters. A furnace and forge department will be installed in the addition.

Plans are formulating for the creation of the Liberty Sales Co., an organization that will take over the manufacture of spark plugs and automobile accessories formerly produced by the Federal Corporation, Westfield, Mass., now bankrupt.

Officials of the Boston Elevated Railway Co. are again considering the erection of a machine shop in Everett, Mass. Present plans call for the construction of a foundation this fall and the erection of the superstructure in the early spring.

The Majestic Mfg. Co., 70 Commercial Street, and the Persons Mfg. Co., Worcester, have been consolidated under the name of the Persons-Majestic Mfg. Co., capitalized for $100,000 in preferred stock and 600 shares of common, no par value, to manufacture bicycle and motorcycle accessories. Charles A. Persons, 490 Salisbury Street, is president, and Frank E. Billings, 26 Wyola Drive, treasurer.

S. I. DeSimone, 365 Border Street, Boston has filed plans for a new one-story machine shop.

The Hampden Tool Co., 344 Main Street, Springfield, Mass., has awarded a contract for a new one-story shop, 40 x 90 ft. E. J. Pinney, Inc., 374 Main Street, is contractor.

A. F. Robinson, Commercial Avenue and Binney Street, Cambridge, Mass., has awarded a contract to Joslin & Landry, 161 Devonshire Street, Boston, for a new one and two-story boiler and plate shop, 95 x 195 ft., at Binney and Second streets, to cost about $50,000.

The Universal Valve Co., New Britain, Conn., has been incorporated with a capital of $25,000 by E. P. Burns, M. C. and George LeWitt, 17 Main street, to manufacture valves, fittings, etc.

Fire, Aug. 27, destroyed the plant of the United Railway Signal Co., Providence, R. I., manufacturer of railroad torpedoes and other signal apparatus, with loss reported in excess of $75,000.

The Martin Motor Co., Springfield, Mass., recently organized, is arranging for the establishment of a plant to manufacture small automobiles, consisting of a car made of aluminum and duralumin, weighing about 200 pounds. Charles J. Glidden is president, and Charles H. Martin, head of the Martin Rocking Fifth Wheel Co., is interested in the company.

The Silrose Mfg. Co., Providence, R. I., manufacturer of emblems and other metal specialties, has removed its plant from 100 Fountain Street to 44 Franklin Street for increased manufacturing facilities.

C. A. Wilson, 16 Fox Street, West Springfield, Mass., has awarded a contract to Emil Rioux, 65 Summer Avenue, Springfield, for a new one-story machine shop on Riverdale Street, West Springfield, 30 x 50 ft.

Chicago

CHICAGO, SEPT. 5.

The past week has been a quiet one, both store calls and mail inquiries being less numerous. One of the few developments of interest was the appearance of another railroad inquiry, a small list from the Chicago, Rock Island & Pacific, including a 3-in. pipe threading machine, band saw filing machine, pipe bending machine, circular saw filing machine, a D-4-A Grand Rapids drill grinder with capacity up to 4-in. drills, No. 2½ wet tool grinder with 24 x 3½-in. grinding wheel, Yankee single end wet drill grinder for grinding drills from ½ to 4-in., and a 5 WA alternating current motor-driven floor grinder with 12 x 1½-in. wheel. Aside from the Rock Island and the Santa Fe, no railroads are in the market. A large list was included in the Burlington's 1921 budget, but it is likely that action on it will be deferred until next year.

While industrial users of tools are still buying little, many are experiencing an expanding demand for their products and some are increasing their operations. The Aug. 31 report of the Seventh Federal Reserve District shows that the automotive industry is in a far better condition than was generally appreciated. The output of automobile truck manufacturers in July was 87 per cent of the production in that month a year ago. Eliminating the big-

gest producers of low-priced cars from calculations, the passenger automobile industry operated in that month at 57 per cent of the rate of production in July, 1920. The farm implement business is estimated at 57 per cent of 1920. From another source it is reported that an important manufacturer of tractors sold 1200 machines in the month of August. In view of the almost complete paralysis of that industry the first half of the year, the movement of that number of tractors is a source of encouragement. Although it is still held in well-informed circles that there can be no real revival in the farm equipment trade until a year from now, it seems plausible that this fall will at least show an improvement over the rest of 1921. Small shops are, in many cases, getting back to normal faster than the larger industries. A local manufacturer of arbor presses who was on the verge of closing down definitely a few weeks ago, is now finding it difficult to fill the orders which suddenly commenced to flow in. A further evidence of the slow, but steady revival of general business activity is the fact that building permits issued in Chicago in August exceeded the number issued in any similar period in the last seven years. Just when the change in general trade conditions will be reflected in the machine tool market cannot be forecast, but it is the opinion of some that a noticeable improvement in demand will develop before the end of this year and that by next spring trade will be normal.

Only one further change in machine tool prices has been reported the past week, a 15 per cent reduction by a St. Louis manufacturer of upright drilling and milling machines.

The Midwestern Mfg. Co., 126 South Sixteenth Street, Maywood, Ill., has been incorporated with $10,000 capital stock by Lillian Hoffman, Ode L. Rankin and Joseph Lustfield to manufacture novelties and mechanical appliances.

The Moline Plow Co., Moline, Ill., is negotiating for the taking over of the machinery and business of the Moline Engine Co., which operated the Root & Vandervoort plant in EastMoline. The machinery in the East Moline plant is being dismantled and will be removed to the tractor plant of the Moline Plow Co. in Rock Island, Ill., where it will be used for the production of tractor and automobile engines.

The Briskin Mfg. Co., 215 South Hoyne Avenue, Chicago, plans the erection of a two-story addition to its sheet metal works, 50x77 ft., to cost $25,000.

The Hercules Steel Post Co., Niles, Mich., has had plans drawn for a one-story factory, 50 x 250 ft., to cost $25,000.

The Crampton Mfg. Co., manufacturer of store fixtures, 1518 East Fifty-third Street, Chicago, has let contract for a one-story factory, 50 x 150 ft., 6900 Cottage Grove Avenue.

A. W. Zuanstrom, 2331 East Sixty-eighth Street, Chicago, is having plans prepared for a new one-story machine works and automobile repair shop, 46 x 50 ft., at 1532 East Sixty-seventh Street. E. N. Braucher, 6 North Clark Street, is architect.

Considerable electrical equipment and paper-working machinery will be installed in the new one and two-story plant to be erected by the Sewell Clapp Envelopes, Inc., 23 Desplaines Street, Chicago, estimated to cost $250,000. Contract has been let and work will be placed under way at once.

The Ideal Utilities Corporation, Homeward, Ill., has been chartered under State laws to manufacture electrically operated dish-washing machinery and other equipment for domestic service. The incorporators are Owen D. Kinsey, Willis E. Howes and Lewis U. Heller, Homeward.

Fire, Aug. 26, destroyed the automobile service and repair works of Wallace Perry, Aberdeen, S. D., with loss estimated at close to $100,000.

The Northern States Power Co., Minneapolis, Minn., is planning the construction of a new hydroelectric generating plant near St. Paul, Minn.

Ohio

The Cleveland machine-tool market shows very little change, although some dealers report an increase in inquiries for from one to three machines. As a whole sentiment has improved the past few weeks. Orders are coming almost wholly from small shops and these as a rule are reported to be buying cheaper types of machines. Many transactions are trade deals. The seller, to get an order, has to take in some old machinery and consequently cannot figure a profit until he has disposed of this used machinery.

The first signs of increased activity are expected to come from the railroads, as few industrial plants will need additional equipment even with normal operations. A local builder of drilling machines states that his company is getting virtually no orders for standard tools, but that it is making some sales of machines of special types which manufacturers are buying to replace standard equipment with a view of cutting down production costs.

Mr. DuGuay, a salesman of the Van Dorn Electric Tool Co., Cleveland, decided some time ago that if he were to continue to get orders for drills, he would have to take the drill to the work. Accordingly a bench drilling stand supporting a portable drill was attached to the running board of his automobile, as shown in the accompanying illustration.

Conditions in the Cincinnati machinery market have not materially changed the past week. Some companies report the month of August the best for the past several months and expectations are that September will show a steady improvement. A number of shops which have been closed for the past five or six weeks will reopen this week. In at least one of these, 400 men will be put to work, quite a few orders having piled up which cannot be handled from stock. This company is also reported to have secured a large list for special machinery which it will take about three months to complete. The order for 60 tools reported in last week's issue of THE IRON AGE has been confirmed and the shop booking it will reopen this week with about 50 per cent of normal force. The schedule calls for the order to be completed in three months. It is not known where the machines are destined, as shipping instructions have not yet been received. The General Motors inquiry for tools for its Dayton plants is still pending, as is an inquiry from the Imperial Japanese Navy for a number of machines, including eight engine lathes.

The past week a local manufacturer received an order for a machine from England, the first for many months. Some inquiries are coming in, however, for export, South Africa and the Far East being the principal sources. Refrigerating machinery manufacturers report the receipt of a number of orders from South Africa, Australia and Japan. Several inquiries are still pending from these countries. Some interest is also being shown in Mexico as a possible market for machine tools.

A Cincinnati manufacturer is in receipt of a communication from a New York exporting house seeking information on machine tools. The letter states that it has been retained by a syndicate, the name of which was not disclosed, to secure bids on approximately $100,000,000 worth of equipment to be exported. The intimation was given that this syndicate has received a concession from some foreign government, for development of important natural resources. It is expected that more information will be available shortly.

The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio, recently booked an order for 45 dump cars for South Africa. This order follows a number of others from China and Manchuria. Incoming inquiries, the company reports, tend to show that business is steadily increasing.

The Electric Furnace Co., Alliance, Ohio, has recently taken export orders for two electric furnaces for melting silver. One order was for a 35-kw. pit type crucible melting furnace,

similar to one installed several years ago, at the plant of the William A. Rogers Co., Ltd., Niagara Falls. The order for this furnace was placed by Mitsui & Co. for shipment to the Japanese Government. The other order came from Johnson, Matthey & Co., London, and was for a standard 50-kw. tilting type.

The Bowling Green Die & Tool Co., Bowling Green, Ohio, will add to its present line of products the manufacture of electric washing machines, designed by R. L. Swartz, superintendent of the company.

The O'Neill Engineering Co., Toledo, Ohio, has been incorporated by Frank O'Neill, Frank R. Smith and others and will establish a plant in the Factories Building, Toledo, for the manufacture of special machinery.

The Aetna Welding Co., 4613 Broadway, Cleveland, has placed a contract for a one-story welding shop, 40 x 66 ft.

Detroit

DETROIT, SEPT. 5

The Perry Mfg. Co., Inc., Argentine, Mich., has been organized to manufacture farm equipment. It is capitalized at $100,000 and is headed by W. L. Coop, engineer and manufacturer, formerly of Flint. The company has taken over the tools and equipment of the Ground Hog Tractor Co., Holly, Mich.

The Commercial Pattern & Mfg. Co., Detroit, has been organized by Ernest J. and Leo J. Rousseau and Lynn C. Beadle with a capitalization of $40,000 to manufacture metal patterns, brass and aluminum castings, etc. The headquarters are at 8772 Quincy Avenue, Detroit.

The Hercules Steel Post Co., Niles, Mich., will soon start construction on a new one story plant, 50 x 250 ft., to cost about $25,000.

The American Forging & Socket Co., Pontiac, Mich., is preparing to build a new foundry, to cost about $30,000.

The True Mfg. Co., which recently located in Eaton Rapids, Mich., plans to start construction on its new plant within 30 days.

The West Foundry Co., Wyandotte, Mich., expects to have its new foundry in production within the next 30 days. It will specialize in gray iron castings. The capacity of the plant will be about 17 tons daily.

The Hoskins Mfg. Co., Detroit, manufacturer of electric furnaces, etc., has filed plans for a one-story top addition to its plant, 60 x 190 ft. H. B. Walker is president.

The Clark Mfg. Co., Adrian, Mich., manufacturer of separators, etc., is planning to rebuild its factory, recently destroyed by fire with loss of about $18,000.

Plans for the erection of a new two-story power house are being completed by the Marquette Lumber Co., 1555 Taylor Street, N. W., Grand Rapids, Mich.

The American Accessories Co., Detroit, has been incorporated with a capital of $25,000 by Lynn C. Beadle and Ernest J. Rousseau, 8772 Quincy Avenue, to manufacture brass and aluminum castings, tools, machine parts, etc.

The Chamber of Commerce, Hillsdale, Mich., is negotiating with the Caskey-Dupree Mfg. Co., Marietta, Ohio, manufacturer of automobile equipment and accessories, relative to the establishment of a local plant.

Baltimore

BALTIMORE, SEPT. 5.

The Bull Dock Lock Washer Co., 269 South Seventh Street, Baltimore, is perfecting plans for its new factory, estimated to cost close to $50,000, including equipment. G. R. Holmes is president.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturers of sheet metal products, have filed plans for a new one-story plant, 40 x 140 ft.

Oliver B. Rutherford, 104 Dolphin Street, Baltimore, has filed plans for a new three-story plant, 28 x 60 ft., estimated to cost about $25,000, for the manufacture of automobile radiators and other metal products.

The American Ice Co., Calvert Building, Baltimore, will build a new machine and repair shop, in connection with its new two-story service building for company motor trucks, 35 x 75 ft., at 1314-20 Ridgely Street. Plans have been completed.

The Kelly Mfg. & Sales Co., 2503 West Lexington Street, Baltimore, has leased a building for the establishment of a new plant to manufacture sleds, coasting cars and other vehicles. A list of equipment is being arranged. The company was recently organized with John I. Kelly as president, and Andrew J. Kelly, vice-president and general manager.

The City Commission, Lynchburg, Va., has commissioned Lamar Lyndon, 21 Park Row, New York, consulting engineer, to prepare plans for its new municipal electric light and power plant. E. A. Beck is city manager.

The Columbia Railway & Navigation Co., Columbia, S. C., has been granted a preliminary permit for the erection of its new hydroelectric generating plant on the Santee and Cooper rivers, estimated to cost approximately $5,000,000. G. A. Guignard is president.

The Greenwood Petroleum Co., Greenwood, S. C., is planning the erection of a one-story automobile service and repair works for company cars.

Loaders, conveyors, transmission and other machinery will be installed in the new grain elevator to be erected by the Port Commission, Norfolk, Va., plans for which are being prepared. It is estimated to cost in excess of $700,000. Loading and unloading machinery, hoisting equipment, etc., will also be installed on the pier to be constructed by the commission, to cost more than $500,000.

The Norfolk & Western Railway Co., Roanoke, Va., will take bids up to Sept. 12, for double coil steel springs, wire rods, wire nails, and parts for electrical apparatus. J. H. Clemmitt is purchasing agent.

The Bristol Granite & Marble Works, Bristol, Va., has awarded a contract to the Stone Lumber Co., Bristol, for a new building, 40 x 100 ft. A traveling crane has been purchased and other equipment will be acquired. John Shirreffs, Box 317, Bristol, Tenn., is general manager in charge.

W. I. Anderson & Co., Greensboro, N. C., have completed plans for the construction of a new cold storage plant, estimated to cost about $80,000.

The L. Rosenfeld Mfg. Co., Russell and Ostend streets, Baltimore, manufacturer of utensils for dairy and ice cream plants, plans to erect a factory, 40 x 125 ft. Louis Rosenfeld is president.

The Georgia Marble Co., Tate, Ga., will install additional stone-working machinery. H. Litchfield is vice-president.

The Florida Doll Mfg. Co., Monroe Street and Peck Avenue, Fort Myers, Fla., manufacturer of toys, etc., will build an addition and install new machinery.

The Grass Fibre Pulp & Paper Co., Tampa, Fla., is establishing a plant at Leesburg, Fla., for the manufacture of paper pulp, etc. C. F. Logan is consulting engineer.

Pittsburgh

PITTSBURGH, SEPT. 5.

It is doubtful if the local trade ever before experienced a quieter week than the one past. There has been an almost complete absence of inquiries other than those which come out from time to time for estimating purposes. So little is going on that one firm here recently went over the list of projects which had been abandoned or deferred since 1919 and a letter was sent to all, naming current prices on the equipment inquired for. There was only one response to 30 or more letters sent out and this one suggested that if a lower price than quoted was made the company might be interested. Not a crane award has been reported the past week and machine-tool sales have been entirely of individual pieces from dealers' stocks. In manufacturing centers, business is almost at a standstill. It is stated that one Cleveland company has only a dozen men at work when it ordinarily employs hundreds, while another in the same city is said to have more than $2,000,000 worth of tools in stock.

The Wyckoff Drawn Steel Co., Frick Building, Pittsburgh, has plans under way for an addition to its plant at Wyckoff, Pa., one-story, 60 x 240 ft., and estimated to cost about $60,000.

The Point Motor Co., 36 Penn Avenue, Pittsburgh, has taken bids for a new three-story service and repair works, 75 x 110 ft., at Penn Avenue and Bell Alley, estimated to cost about $45,000.

The Moorhead Electric Machinery Co., Pittsburgh, is being organized by William L. Moorhead, Jr., I. R. Moorhead and M. R. Mueller, to manufacture electric equipment, machine parts for electrical apparatus and operate a general repair works. Application for a State charter will be made on Sept. 19. The company is represented by H. J. Rechterwald, 1308 Farmers' Bank Building.

The North Pole Ice Co., Carson Street, Pittsburgh, is having revised plans prepared for its new six-story cold

storage and refrigerating plant, 160 x 190 ft., at 1618 West Carson Street, estimated to cost close to $500,000 with machinery.

The United Auto Service Co., Pittsburgh, is being organized by Edward, Joseph and I. Harry Goldberg, to manufacture automobile parts and equipment, and operate a general machine works for automotive service. Application for a State charter will be made on Sept. 12. The company is represented by Frank R. S. Kaplan, 922 Frick Building.

The Ford Motor Co., Detroit, has acquired about two acres of land at Huntington, W. Va., as a site for a new assembling plant. Preliminary plans are under way. E. Vernon Carter is local manager.

The Hess Coal & Coke Co., Morgantown, W. Va., will build a new tipple at its plant, with installation of new electrical and mechanical equipment for other departments as recently announced.

The Cheylan Electric, Water & Ice Co., Chelyan, W. Va., is considering the erection of a new ice-manufacturing plant, Ernest E. Coon is secretary and treasurer.

The Motor Transport Co., Huntington, W. Va., is planning for extensions and improvements at its works, to include the installation of a new machine and repair department. W. H. Kincaid is general manager.

Indiana

INDIANAPOLIS, SEPT 5.

The Pioneer Brass Co., 418 Pennsylvania Street, Indianapolis, will soon call for bids for a new two-story machine shop, 75 x 175 ft., estimated to cost about $45,000. Charles Brossman, 1503 Merchants Bank Building, is architect.

The Central States Bridge Co., 601 Beecher Street, Indianapolis, has filed plans for a one-story shop extension.

The Knox Engineering & Mfg. Co., Roanoke, Ind., has been incorporated with a capital of 100,000 by A. L. Knox, T. K. Biggs and J. W. Menefee, Roanoke, to manufacture metal products.

The Board of School Trustees, Kendallville, Ind., has completed plans for the erection of its new power house. Improvements will also be made in the present plant.

The Board of County Commissioners, Indianapolis, will take bids until Sept. 27 for extensions and improvements in the power house at the county jail. C. S. Bark, 159 East Market Street, is architect.

Preliminary to the construction of a new plant at Torreon, Mex., for the manufacture of automobiles, the Frontenac Co., Indianapolis, is building a number of model automobiles at its plant for the Compania Automobiles Anahuac de Mexico, headed by A. P. Buquor, vice-president and general manager, and J. A. Carvel, secretary, both of El Paso, Tex. It is proposed to commence construction of the Torreon plant at an early date and have the works ready for operation shortly after the first of the year. The Frontenac Co. will manufacture parts and other equipment for the new cars.

Milwaukee

MILWAUKEE, SEPT. 5.

A gradual increase in the number of inquiries and the broader scope of their origin are the two most important developments in machine tool trade in this section. It is not so difficult to get inquiry to the stage of closing sales as it was for several months past, although it generally requires concessions to make deals. Buyers are still doing an unusual amount of shopping, and spreading a single inquiry over a relatively larger number of sellers probably gives an aspect of more activity than really exists. The time is not yet at hand when large lot buying is in prospect. Business remains limited largely to single orders for replacement or piecing out equipment. In a few shops production has made a slight advance with the recent reduction of stocks of standard machines and orders for special specifications.

The Oshkosh Tractor Co., Oshkosh, Wis., which has acquired the entire business of the LaCrosse, Wis., Tractor Co., has purchased eight acres on Harrison Street, between the main lines of the Chicago & Northwestern and Soo Line railroads, and expects to award contracts within 10 days for the construction of its new plant. Auler & Jensen, local architects, have completed plans for a main building, 150 x 500 ft., of brick and steel, with sawtooth roof of six bays, each 25 ft. wide, with a wing, 25 x 100 ft., as a motor testing room. Provision also is made for a separate power plant, 60 ft. sq., and a detached office building, 40 x 80 ft., two stories. The equipment and materials at LaCrosse are now being prepared for shipment to Oshkosh. In addition to this machinery, the company will be in the market for a considerable list of miscellaneous tools and other equipment. L. W. Melcher, factory manager at LaCrosse, will occupy the same position with the new concern.

The Safety First Automatic Signal Co., Racine, Wis., has been organized with a capital of 1,000 shares of common stock without par value, by C. C. Mortenson, A. J. Riggs and F. G. Haidle, to manufacture signal devices. A plant will be equipped in leased quarters.

The Prime Mfg. Co., 97 Wisconsin Street, Milwaukee, will build a two-story addition, 40 x 50 ft., to its main plant at 653-657 Clinton Street, to accommodate the administration department, now in separate quarters. Part of the building will also be used for laboratory purposes. The Prime company manufactures railroad supplies and brass castings. Orton L. Prime is president and general manager.

The Twin Ports Steel & Tractor Co., Superior, Wis., has changed its name to the Twin Ports Steel & Machinery Co. For some time past the manufacture of tractors has given way largely to the production of general machinery and repairs and the new title is adopted to better express the nature of its business.

George Erlinger & Co., Milwaukee, have been organized in Wisconsin with capital stock of $200,000 to succeed to the business of manufacturing mechanical specialties conducted by George Erlinger at 191-194 Milwaukee Street. The new company intends to enlarge the scope of the business to embrace the manufacture of machinery, tools and similar specialties in addition to tools, dies, jigs, fixtures, etc.

The Board of Education, Prairie du Sac, Wis., has let the general contract to Willis & Deason, Janesville, Wis., for an addition to the high school to be equipped for manual training and general vocational instruction. It will cost about $75,000. The equipment will be purchased in about 60 days.

The Drop Head Projector Co., Fond du Lac, Wis., manufacturer of portable motion picture machines, has increased its capitalization to $750,000, consisting of $700,000 common and $50,000 preferred stock. The company has been reorganized and is preparing to engage in quantity production. The contract for dies and die castings has been placed with the Doehler Die Casting Co., Chicago and Toledo.

The Board of Education, Valders, Manitowoc county, Wis., has placed the general contract for a new high school, with manual training facilities, with Hugo V. Hertling, Inc., general contractor, Manitowoc. The project involves about 125,000.

The Kiechkhefer Box Co., Milwaukee, and a member of smaller allied concerns manufacturing wooden, wirebound, fibre and composition boxes and other packages, have been reorganized into the Kiechkhefer Container Co., capitalized at $1,315,000. The main plant is at Sixteenth and Canal streets. John W. Kiechkhefer is president and general manager.

The Gulf States

BIRMINGHAM, SEPT. 5.

The Chicago, Rock Island & Pacific Railroad Co., 137 West Van Buren Street, Chicago, has awarded a contract to J. E. Nelson, 3240 South Michigan Avenue, for a new engine house and repair shop at Amarillo, Tex., estimated to cost about $50,000.

The Pitts-Noyes Co., 112 East Fifth Street, Austin, Tex., recently organized to manufacture tools, dies, etc., has acquired a local building and plans for the immediate installation of lathes, grinders, presses, and other machine tools. C. K. Noyes, secretary and treasurer, is in charge.

Potter Johnson, Crystal Springs, Miss., has plans under way for a new two-story foundry and machine shop.

Fire, Aug. 23, destroyed the plant of the Flake Graphite Corporation, Goodwater, Tex., with loss estimated at about $500,000, including refining mill, machinery, etc. Plans are under way for the immediate rebuilding of the plant.

The Planters' & Merchants' Mills Co., 200 East Fortieth Street, Austin, Tex., S. M. Ransopher, president, has preliminary plans under way for a new hydroelectric generating plant on the Guadalupe River, estimated to cost about $700,000.

Fire, Aug. 23, destroyed the power house of the Kyle Light & Power Co., Kyle, Tex. It will be rebuilt.

Reed Bingham, Pensacola, Fla., has been granted a permit for the construction of a new hydroelectric generating

plant on the Perdidio River. A branch power station is also planned on the Blackwater River. Work will be placed under way at an early date.

The A. & J. Stove Foundry, Gadsden, Ala., will soon resume operations at its plant, following a shut-down for about 24 months, and has tentative plans under way for the erection of additions.

The Burns Building Board Co., Box 1643, Tampa, Fla., recently organized, has plans under way for its proposed plant to manufacture wall board products. Joseph J. Burns is president and manager.

The National Compress Co., Waco, Tex., is planning to rebuild its cotton compressing plant at Brady, Tex., recently destroyed by fire. The new plant will cost about $125,000 with machinery. R. D. McCaskill is manager.

The McCullough Service & Mfg. Co., Tampa, Fla., recently incorporated, will operate a plant for the manufacture of automobile parts, with service and repair departments. F. L. McCullough is president, and M. G. Gibbons, treasurer.

California

SAN FRANCISCO, AUG. 31.

The past week or ten days have witnessed a considerable revival in the demand for machinery on the coast. While buying is largely confined to the smaller and low priced tools, the volume of business is said to be greater than that which has been prevailing for the last two or three months. There is still much Government and second-hand machine tools available which continue to attract the greatest attention.

The Shell Oil Co., Signal Hill, Long Beach, Cal., has filed plans for the erection of a machine shop, 52 x 75 ft.; forge shop, 52 x 60 ft.; general works building, 76 x 90 ft.; and service building for company trucks, 44 x 130 ft.

The Miller Auto Electric Mfg. Co. Los Angeles, has been incorporated with a capital of $100,000 by Robert C. Camp, Sidney G. Miller and J. F. O. Nelson, to manufacture electrical products. It is represented by L. T. Mayhew, 338 Byrne Building.

The Excelsior Water & Mining Co., Sacramento, Cal., is planning the construction of six hydroelectric generating plants to develop about 115,000-hp.

A one-story machine shop, 36 x 40 ft., will be constructed by the Golden State Woolen Mills, Long Beach, Cal., in connection with rebuilding its plant, recently destroyed by fire with loss of about 200,000.

The J. & M. Brick Co., 203 Boundary Avenue, Los Angeles, has filed notice of organization to manufacture bricks, tiles and kindred products. It is headed by D. B. Jefferies, 1818 West Forty-ninth Street, and E. K. Muller, 422 Cypress Avenue.

G. S. Eyre, Buena Vista, Cal., and associates are planning the construction of a new hydroelectric generating plant on Chalk Creek.

The Arro Plane Co., Scottdale, Cal., has been incorporated with a capital of $500,000 by O. K. Jeffery, John A. Hesse and J. D. Hill, to manufacture airplanes and parts.

The Great Basin Power Co., Walker Bank Building, Salt Lake City, Utah, has plans under way for a new hydroelectric generating plant in the vicinity of Stockmore, Utah, with initial capacity of about 10,000-kw. H. A. Srauss, company address, is engineer.

The Central South

ST. LOUIS, SEPT. 5.

The Unico Motor Products Co., 1229 West Fifty-ninth Street, Kansas City, Mo., has plans nearing completion for two one-story buildings, 60 x 224 ft. and 60 x 160 ft., respectively. The first will be equipped as a machine works for the manufacture of pistons, piston rings, etc., and the other will be used as a foundry. W. R. Alexander is head.

The Common Council, St. Charles, Mo., has commissioned Benham & Mullergren, consulting engineers, Firestone Building, Kansas City, Mo., to prepare plans for the proposed municipal electric power plant, estimated to cost about $200,000.

The Wichita Visible Pump Co., 701 Gilbert Street, Wichita, Kan., E. P. Hayes, head, manufacturer of pumping equipment, parts, etc., is planning for the erection of a new factory, estimated to cost about $60,000.

The Norton Iron Works, Ashland, Ky., is considering preliminary plans for a one-story addition to manufacture wire-fencing. T. M. Adams is president.

The Eagle Motor Truck Co., 6154 Bartmer Avenue, St. Louis, has awarded a contract to Rodinan & Son, 6063 Clemons Avenue, for the superstructure of its new one-story plant on Bartmer Avenue, 50 x 150 ft., estimated to cost $50,000. J. P. Reis is head.

The Producers' & Refiners' Corporation, Tulsa, Okla., has plans under way for the construction of a new oil refinery on a local site.

Fire, Aug. 23, destroyed the machine shops at the automobile works of Christian & Brough, Vicksburg, Miss., with loss estimated at about $65,000. It will be rebuilt.

The Charitan Coal & Coke Co., Marceline, Mo., is planning the construction of a new steel tipple.

The Clarence Automobile Co., Clarence, Mo., is having plans prepared for a new one-story machine and repair works, 100 x 140 ft., estimated to cost about $50,000, including machinery. Burgher Brothers, Hannibal, Mo., are architects. A. Burnett is head.

The Kingston Ice & Light Co., Kingston, Okla., is planning to rebuild the portion of its plant, recently destroyed by fire with loss of about $25,000.

The Lexington Utilities Co., Lexington, Ky., has completed plans for a one-story addition to its power plant. The company recently issued bonds for $560,000 for expansion.

W. B. Collins, Ketcham, Okla., and associates, are organizing a company with capital of $2,000,000 for the construction of a hydroelectric generating plant on the Grand River, estimated to cost about $1,000,000. Byron Kirkpatrick, Tulsa, Okla., is interested.

The Twentieth Century Piston Ring Co., St. Louis, has leased the building at Eighteenth Street and Cass Avenue, which will be remodeld for the manufacture of piston rings.

Canada

TORONTO, SEPT. 5.

With the passing of summer the Canadian machine tool market is expected to show improvement and dealers look for a better demand for equipment within the next few weeks. A number of tool makers have excellent exhibits at the Canadian National Exhibition, now being held in Toronto, and are making the most of the opportunity to show new and special lines of equipment and from the interest taken by the general public it would appear that better times are not far ahead. At present very little is being done in the way of building new plants or additions, and although a number of concerns are in need of equipment for replacement purposes, purchases are being held up until more favorable conditions arise. Municipal and provincial governments continue to buy for public works and this is holding up the demand for this particular line of equipment.

The general contract for the construction of an electric pumping station for Montreal has been placed with the Atlas Construction Co., Ltd., 37 Belmont Street. The city will shortly call for bids for three electric pumps of 30,000,000 gal. capacity; also electric apparatus, transformers, etc.

W. C. Durant, founder of General Motors, Ltd., in Canada, has purchased the property and buildings of the Leaside Munitions Co., Leaside, Toronto, and will install equipment for the manufacture of Durant automobiles. Plans call for a capacity of 100 finished cars a day and it is proposed to manufacture in the Dominion every important part of the car, including electrical equipment and tires. A woodworking plant will be erected for the manufacture of car bodies. The main building on the site, 130 x 640 ft., will be used as a machine shop, where all motors, axles and transmissions will be made. The building program also calls for the construction of a three-story assembling plant, 130 x 160 ft. It is expected to have the works in full operation by next March.

The Wingham Wire Co., Ltd., Hamilton, Ont., has been incorporated with a capital stock of $250,000 by James Chisholm, Thomas B. McQuesten, William G. Welby and others to manufacture wire, wire rope, cables, etc.

Dodge Brothers, Detroit, Mich., have purchased 35 acres in the town of Sandwich, Ont., where they intend to erect an assembling plant to take care of Canadian and British export trade.

NEW TRADE PUBLICATIONS

Gears.—Boston Gear Works, Norfolk Downs, Quincy, Mass. Second edition 1921 catalog. Outlines in full the entire line of gears, bearings and other material carried in stock, listing also material and new sizes not included in previous catalogs. Size 3½ x 5¾ in., 112 pages.

Conveying Machinery.—Freeman-Riff Co., Terre Haute, Ind. Bulletin No. 210. Describes the F-R, Type A, portable flight conveyor. The illustrations include line drawings of the conveyor arranged for unloading coal from car to storage shed and mounted on truck for loading coal from shed into wagons.

Crane Booms.—Pawling & Harnischfeger Co., Milwaukee, Wis. Pamphlet TX. Describes the new skimmer scoop attachment for use with the company's type 205 and 206 excavator cranes. Data and operating cost on a road grading job are given.

Air Compressors.—Bury Compressor Co., Erie, Pa. Bulletin No. 407. Size 8½ x 11 in., 20 pages. Describes the Bury direct-connected, two-stage, three-cylinder, variable-volume, motor-driven, air compressor. Contains also an abridged general catalog supplement illustrating Bury single-stage, power driven machines; two-stage, duplex power driven and vacuum pumps of various classes. Illustrations and a list of users of the Bury patented Pyramid box-plate valve is included.

Electric Furnaces.—Westinghouse Electric & Mfg. Co., electric furnaces which recently have been added to the list of products of the company, described and illustrated in catalog 9-C, just issued. This type of furnace includes the multiple unit designed for use with heats of 1800 to 2000 deg. Fahr. The small hevi-duty furnaces of the multiple crucible type may be operated continuously at 2000 deg. Fahr. Hevi-duty industrial furnaces with applications for annealing, hardening, drawing and enameling, are described in detail. A discussion of the characteristics of these furnaces also is given.

Oil Circuit Breakers.—Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., treats the application of oil circuit breakers in a 20-page pamphlet known as Special Publication 1643. This includes a complete discussion of the application of circuit breakers, together with an outline of the characteristics of several types of Westinghouse breakers.

Wiring Tables and Illumination Data.—Booklet issued by George Cutter Works, Westinghouse Electric & Mfg. Co., South Bend, Ind., contains much interesting data on wiring and lighting offices, factories, etc. Tables of foot candle intensities recommended for different classes of service, are included in this booklet, and an interesting discussion of lighting installations is given. Several new devices manufactured by the Westinghouse company are shown in the booklet.

Electric Tramrail Equipment.—Cleveland Crane & Engineering Co., Wickliffe, Ohio. Catalog No. 2. Photographs are shown of tramrail systems installed in brass foundries for various operations including the handling of molten metal, for warehouse use, coal handling, handling work in a machine shop and for use in garages and rubber plants. The system is designed for hoisting and conveying loads up to 2 tons. The line of equipment includes hand carriers of various capacities down to a maximum of 125 lb., electric carriers with or without hoists, electric hoists with hand travel, and electric carriers with hoists and platforms or open or enclosed cabs. Tramrail cranes and transfer bridges are also included in the line as well as various tramrail handling attachments and a tramrail scale.

Pneumatic Tool Accessories.—Ingersoll-Rand Co., 11 Broadway, New York, Form No. 8017, 24 pages. Illustrates and describes complete line of Little David pneumatic tool accessories, including air hose, hose couplings, hose clamp and menders, air drill chucks, rivet sets and blanks, rivet set clips and other equipment. Tables of dimensions of all rivet sets and chisels are given.

Small Tools.—Greenfield Tap and Die Corporation, Greenfield, Mass., catalogue No. 46, superseding Nos. 40 and 42, and Lincoln Twist Drill Co., catalogue Nos. 10 and 10-C. Size, 400 pages 5 x 7½ in. Comprehensive catalogue describing the small tools and pipe tools comprising the greater part of the company's product. The tools include screw plates, taps, dies, drills, reamers, milling cutters, bits, arbors, countersinks, hobs, tap and drill kits, mandrels, sleeves, sockets, stocks, tap wrenches, pipe vises and pipe wrenches. More than 70 pages of tables and other information is given for the user and designer of tools and machinery.

Oil Burners.—F. J. Ryan & Co., Philadelphia. Bulletin 1 A. Describes the Mircs Universal Burner. Illustrations include a diagrammatic photograph of the burner, and various furnace applications. Size 8 x 11 in., 4 pages.

Rivet Heating Furnace.—F. J. Ryan & Co., Philadelphia. Bulletin 2 A. Devoted to the Mircs oil-fired, portable rivet heating furnace.

Portable Air Hoist.—The Denver Rock Drill Mfg. Co., Denver, Colo. Booklet 6 x 9 in., 16 pages, describing in detail the Waughoist, model 250. The illustrations include the hoist in use in mining operations, in foundry work, in loading freight and in other operations. Sectional views of the mechanism are given. The general specifications mention the hoisting capacity as 500 to 2000 lb. at 100-lb. air pressure at vertical speed of 68 to 143 ft. per min., depending on the load.

Coal Washeries and Handling Plants.—Simon-Carves, Ltd., Manchester, England. Booklet 9 x 11 in., 56 pages. Describes and illustrates the British Baum coal washing plant, giving sectional drawings and plans of the 150 ton per hour illustration at the Penallta Colliery. Several full page photographic reproductions of installations are also given. Coal handling, crushing and storage plants, with illustrations of the units and of various installations are included. A list of installations and maps of the coalfields of England and Scotland conclude the booklet.

New Books Received

The Management of Men. By Edward L. Munson. Pages xiii + 801; 5½ x 8½ in. Published by Henry Holt & Co., 19 West Forty-fourth Street, New York.

Transactions of the American Institute of Chemical Engineers, Vol. XIII, Part 1, 1920. Pages iv + 463; 6 x 9 in. Published by the Institute and for sale by D. Van Nostrand Co., 8 Warren Street, New York.

Official Proceedings of the Eighth National Foreign Trade Convention Held at Cleveland, Ohio, May 4-7, 1921. Pages 600, 6 x 9 in. A stenographic report of the proceedings and the discussions at the 11 group sessions and the addresses at the general sessions. Issued by the secretary, India House, Hanover Square, New York.

Statistical Abstract of the United States, 1920 (Forty-third Number). Pages xix + 874, 5¾ x 9 in. Sold only by the Superintendent of Documents, Government Printing Office, Washington, D. C.

The Working of Steel. By Fred H. Colvin and K. A. Juthe. Pages 244, 6 x 9 in.; 123 illustrations. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

The Metallurgy of the Common Metals. By Leonard S. Austin. Pages xvii + 615, 6 x 9 in.; 326 illustrations. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

Text Book of Mathematics. By Esselborn. In two volumes. Pages, Vol. I, 643; Vol. II, 770; 7½ x 10½ in.; illustrations, 1578. Published by William Engelmann, Leipzig, Germany. Written in German.

The Ideal Electric & Mfg. Co., Mansfield, Ohio, has just issued a complete technical bulletin on "Synchronous Motors for Power and Power Factor Correction." All technical articles, data and descriptions were written and compiled by the chief engineer of the company, Theodore Schou. The company has also completed a bulletin on elevator motors. Both bulletins may be had for the asking.

The *Boletin de Obras Publicas*, Florida 32, Buenos Aires, one of the leading engineering periodicals in Argentina, maintains a free information service for its 6,800 subscribers, most of whom are engineers and contractors. It has been suggested that the American manufacturers of building materials, construction machinery and railroad equipment send catalogs of this class of material to the office of the publication mentioned, to be placed at the disposal of subscribers.

Practical applications of the electric arc welding process is to be discussed by E. Wanamaker, Chicago, Rock Island & Pacific Railroad, at a meeting of the Metropolitan Section of the American Welding Society to be held on Tuesday, Sept. 20, in the Engineering Societies Building, New York.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 8.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed	Per Lb.
No. 10	3.28c.
No. 12	3.33c.
No. 14	3.38c.
No. 16	3.48c.

Box Annealed—Black

	Soft Steel C. R., One Pass, Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized	Per Lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Blk.	Galv.	*Wrought Iron*	Blk.	Galv.
½ in. Butt..	—48	—32	¾ in. Butt....	—22	—4
¾ in. Butt..	—54	—39	1-1½ in. Butt.	—24	—6
1-3 in. Butt..	—56	—42	2 in. Lap.....	—14	—1
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—22	—6
7-12 in. Lap..	—43	—27	7-12 in. Lap..	— 7	+4

Steel Wire

Based Price* on No. 9 Gage and Coarser	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¾c.
High brass wire	16¼c. to 21¼c.
Brass rod	13¼c. to 20¼c.
Brass tube, brazed	26½c. to 31 c.
Brass tube, seamless	18 c. to 20 c.
Copper tube, seamless	19½c. to 22¼c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 23c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
	Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20		Primes	Wasters
			80 lb...	$6.80	$6.55
			90 lb...	6.90	6.65
			100 lb...	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	30c.
Bar	36c. to 37c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

The market is very quiet with no business. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.50
Copper, heavy and wire	8.75
Copper, light and bottoms	7.50
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.00
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.50
Lead, tea	2.00
Zinc	2.50

THE IRON AGE

New York, September 15, 1921

ESTABLISHED 1855 VOL. 108: No. 11

Electric Furnaces and Heat Treatment

A Survey of Their Commercial Application to Steel and Other Industries —Over 80 in the United States

BY EDWIN F. CONE

THE electrical heat treatment of steel of all kinds has expanded extensively in the last few years. This has been particularly marked recently. Beginnings were made just before the war in treating steel with electricity as the source of heat, but it was the war which really furnished the stimulus which has made this phase of heat treatment one of importance.

An attempt is made in the following article to present a general, but not necessarily complete, review of the extent to which electrical apparatus or furnaces are used commercially in the United States as a means of heat treating steel. It is not claimed that in the summary every type of furnace has been included, but the facts as presented cover the main features of this remarkable development.

Several companies have developed furnaces of types especially adapted to the product to be treated. Not only are castings and forgings now being treated in such furnaces, but sheets, steel chain, automobile parts, axles, bolts and nuts and small parts for airplanes, as well as non-ferrous and other products. In order to reveal the extent to which this method of heat treatment is being applied industrially, steel, non-ferrous and other installations are included, but no attempt is made to mention laboratory or research appliances.

IT is pretty generally recognized that one of the pioneers, if not the pioneer, in applying electricity to heat-treating problems was T. F. Baily, of the Electric Furnace Co., Alliance, Ohio. One of the earliest Baily installations was made in 1914 at the plant of the William A. Rogers, Ltd., Niagara Falls, N. Y.,

Battery of Eight Electric Heat-Treating Furnaces Installed by Holcroft & Co., Detroit, at the Plant of the Packard Motor Co., Detroit. The first six furnaces operate at 1650 deg. Fahr. and the last two at 1100 deg. Fahr. They are used for hardening and drawing crankshafts

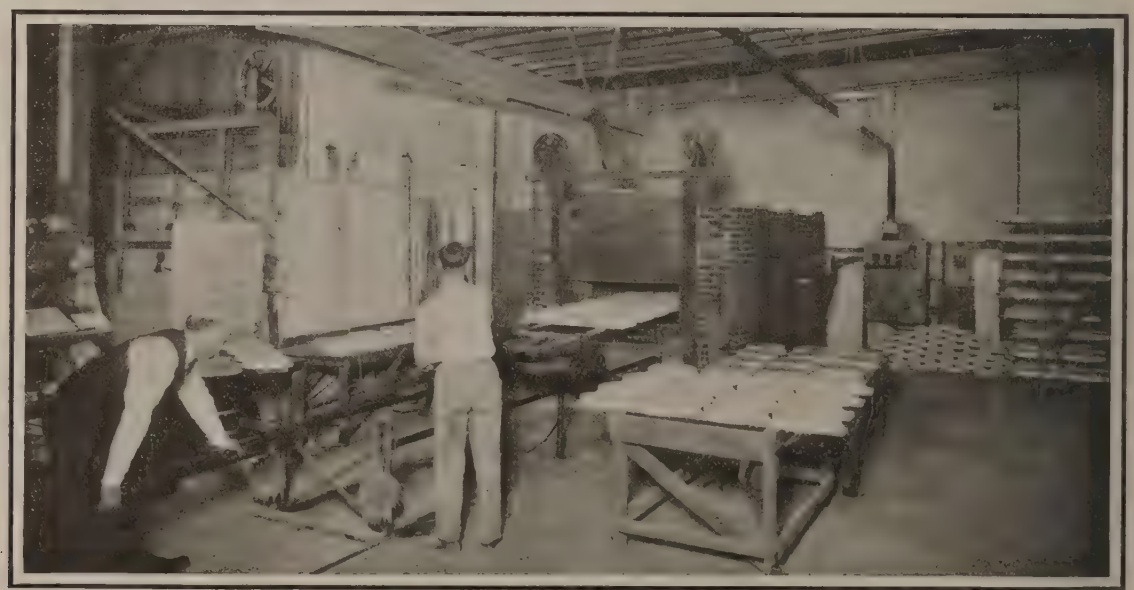
Table of Principal Electric Furnaces Installed or Contracted for as of Sept. 1, 1921, Using General Electric Equipment for Heat Treating Steel, Etc.

Company and Location	Size of Furnace and Product Treated	Kw. of Each
Adel Clay Products Co., Adel, Iowa	1 Furnace 2 ft. wide, 2 ft. high, 2 ft. long; 50 lb. per hr. Firing clay for phonograph needles	15
Connecticut Elec. Steel Co., Hartford, Conn.	1 Furnace 3 ft. wide, 2 ft. 8½ in. high, 4 ft. 4 in. long; 3000 lb. 12 hr., including 1 hr. soaking period. Annealing steel castings	45
St. Louis Brass Co., St. Louis	1 Furnace 4 ft. wide, 2 ft. high, 10 ft. long; 1300 lb. per hr. Firing vitreous enamel on cooking utensils and lamp reflectors	150
Standard Equipment Co., Cleveland	2 Furnaces 3 ft. wide, 2 ft. high, 6 ft. 4 in. long; 160 lb. per hr	60
	2 Furnaces 4 ft. 9 in. diam., 2 ft. high; 500 lb. per hr. Carbonizing gears and roller bearings and heat treating ring gears	60
Eastman Kodak Co., Rochester, N. Y.	1 Furnace 1 ft. 6 in. wide, 2 ft. high, 5 ft. 6 in. long; 185 lb. per hr. Annealing glass lens blanks	47
Spencer Lens Co., Hamburg, N. Y.	1 Furnace 4 ft. 6 in. diam., 4 ft. deep. Annealing large glass lenses for telescopes	24
General Motors Corp. (Central Gear), Detroit, Mich.	1 Furnace 4 ft. 9 in. diam., 2 ft. high; 500 lb. per hr. Heat treating gears	60
Chase Metal Works, Waterbury, Conn.	1 Furnace 6 ft. 6 in. wide, 2 ft. 6 in. high, 24 ft. long; 8300 lb. per hr. Annealing brass stock, rods, plate, etc.	425
Aluminum Co. of America, Cleveland	1 Furnace 4 ft. wide, 2 ft. 6 in. high, 10 ft. long. Annealing aluminum	60
Galusha Stove Co., Buffalo, N. Y.	1 Furnace 3 ft. 6 in. wide, 2 ft. high, 5 ft. long; 750 lb. per hr. Firing vitreous enamel on stove parts	95
Acheson Graphite Co., Niagara Falls, N. Y.	1 Furnace, 2 ft. 10 in. wide, 6 ft. high, 9 ft. 7 ft. long; 113 lb. per hr. net. Baking graphite electrodes	75
Crosby Co., Buffalo, N. Y.	1 Furnace 2 ft. wide, 2 ft. high, 3 ft. long; 150 lb. per hr. Hardening dies	20
Standard Pencil Co., St. Louis	1 Furnace 3 ft. 9 in. wide, 2 ft. high, 12 ft. long; 500 lb. per hr. (process). Baking graphite for lead pencils	114
Gleason Works, Rochester, N. Y.	1 Furnace 17 in. wide, 2 ft. high, 10 ft. long; 550 lb. per hr. Hardening gears	72
Amoskeag Mfg. Co., Manchester, N. H.	1 Furnace 3 ft. wide, 3 ft. high, 6 ft. long; 350 lb. per hr. Heat treating steel rolls	48
Waterbury Mfg. Co., Waterbury, Conn.	1 Furnace 4 ft. 6 in. wide, 2 ft. 2 in. high, 16 ft. 9 in. long; 1000 lb. per hr. Annealing brass punchings, etc.	80
Muncie Cap & Set Screw Co., Muncie, Ind.	1 Furnace 2 ft. 9 in. wide, 2 ft. 5 in. high, 7 ft. long; 600 lb. per hr. Hardening cap and set screws	80
Saco Lowell Shops, Biddeport, Me.	1 Furnace 3 ft. diameter, 2 ft 8 in. high; 300 lb. per hr. Heat treating knitting machine spindles	45
Bishop & Babcock Co., Cleveland	1 Furnace 2 ft. wide, 2 ft. high, 4 ft. 6 in. long; 400 lb. per hr. Annealing brass tubing	50
General Electric Co., Schenectady, N. Y.	1 Furnace 15 ft. 10 in. wide, 8 ft. 7 in. high, 27 ft. 7 in. long; 4000 lb. per hr. Annealing housing castings	690
General Electric Co., Schenectady, N. Y.	1 Furnace 30 in. wide, 24 in. high, 40 in. long; 175 lb. per hr. Pack hardening lathe centers, thrush bearings, boring bars and bushings	20
General Electric Co., Schenectady, N. Y.	1 Furnace 30 in. wide, 24 in. high, 40 in. long; 250 lb. per hr. Drawing temper on high-speed cutting tools	20
General Electric Co. (Baltimore Works), Baltimore, Md.	1 Furnace 3 ft. wide, 2 ft. 8 in. high, 6 ft. 6 in. long; 1300 lb. per hr. Annealing punchings. Each compt	90
General Electric Co., Schenectady, N. Y.	2 Furnaces 1 ft. 6 in. wide, 2 ft. high, 4 ft. long; 330 lb. per hr. Firing vitreous enamel on resistance tubes	24
General Electric Co., Schenectady, N. Y.	2 Furnaces each 2 ft. 6 in. wide, 2 ft. high, 3 ft. long; 125 lb. per hr. Hardening stamping dies	20
	1 Furnace 1 ft. 6 in. wide, 2 ft. high, 2 ft. long; 160 lb. per hr. Drawing temper on stamping dies	20
	1 Furnace 5 ft. wide, 15 ft. high, 8 ft. long; 50 lb. per hr. (Heating chamber 1 ft. 2 in. wide, 4 ft. high, 3 ft. 4 in. long.) Annealing X-ray tubes	30
General Electric Co. (Bridgeport Works), Bridgeport, Conn.	1 Furnace 15 in. wide, 2 ft. 3 in. high, 2 ft. long; 160 lb. per hr. Hardening dies, tools, etc.	35
General Electric Co. (National Lamp Works)	1 Furnace 3 ft. wide, 2 ft. high, 14 ft. long; 10 cu. ft. bulbs per hr. Annealing miniature lamp bulbs	60

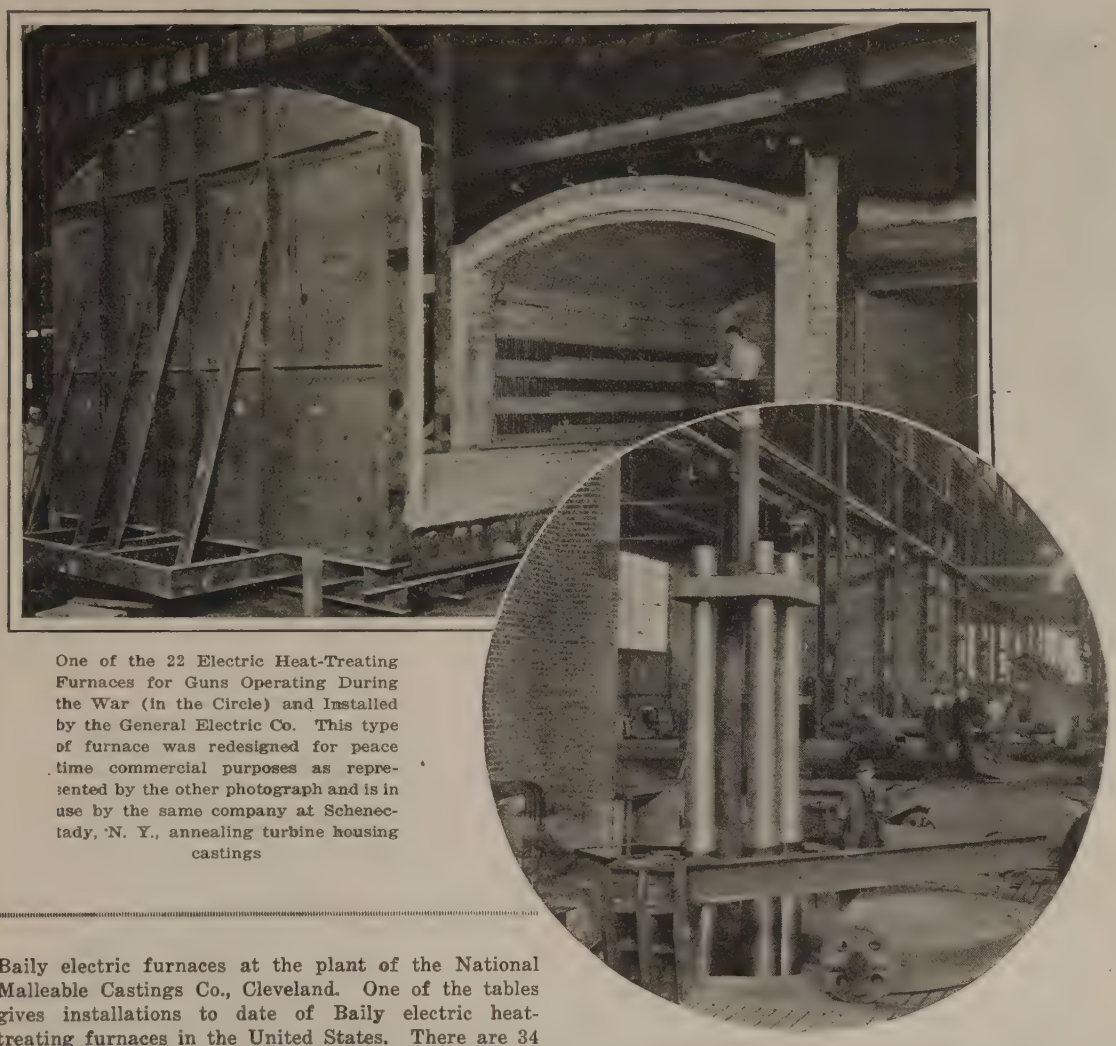
Girod Electric Steel Co., France, has one 265-kw. furnace, 9 ft. wide and 15 ft. long, for annealing 1400 lb. of tool steel stock per hr.

for annealing flat ware. A little later, or in 1915, the Otis Elevator Co., Niagara Falls, installed two Baily furnaces for annealing elevator steel castings.

It is claimed that one of the factors which made cast steel anchor chain a commercial success during the war was the proper heat treatment made possible by



An Electric Furnace in the Enameling Industry, Firing Vitreous Enamel on Cooking Utensils and Lamp Reflectors at the Plant of the St. Louis Brass Co., St. Louis. The operating temperature is 1700 deg. Fahr.



One of the 22 Electric Heat-Treating Furnaces for Guns Operating During the War (in the Circle) and Installed by the General Electric Co. This type of furnace was redesigned for peace time commercial purposes as represented by the other photograph and is in use by the same company at Schenectady, N. Y., annealing turbine housing castings

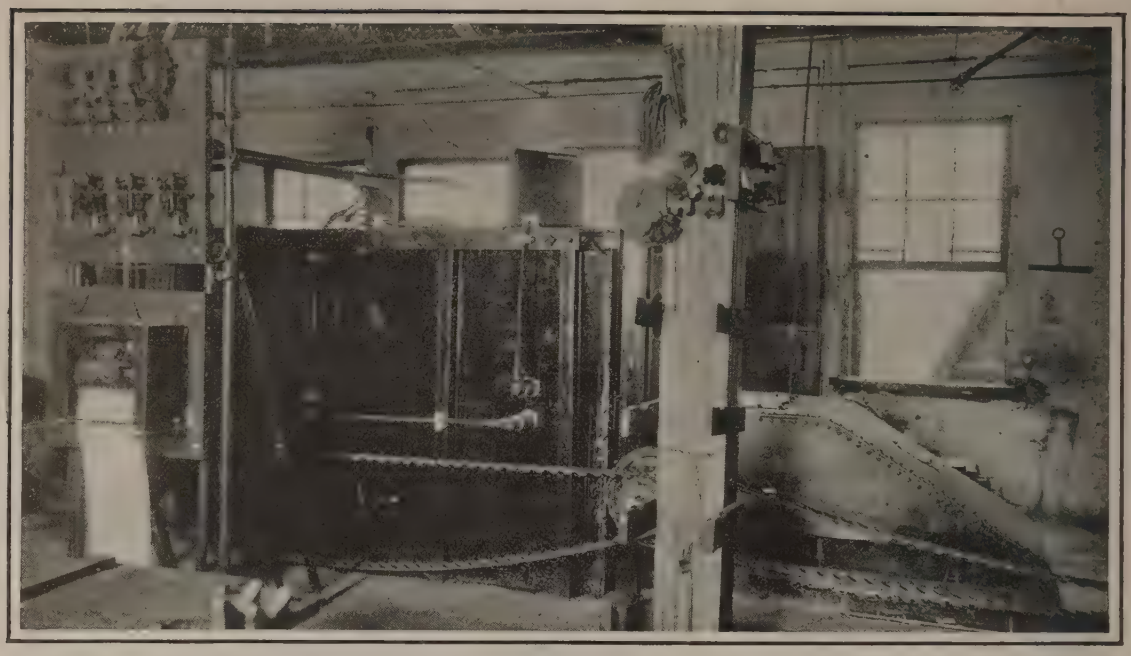
Baily electric furnaces at the plant of the National Malleable Castings Co., Cleveland. One of the tables gives installations to date of Baily electric heat-treating furnaces in the United States. There are 34 such furnaces in this country, one of which is credited to the non-ferrous industry. Of this total 10 were contracted for since Jan. 1, 1920.

Another pioneer in this field is the General Electric Co., which has to its credit the development of large commercial electric heat-treating furnaces of the metallic resistor type. This company states that it

Table of Baily Electric Furnaces Installed or Contracted for on Sept. 1, 1921, for Heat Treating

Company and Location	Product Treated	No. of Units	Kw. of Each	Total Kw.	Daily Tonnage
Wm. A. Rogers, Ltd., Niagara Falls, N. Y.	Annealing flat ware	2	200	400	24
Wm. A. Rogers, Ltd., Niagara Falls, N. Y.	Annealing flat ware	1	200	200	12
Otis Elevator Co., Niagara Falls, N. Y.	Annealing elevator castings	2	150		
			300	450	36
National Malleable Castings Co., Sharon, Pa.	Annealing draw bars knuckles	4	900		
			900	3,600	144
United States Aluminum Co., Massena, N. Y.	Aluminum castings	1	50	50	6
Erie Specialty Co., Erie, Pa.	Small steel parts for airplanes and tractors	2	150		
			150	300	24
Pierce Arrow Motor Car Co., Buffalo, N. Y.	Transmission gears	1	40	40	4
Laclede Steel Co., St. Louis	Railroad axles	1	150	150	12
National Malleable Castings Co., Cleveland	Anchor chain*	6	900	5,400	150
Ingalls-Shepard Forging Co., Harvey, Ill.	Crank shafts	2	900	1,800	144
Braeburn Steel Co., Braeburn, Pa.	Annealing steel	1	600	600	75
Standard Steel & Bearing Co., Philadelphia	Roller bearings and ball races	1	150	150	12
Lamson & Sessions, Cleveland	Heat treating bolts	1	40	40	4
Timken Roller Bearing Co., Canton, Ohio	Roll hardening	1	75	75	5
Mullins Body Corporation, Salem, Ohio	Sheet heating	1	100	100	9
Ohio Steel Foundry, Springfield, Ohio	Annealing castings	1	200	200	18
C. Harold Wills, Detroit, Mich.	Automobile parts**	2	600	1,200	18
Somers Mfg. Co., Waterbury, Conn.	Annealing brass	1	150	150	18
Lorain Steel Co., Johnstown, Pa.	Annealing bolts	1	200	200	24
Ingram Richardson Mfg. Co., Beaver Falls, Pa.	Enameling steel signs, stove parts, etc.	1	600	600	43
Name withheld	Annealing steel	1	360	360	24
		34		16,066	1,096

One 600-kw. furnace is in use by the Stavanger Electro Staalverk, Stavanger, Norway, for annealing steel castings.
*Described in THE IRON AGE, Feb. 27, 1919.
**Described in THE IRON AGE, June 30, 1921.



A Continuous Conveyor Type (Hagan) of Electric Furnace for Bright Annealing. It is provided with water seal at both ends and the automatic control and temperature recording instruments are at the left

first undertook this work early in 1917 when it developed the vertical cylindrical furnace for heat-treating large gun forgings. The company never did and does not now actually build and install large furnaces but it does manufacture and supply the metallic resistor heating units with refractory insulator supports for installation in the furnace as well as the automatic temperature control consisting of contractor panels operated by Leeds & Northrup controller instruments or in some cases recording controllers.

One of the illustrations shows four gun forgings being lowered into a battery of four furnaces in the plant of the Tioga Steel & Iron Co., Philadelphia. There were installed during the war 22 of these gun furnaces in the following ordnance plants: Tioga Steel & Iron Co., Philadelphia; Inland Ordnance Co., Rochester, N. Y.; Syminton Anderson Co., Rochester, N. Y.; Watertown Arsenal, Watertown, Mass.; U. S. Naval Ordnance Plant, South Charleston, W. Va. These furnaces ranged from 6 ft. in diameter by 11 ft. deep, consuming 200 kw., to 7 ft. in diameter by 35 ft. deep, consuming 700 kw. A large furnace of this type is at present under construction in a Government ordnance plant having dimensions of 8 to 10 ft. in diameter by 105 ft. deep with a connected load of 2700 kw.

This Is a 210-Kw. Electric Annealing Furnace for Annealing Sheet Steel, the Charge Consisting of 16,000 Lb. The furnace is 12 ft. long, 4 ft. 6 in. wide and 3 ft. high and is a product of the George J. Hagan Co., Pittsburgh

With the ending of the war, the company states that its efforts were directed to modifying the design of the gun furnace so as to secure one which would be suitable for peace time needs on a commercial basis. One of the illustrations shows this later type. In it the units consist of heavy metallic windings supported in refractory insulators on the inner walls of the furnace chamber. The pitch and length of the ribbon convolutions can be made so as to concentrate or distribute the heating effect as desired. Such ribbon units can be placed in the hearth or floor of the furnace or under the arch.

One of the tables gives a list of some of the more important metallic resistor type of heat-treating furnaces in commercial use as equipped with G. E. heating units and temperature control. Some were installed and built by furnace building companies and others were installed by the company using them. The General Electric Co. also builds three or four furnaces of this type of relatively smaller size or of such size that the furnace can be built up complete at the plant and shipped to the user in that condition.

Besides the Baily and General Electric heat-treating furnaces there are four other companies which have introduced or are introducing commercial furnaces for heat-treatment as follows:

The George J. Hagan Co., Pittsburgh, has the following installations either made or under contract as follows:

Fowler & Union Horsenail Co., Buffalo:

One 24 ft. regenerative car type furnace having a connected load of 180 kw for operation on 440 volts, 3-phase, 60-cycle power service.

This furnace is used for annealing special steel wire in coil form.

Nash Motors Co., Kenosha, Wis.:

One large rotary furnace, 20 ft. in diameter and having a connected load of 270 kw for operation on 440 volts, 3-phase, 60-cycle power service.

This furnace is used for hardening, annealing and carbonizing automobile parts, varying from a spring clip to a front axle. A description of this installation appears elsewhere in this issue.

Ontario Silver Co., Muncie, Ind.:

One continuous annealing furnace for annealing brass and nickel silver flat ware.

This furnace has a connected load of 75 kw for operation on 220 volts, 3-phase, 60-cycle power service.

Standard Stoker Co., Inc., Erie, Pa.:

One box type annealing furnace having a connected load of 40 kw for operation on 220 volts, single-phase, 60-cycle power service.

This furnace is used for annealing miscellaneous steel castings.

Canadian Allis Chalmers Co., Toronto, Ont.:

One car type sheet annealing furnace having a connected load of 210 kw for operation on 440 volts, 3-phase, 60-cycle power service.

This furnace is used exclusively for annealing special transformer steel in sheet form.

Illinois Watch Co., Springfield, Ill.:

One small rotary enameling furnace, 6 ft. in diameter having a connected load of 31 kw for operation on 220 volts, 3-phase, 60-cycle power service.

The furnace is used exclusively for enameling watch dials.

Coonley Mfg. Co., Cicero, Ill.:

One double end enameling furnace 225 kw connected for operation on 220 volts, 3-phase, 60-cycle power service.

The furnace is to be used for enameling cooking utensils.

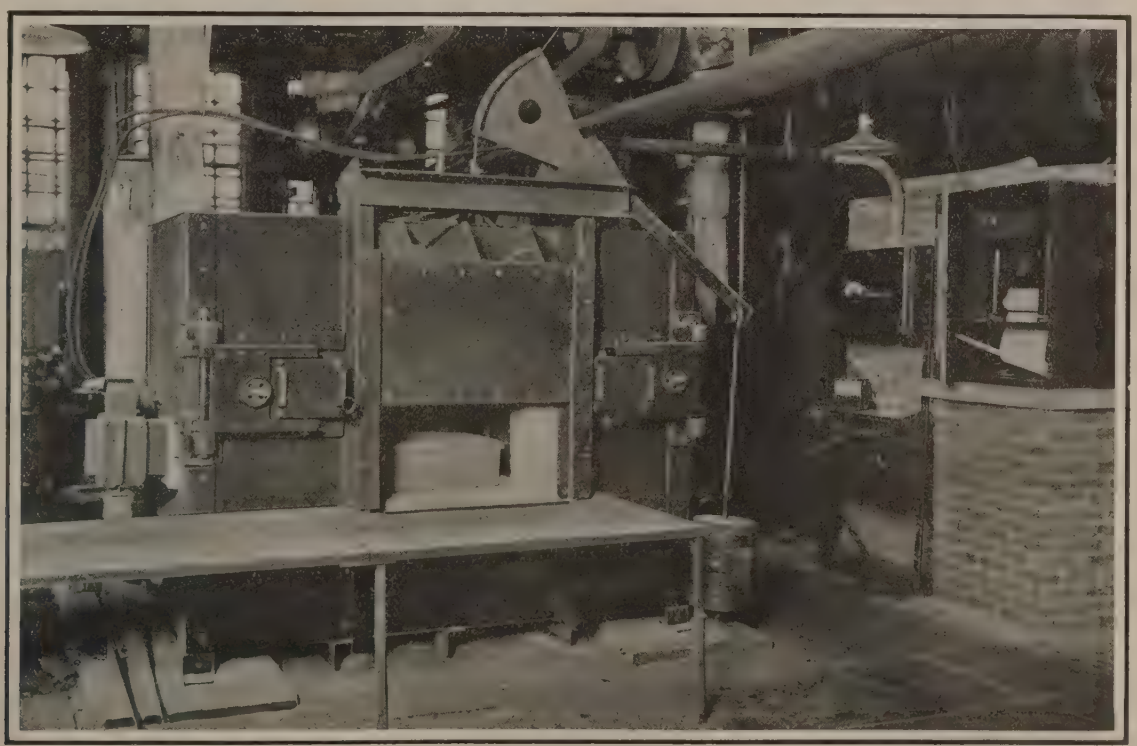
Total furnaces, 7; of which 5 are treating steel.

Holcroft & Co., Detroit, Mich., have already installed or contracted for the following electric heat-treating furnaces:

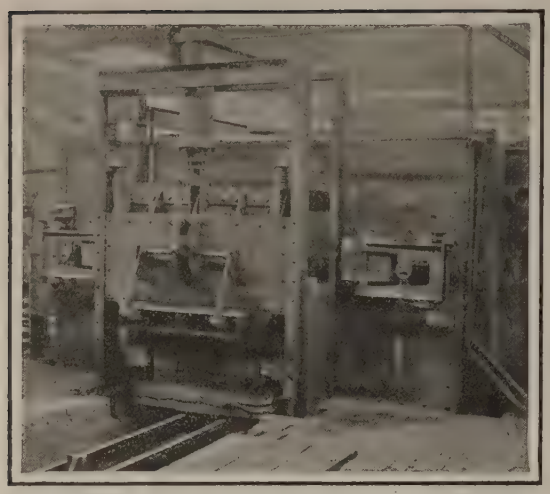
An Electric Carburizing Furnace Furnished by the General Electric Co. to the Standard Equipment Co., Cleveland, for Carburizing Gears and Roller Bearings and Heat Treating Ring Gears

Packard Motor Car Co., Detroit:

Eight (8) furnaces, 2 ft. wide, 2 ft. high, 6 ft. long, 80 kw each.



A Baily Electric Furnace for Heat Treating Bolts at the Plant of the Lamson & Sessions Co., Cleveland



A Baily Electric Heat-Treating Furnace of the Car Type Operating at the Pittsburgh Plant of the Crucible Steel Co. of America

Hardening and drawing crankshafts, 500 lb. and 800 lb. per hour respectively.

Schwartz Hermann Co., Sommerville, N. J.:
One furnace, 2 ft. wide, 8 in. high, 7 ft. 4 in. long, 68 kw and one furnace 2 ft. wide, 8 in. high, 6 ft. long, 32 kw.
Hardening and drawing 500 lb. of temper spring steel per hour.

General Motors Laboratory, Dayton, Ohio:
One furnace, 2 ft. wide, 5 ft. 6 in. long, 15 in. high. 31 kw.
General heat treating, 300 lb. per hour.
Total furnaces, 10; all treating steel.

The Electric Furnace Construction Co., Philadelphia, has, already installed or under contract, the following electric heat-treating furnaces:

Emery Steel Casting Co., Baltimore:
One pit type annealing furnace and soaking pit for small steel castings. The same company also has an electrically heated core drying oven finished by the same builders.

Yale & Towne Mfg. Co., Stamford, Conn.:
One electric recuperative car type furnace, 60 ft. long, 12 ft. wide and 11 ft. high, 180 kva.
It is used for annealing gray iron.

The same company has also sold to the Sociedad Espanola Construccion Naval, Rheinosa, Spain, one furnace, 6 ft. dia., 37 ft. deep, 712 kw. for heat treating 6000 lb. of gun forgings per hour and one furnace, 10 ft. 6 in wide, 7 ft. high, 20 ft. long, for annealing 5500 lb. of gun forgings per hour.

Another company, the American Industrial Furnace Corporation, Boston, has made installations of electric heat-treating furnaces as follows:

Connecticut Broach Co., New London, Conn.:
One furnace, 9 in. wide, 2 ft. high, 5 ft. long, 25 kw.
For hardening and drawing 200 lb. of broaches per hour.

Chapman Valve Co., Indian Orchard, Mass.:
One furnace, 5 ft. wide, 4 ft. high, 6 ft. 10 in. 120 kw.
Annealing 800 lb. of steel and brass castings per hour.

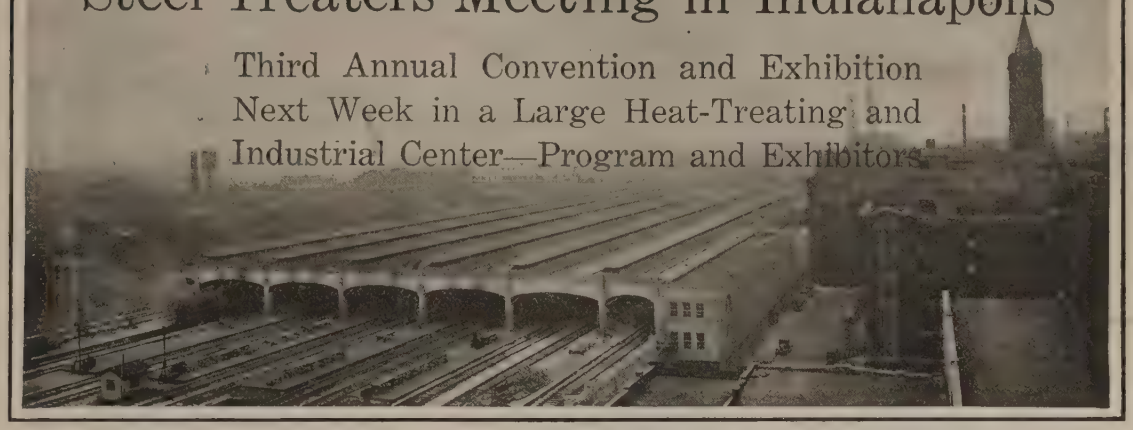
A review of this subject should not close without reference to the electrical heat treatment of alloy steel tubing as carried out by the Snead & Co. Iron Works, Jersey City, N. J., a description of which appeared in THE IRON AGE, Jan. 22, 1920, and which has recently been presented as a moving picture before various technical societies. While the apparatus is not distinctly a furnace, it is a novel and highly successful method of heat treating tubing and gives promise of being applied more generally.

The foregoing analysis, when summarized, presents a striking total of heat-treating furnaces using electricity as a source of heat. In the steel field alone there are about 80 such furnaces now installed or contracted for. They are operating on many kinds of products, including steel and iron castings, automobile parts, tool steel, sheets, etc. At least seven furnaces are operating on non-ferrous material and the application to glass and other industries is growing. It is also of interest that there are already several installations of American electric heat-treating furnaces in foreign countries: Canada, France, Spain, Norway, etc.

An Electric Furnace for Annealing Steel Castings at the Plant of the Connecticut Electric Steel Co., Hartford, Conn. Its capacity is 3000 lb. of castings every 12 hr., including one hour soaking period

Steel Treaters Meeting in Indianapolis

Third Annual Convention and Exhibition Next Week in a Large Heat-Treating and Industrial Center—Program and Exhibitors



WHEN the American Society for Steel Treating meets in Indianapolis, Ind., next week, Sept. 19 to 24, for its third annual convention and exhibition, it will mark the anniversary of the amalgamation into one large organization of two heat-treating societies. This was accomplished at the second annual convention in Philadelphia last September.

The past year has been a remarkably successful one for the organization. Membership has increased in numbers and an increase in service as well as one in financial assets has been registered. When the American Steel Treaters' Society and the Steel Treating Research Society were amalgamated last year, the combined membership was close to 2750. The membership of the new society on Sept. 1 was 3237, or an increase of 487.

Since the last convention four new chapters have been organized: At Syracuse, N. Y.; Charleston, W. Va.; Gary, Ind., and Worcester, Mass., making a total of 31. Practically all chapters have reported excellent attendance at their monthly meetings during the past winter, and all of them have made extensive plans and preparations for the coming year. The average attendance at the meetings of each of the chapters has been approximately 100 members and guests, which means that there are 3000 individuals attending meetings of the whole organization each month, with a total attendance of over 30,000 for the year.

One of the most important developments of the society during the past year has been the increased value of its publication, the *Transactions*. The general make-up and appearance have been improved while the number of pages has been increased. Over 775 pages of reading matter, exclusive of advertising, have been published in the 12 numbers since last September.

Since the amalgamation, two nationally prominent men have been elected to and accepted honorary memberships. They are Dr. Albert Sauveur, head of the department of metallurgy of Harvard University, and Dr. Edward D. Cambell, head of the department of chemistry, University of Michigan, Ann Arbor, Mich. This makes a total of four honorary members, Sir Robert Hadfield and Dr. Henry M. Howe having been previously elected. The national standing committees have held meetings during the past year and have contributed valuable results toward increasing the efficacy of the society and toward the preparation of the research program and standards for heat treating.

There are a number of causes contributing to the success of the society, one of the most important being decentralization of organization, or that of having many chapters located in industrial centers, easy of access and of greatest benefit to the members. The large portion of the dues, which the constitution provides, should remain with local chapters for payment of expenses incident to securing speakers and sending announcements, etc., has placed the chapters in a sound financial condition with money in their local treasuries to insure active participation in the aims and purposes of the society.

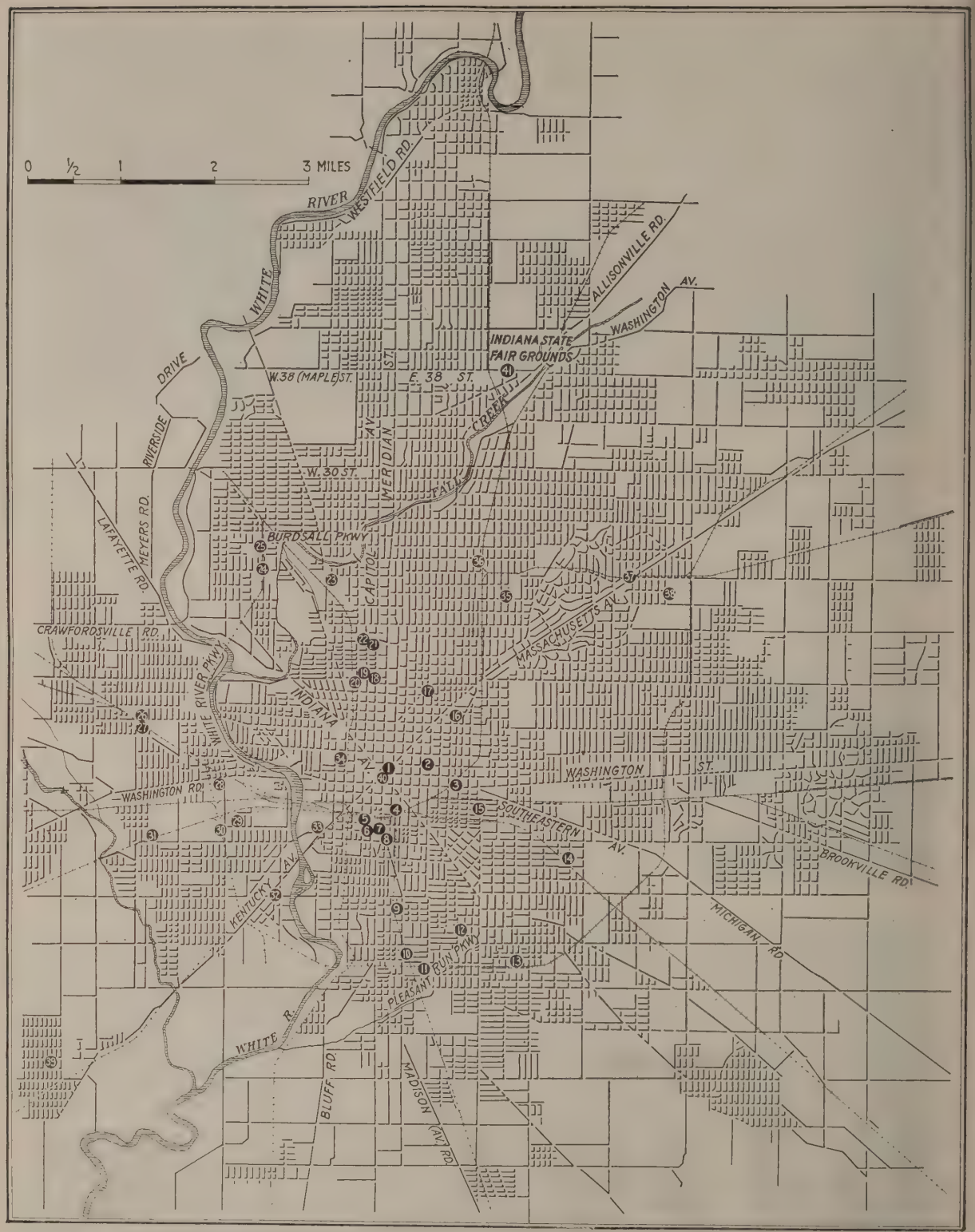
The national president, Lt.-Col. A. E. White, has visited all of the chapters of the society the past winter and has traveled over 10,000 miles, using over six weeks of his time and thus giving to the entire membership a portion of his enthusiasm, his counsel and his advice. The officers of the society believe that it has as yet made but a small impression upon the field of possible members and of its potential usefulness.

Indianapolis and Its Industries

The location selected for the annual meeting this year is one of the important heat-treating centers of the country. The map, reproduced on another page, shows the location of the leading places where heat treating of various kinds is being practiced, as well as the location of the Indiana State Fair Grounds where the convention and exhibition are to be held.

Indianapolis is fast coming to the front as a manufacturing city and to-day it has over 1200 industries, manufacturing some 800 different products. The city is located within 50 miles of the center of population of the United States and claims to be the geographical center of manufacturing. It is, in population, transportation facilities and volume of business transacted, the largest inland city not on a navigable stream in the United States. The population numbers approximately 315,000; 82 per cent of this are native born whites, and 2,000,000 live within 100 miles of the city. In the city itself, 146,000 were listed at the last census as engaged in gainful occupations. There are over 70,000 families, of which 65 per cent own their own homes.

The city has direct railroad connection with all parts of the country by means of 17 railroads. Everyone of these is served by a belt railroad, 14 miles in length, which surrounds the city and gives industrial plants ready access to each radiating line. In addition to the steam railroads electric interurban lines, radiating from Indianapolis, comprise one of the most ex-



tensive systems in the United States. There are 13 of these lines, and the number of passengers passing through the terminal station each day numbers approximately 21,000.

The metal working industry is steadily gaining in importance, being second only in volume to the packing industry. The manufacture of automobilies is the leader in the metal trades, and the city is claimed to be second only to Detroit in the number of automobiles built. There are 10 automobile manufacturing plants within the city limits. Manufacture of automobile parts, including drop forgings, body sheets, carburetors, gears, bodies, springs, fans, radiators, etc., all go to make it one of importance in the automotive field.

While the automobile industry is undoubtedly of first importance, Indianapolis has a large number of other metal-working industries that go to make it one of the leaders among the cities of the country. Perhaps the most important of these is the manufacture of chain transmissions and sprockets. The city is also a leader in the manufacture of saws, having one of the largest plants in the country. The machine tool industry is assuming greater proportions and several large companies are now operating there. Among other products

The map on the opposite page shows by numbers the location of some of the Indianapolis plants where heat treating is practiced. The lists below are a key to the map.

Numerical Finding List

No.
1.—General Tool & Gauge Co.
2.—Specialty Gauge & Tool Co.
3.—Cole Motor Car Co.
4.—Modern Tool & Die Co.
5.—Indianapolis Tool & Mfg. Co.
6.—B. C. Atkins & Co.
7.—American High-Speed Chain Co.
8.—Spacke Machine & Tool Co.
9.—Indianapolis Drop Forge Co.
10.—Marschke Mfg. Co.
11.—American Can Co.
12.—Stevenson Gear Co.
13.—Robt. H. Hassler, Inc.
14.—Service Spring Co.
15.—Weidely Motors Co.
16.—Frontenac Motor Co.
17.—Modern Electric & Machine Co.
18.—Stutz Motor Car Co. of America, Inc.
19.—Ott Grinder Co.
20.—Dean Bros. Steam Pump Works.
21.—Stutz Fire Engine Co.
22.—H. C. S. Motor Car Co.
23.—Fairbanks, Morse & Co.
24.—International Machine Tool Co.
25.—Milholland Machine Co.
26.—National Malleable Castings Co.
27.—Link-Belt Co.
28.—Duesenberg Automobile & Motors Co.
29.—Metal Auto Parts Co.
30.—Imperial Drop Forge Co.
31.—Chandler & Taylor Co.
32.—Nordyke & Marmon Co.
33.—Diamond Chain & Mfg. Co.
34.—Zenite Metal Co.
35.—Midwest Engine Co.
36.—National Motor Car & Vehicle Corporation.
37.—Oakes Co.
38.—Premier Motor Corporation.
39.—Lafayette Motors Co.
40.—Monument Circle.
41.—Indiana State Fair Grounds.

Alphabetical Finding Index

	No.
American Can Co., Garfield Park car	11
American High Speed Chain Co., South Meridian, Stock Yards or Garfield car	7
Atkins, E. C., & Co., South Meridian, Stock Yards or Garfield car	6
Chandler & Taylor Co., West Indianapolis or Terre Haute Traction car	31
Cole Motor Car Co., East Washington car	3
Dean Bros. Steam Pump Works, Northwestern car	20
Diamond Chain & Mfg. Co., West Indianapolis car or Stock Yards car	33
Duesenberg Automobile & Motors Co., West Washington car	28
Fairbanks, Morse & Co., Northwestern car	23
Frontenac Motor Co., East Tenth Street or East Michigan car	16
General Tool & Gauge Co., East Michigan car	1
Hassler, Robt. H., Inc., Virginia Avenue car, transfer to Minnesota	13
Imperial Drop Forge Co., West Indianapolis car or Terre Haute traction	30
Indianapolis Drop Forge Co., Garfield Park car	99
Indiana State Fair Grounds, Central and College cars	41
Indianapolis Tool & Mfg. Co., South Meridian car	5
International Machine Tool Co., Riverside car	24
Lafayette Motors Co., West Indianapolis car marked "Mars Hill" or Martinsville traction	39
Link-Belt Co., West Michigan car	27
Marschke Mfg. Co., Garfield Park car	10
Metal Auto Parts Co., West Indianapolis car	29
Midwest Engine Co., Columbia car	35
Milholland Machine Co., Riverside car	25
Modern Electric & Machine Co., Central car	17
Modern Tool & Die Co., three blocks from monument	4
Monument Circle	40
National Malleable Castings Co., West Michigan car	26
National Motor Car & Vehicle Corporation, College car	36
Nordyke & Marmon Co., Stock Yards car	32
Oakes Co., Brightwood car	37
Ott Grinder Co., Northwestern car	19
Premier Motor Corporation, Brookside car	38
Service Spring Co., English car	14
Spacke Machine & Tool Co., South Meridian or Garfield car	88
Specialty Gauge & Tool Co., East Washington and East Michigan cars	2
Stevenson Gear Co., East Washington car	12
Stutz Fire Engine Co., Illinois car	21
Stutz Motor Car Co. of America, Inc., Illinois car	18
Weidely Motors Co., East Washington car	15
Zenite Metal Co., West Michigan car	34

manufactured are oil and gas engines, road building machinery, gray iron and steel castings, steam engines and boilers, freight cars, concrete machinery, hoisting derricks, small tools, metal stampings and electrical apparatus of various kinds. To supply the needs of the various industries, a larger stock of iron and steel is carried by jobbers than in any city in the Middle West, outside of Chicago.

The Chamber of Commerce, through its industrial division, is conducting a never-ceasing campaign for new industries. While no bonuses are offered to bring industries to the city, its natural advantages are stressed, such as its location with reference to the center of population and manufacture, its nearness to the coal fields of Indiana, its railroad facilities and unusually low rates for electric power and artificial gas and the excellence of its labor conditions.

The city is essentially an "open-shop" city. In the metal trades it is practically 100 per cent open and the city as a whole shows an average of 90 per cent of its industries working without union agreements. In the Associated Employers of Indianapolis, the city has an asset in coping with the labor problem. This association today has over 500 members, with employees numbering approximately 46,000. It was organized in 1904, the object being civic, economic and commercial betterment. The fundamental principles of the association's activities are first, securing of harmonious industrial relations between the employer and employee, and insistence on adequate compensation and timely advancement for the employee as measured by his individual efforts; second, unalterable opposition to the principle of the closed shop as un-American, illegal and unfair to the independent workmen, the employer and the public; third, strenuous opposition to strikes, lockouts, boycotts and kindred evils; and fourth, the impartial enforcement of law and strict maintenance of order. The association was one of

The Famous Speedway at Indianapolis Where Special Automobile Races Will Be Staged on Wednesday Morning, Sept. 21, for the Entertainment of the Steel Treaters and Their Guests

the first in the country to carry on an organized systematic campaign of education in industrial matters. It has already distributed hundreds of thousands of pieces of educational and instructive literature, not only to its own mailing list of 2000 business men and employers of labor, but also to public and professional men, clergymen and officers in public service in federal, state, county and municipal government.

There are many points of interest about the city, chief among which are the soldiers and sailors, monument and the motor speedway. The new union station, with its system of elevated tracks, is impressive, over 20,000 tons of steel having been used in its construction. In addition, the city has excellent educational facilities and a system of public parks.

Exhibition and Convention Program

The regular exhibition of heat-treating appliances and processes will be held, in connection with the convention, at the manufacturers building, Indiana, State Fair Grounds. In spite of the business depression, the society has been fortunate in securing a large list of exhibitors who will display the latest and most efficient products and equipment used in heat-treating. A complete report of the exhibitors and what they will show is found elsewhere.

A technical program of 78 papers is scheduled for the convention. A list of the authors and their subjects were printed in THE IRON AGE, Sept. 1. The sessions will be held in the Woman's Building, located close to the exhibition and for the first time there will be simultaneous meetings. The general program for each day follows:

Monday, Sept. 19—Opening Session, 2 p. m.

Address of welcome.....
W. R. Chapin, chairman executive committee, Indianapolis chapter
Welcome to Indianapolis.....City official
Response.....A. E. White, National President
Report of tellers of election.....R. T. Bayless, Chairman
Report of secretary....W. H. Eisenman, National Secretary
Report of treasurer.....W. S. Bidle, National Treasurer
President's address.....A. E. White, National President
Announcements.

Tuesday, Sept. 20

10 a. m.—Papers on carburizing.
2 p. m.—Papers on tool steel.
6 p. m.—Smoker and entertainment.

Wednesday, Sept. 21

10 a. m.—Motor Speedway. 50-mile match race between Duesenberg and Frontenac motor cars.
2 p. m.—Room A: Papers on heat treating equipment. Room B: Papers on alloy steel.
8 p. m.—Dance and entertainment.

Thursday, Sept. 22

10 a. m.—Room A: Program in charge of the Army and Navy. Room B: Papers on alloy steel.
2 p. m.—Room A: Papers on metallographic research. Room B: Papers on heat treating equipment.
6 p. m.—Annual banquet; speakers of national prominence.

Friday, Sept. 23

10 a. m.—Research session in charge of Dr. Harrison E. Howe, chairman National Research Council, Washington, D. C.
2 p. m.—Room A: Papers on heat-treating problems. Room B: Papers on shop management.

Special attention is called to the fact that owing to the large number of excellent and interesting papers, simultaneous sessions will be held on three days of the Convention so that visitors may have the opportunity of attending the sessions which are of the greatest interest.

Army and Navy Session

The Army and Navy Session on Thursday morning will be especially interesting and the following general program will be presented.

The Navy will detail an officer to present a paper on "Laying of the North Sea Barage."

General Amos A. Fries, chief of chemical warfare service, will have a paper presented on some subject of interest to the members.

General C. C. Williams, chief of the ordnance department, has asked F. C. Langenberg, metallurgist Watertown Arsenal, to present a paper on heat treatment at the Arsenal.

Major L. W. McIntosh, assistant to the chief of engineering division, air service, war department, will have a paper presented on "Heat-Treating Problems in Aeronautics."

Research Session

Dr. Harrison E. Howe, chairman of the National Research Council, will preside at the research session on Friday morning. Dr. Howe has consented to secure the speakers for that session, in which the general plan for research in heat treatment will be presented and discussed.

The Exhibitors and Their Exhibits

A

ALCORN, BLOCKHOUSE & Co., Philadelphia—Exhibiting a combination conveyor type furnace, electrically heated, which combines in one the conveyor for such articles as crank shafts, cam shafts, rear axle shafts, and also conveying miscellaneous small pieces, such as rounds, shapes, gears and gear blanks. This furnace was originally designed for the heat treatment of shells, principally 155 mm., and it was eventually adopted by the Ordnance Department as standard equipment. James S. Alcorn and H. M. Austin will demonstrate the furnace.

ARMSTRONG CORK Co., Pittsburgh—Exhibiting the following "Nonpareil" products: insulating brick for all kinds of ovens, furnaces, etc.; high pressure covering and blocks for steam lines, enameling and japanning ovens, feed water heaters, etc.; corkboard for the insulation of cold storage and constant temperature rooms; cork covering for refrigerated drinking water lines, brine and ammonia lines, etc.; also "Circle A" cork brick for floors; an electrically heated furnace will demonstrate the heat retarding properties of "Nonpareil" insulating brick. Represented by J. T. Gower, Cincinnati office.

E. C. ATKINS & Co., Indianapolis—Atkins saws of all kinds, also machine knives, metal cutting machinery, hack saw blades, frames, etc.; also process samples of hand saws from raw material to finished product. Represented by T. A. Carroll, J. E. Andrews, E. C. Drake, T. E. Patton, Robert Arbuckle and Edward Norvell.

ATLAS CRUCIBLE STEEL Co., Dunkirk, N. Y.—Samples of various types of tool steel, including both hot rolled and cold rolled shapes; there will also be an exhibit of fractures, showing the effect of proper and improper heat treatment on the various types of tool steel. Products of the company's high speed drop forging plant, which produces various sizes of blanks for key-way cutters, end-mills and cutters will also be shown. Represented by F. G. Davis, assistant general sales manager; J. A. Disney, sales representative; W. C. Peterson, metallurgical engineer, and F. Kremp, metallurgist.

B

BAUSCH & LOMB OPTICAL Co., Rochester, N. Y.—Metallographic and metallurgical equipment, including microscopes, photomicrographic apparatus and accessories, including new complete metallographic outfits, one of them having the microscope built in as part of the equipment. Represented by W. L. Patterson and I. L. Nixon, both from Rochester.

BELL & GOSSETT Co., Chicago—Exhibiting "Caseite," used in place of cyanide, in either lump or powder form; "Bathite," which is a salts for preheating steel between 1200 and 1600 deg. Fahr., used as a substitute for lead; "Cleancoat," a carbonacious compound used on the top of lead to prevent drossing and oxidation, being a substitute for charcoal; also carbonizing compound, carbonizing pots and boxes (steel and alloy), "Enamelite" (selective hardening material), high temperature cements, quenching and tempering oils, scleroscopes and prestometers.

BETHLEHEM STEEL Co., Bethlehem, Pa.—A feature will be a large illuminated transparency consisting of 32 colored views, showing the various processes of steel manufacture from raw material to finished product; another transparency consisting of charts showing the physical properties of 48 of the standard grades of alloy and carbon steels. The charts include the tensile and hardness results of these steels in their condition as rolled, annealed and after various special heat treatments. Another chart shows physical test diagram, micrographs, fractures, etc., illustrating the effect of quenching steel at the proper and improper temperatures. Products exhibited to include a number of special iron castings made with Mayari iron; an I beam section taken progressively through the various punching, blanking and bending operations in the manufacture of the new Bethlehem structural steel wheels for motor trucks and a representative line of small tools made from Bethlehem tool steel, drop forgings, hardened steel rolls and bolts and nuts. Represented by W. R. Shimer.

sales metallurgist, W. H. Laury, John Moran, W. C. Cutler and Robert MacDonald, all of Bethlehem office.

BRISTOL Co., Waterbury, Conn.—Entire line of Bristol indicating and recording pyrometers, including temperature controllers, together with accessories for these classes of instruments. Exhibit in charge of H. G. Hall, Chicago district sales manager, and H. L. Griggs, general sales manager.

BROWN INSTRUMENT Co., Philadelphia—Apparatus to demonstrate what the research departments of instrument manufacturers are doing today, along the lines of developing newer and more accurate instruments; at this booth will be displayed a potentiometer, so compact that it can be carried under the arm, and yet has a scale of 96 in. long; automatic control showing what has been accomplished during the last year; the heating cycle controller; new cold junction compensated pyrometer, together with the complete line of high resistance indicating and recording pyrometers of single continuous and multiple types; indicating and recording thermometers; indicating and recording pressure gages; tachometers; and all types of instruments for temperature measure and recording. In charge of booth: G. W. Keller, C. C. McDermott, D. J. Jones, R. W. Mayer, E. R. Robinson, and S. C. Ketterer.

BUREAU OF STANDARDS, UNITED STATES DEPARTMENT OF COMMERCE—General equipment available for research and the testing of metals at the Bureau of Standards, shown by transparencies and photographs; copies of publications considered of interest to members will be available for examination. Among the items of interest are the production of pure metals, such as iron and the preparation of gas free alloys, together with the melting of different industrial ferrous and non-ferrous metals by various methods. In connection with this work, methods developed for the determination of gases in metals will be shown. Such investigations which have been pursued intensively for several years at the Bureau of Standards are fundamental, and their perfection must necessarily be achieved before the effects of various gases contained in alloys, such as steels manufactured by various processes, may be determined. Hot and cold working of metals, their heat-treatment and testing, including some applications of the 2,300,000 lb. Emery testing machine, will likewise be exhibited. There will be included the results of recent studies of the properties of metals at high temperatures, including compression tests of different types of bearing metals and tensile tests of carbon and alloy steels under different conditions of rolling and heat-treatment, and applications of magnetic analysis and such special studies as the distribution of stresses in chilled iron and steel car wheels under conditions approximating those of service. The exhibit, as a whole, will illustrate the field of co-operation of the bureau with the metal industries. Dr. G. K. Burgess, H. J. French, and J. S. Vanick, and Miss D. E. Kingsbury will attend.

C

CASE HARDENING SERVICE Co., Cleveland — Exhibiting "Bohnite" and samples of the work which it has produced in the form of gears, cam shafts, etc., cut to show the cross section and polished and etched to show the depth of case; also two machines for testing the hardness of metals, the auto-punch and a quadrant sclerometer, both manufactured by the Rudge-Whitworth, Ltd., Birmingham, England, to be shown for the first time in the United States. Represented by William H. Bell and C. E. Lovejoy.

CELITE PRODUCTS Co., New York—"Sil-O-Cel" Insulating brick, insulating powder, insulating cements, high temperature cements and other products. There will be two demonstrations, one of an electric furnace with standard fire brick used as refractory, three sides and top insulated with "Sil-O-Cel" standard brick and the remaining side uninsulated; furnace will be equipped with pyrometer to show internal heat and thermometers to show temperature difference between walls insulated with "Sil-O-Cel" standard brick and uninsulated walls. The second demonstration will show the heat-resisting qualities of "Sil-O-Cel" brick by means of a blow torch. Represented by Edward F. Davis, H. N. Haberstroh and S. M. Jenkins.

CENTRAL STEEL Co., Massillon, Ohio—Automobile parts made from alloy steel; also a demonstration of the use of the company's oil hardening UMA steels on a gear cutting machine; will also exhibit seamless tubing and cold drawn products made from the company's steels. Represented by F. J. Griffiths, D. N. A. Blacet, L. B. Baker and C. P. Richter.

COLONIAL STEEL Co., Pittsburgh—Exhibiting Colonial high-speed and carbon tool steels, showing fractures and photographs. Represented by Charles M. Brown, vice-president; James E. Barry, special representative; G. W. Hampshire, Detroit representative; Charles Kopenhoefer, Cincinnati and Indianapolis representative; N. B. Hoffman, chief chemist and metallurgist; T. Howe Nimick, assistant to the vice-president.

CRUCIBLE STEEL Co. OF AMERICA, Pittsburgh—Heat treated steel products of various kinds. Represented by J. W. Taylor and F. J. White, Pittsburgh, and C. W. Mayer and H. L. Raynor, Indianapolis, Ind.

D

DEEDS COMMERCIAL LABORATORIES, Indianapolis, Ind.—Carburizing compound, demonstrating methods of use as well as the principle of quenching. Represented by W. C. Horner.

DEEDS & CHAPIN, Indianapolis—"Cinch" Steel Cement, and various dies, tools, and other articles which have been cemented with their products.

DRIVER-HARRIS Co., Harrison, N. J.—Cast Nichrome carbonizing containers of the most popular styles. Represented by H. D. McKinney; L. O. Hart, second vice-president; C. B. Callomon, factory superintendent; F. L. Driver, third vice-president; W. E. Blythe, H. O. Hartdegan and G. A. Rickert, advertising manager.

E

ELECTRIC ALLOY STEEL Co., Youngstown, Ohio—A complete assortment of its various grades of high-speed steel; several tools from its steels which have performed extraordinary feats; a large sample case showing fractured bars in the natural, annealed and hardened, or heat-treated condition in each grade of tool and high speed steel; this sample board shows the grain structure of various degrees of hardness of each of the grades; a complete set of micrographs, showing the cleanness of its cold melt electric furnace steels as well as its crucible cast high-speed steels. Represented by G. Peterson, general manager of sales; G. W. Morrison, general superintendent; J. E. Sandmeyer, field metallurgist, and M. A. Grossmann, chief metallurgist.

ELECTRIC STEEL Co. OF INDIANA, Indianapolis.

ELECTRICAL REFRACTORIES Co., East Palestine, Ohio—Refractories for electric ranges and steel treating furnaces, consisting of electric heating element supports of various types and linings for the same. The products are confined to use in resistance type electric heating devices, where heat up to 2500 deg. is attained. Represented by F. E. Owen, president.

CHARLES ENGELHARD, INC., New York—A complete line of indicating and recording pyrometers and automatic control apparatus. Various forms of thermo-couple mountings will also be shown, particularly Impervite refractory and Impervite hard porcelain tubes. Represented by E. S. Newcomb and G. V. Nightingale.

F

J. B. FORD Co., Wyandotte, Mich.—Chemicals, and cleaning compounds for the hardening room.

G

WILLIAM GANSCHOW Co., Chicago—Exhibiting heat-treated gears and other gears. Represented by A. F. Boissoneau.

GENERAL ALLOYS Co., Chicago—Heat resisting alloys. Represented by H. H. Harris, A. D. Heath, A. L. Grinnell, P. F. McGovern and O. A. Parine.

GENERAL ELECTRIC Co., Schenectady, N. Y.—An oil-tempering bath and a new type of semi-cylindrical furnace for treating carbon steel will be shown. The latter is a new development, being a small furnace whose special features are declared to be its rapid heating, the low voltage required, the strength of construction, especially as regards the heating element, and the accurate control of the temperature. The oil-tempering bath is one of standard construction such as has been built by the company for some time. Represented by C. L. Ipsen, E. F. Collins and C. T. McLaughlin.

H

GEORGE J. HAGAN Co., Pittsburgh—One electric furnace and one combustion furnace, both in operation, together with furnace accessories. The electric furnace is of the ribbon register type, with full automatic temperature control; the combustion furnace is designed for either oil or gas operation, equipped with a Brown automatic temperature control mechanism. Represented by George J. Hagan, Howard G. Hammer, W. C. Buell, Jr., H. C. Adams, R. E. Talley, Alan D. Dauch, F. W. Robertson and O. P. Luetscher.

HALCOMB STEEL Co., Syracuse, N. Y.—Exhibiting a large board showing the steps taken in its mill from the ingot to the finished form, such as hammering bars,

rings, disks, blocks, etc., rolled sheet mill and wire mill products; fractures from bars of all of its tool steels, accompanied by cards showing the principal uses for each grade, including "Dreadnought" high speed steel, "Ketos" oil hardening tool steel, special brands such as "Liberty," "Pyro" die, "Halco," stainless, special vanadium and ordinary carbon tool steels; tensile test pieces of alloy steel, showing the physical properties which may be developed by various heat treatments; also the principal uses in the automotive, aeroplane and motor-truck industries in which these special "Halectralloy" brand steels are used.

HEPPENSTALL FORGE & KNIFE CO., Pittsburgh—Interior and exterior views of the company's plants; nickel steel piston rods, shear knives, die blocks; two racks of drop forgings, made from some of the company's die blocks; data giving the number of forgings of each design that its blocks have made. Represented by J. A. Succop, metallurgical engineer; C. W. Heppenstall, treasurer and general manager.

HOSKINS MFG. CO., Detroit—An electric furnace in operation, using a new type of heating element and controlled automatically by a temperature regulator employing a new principle; also indicating and recording pyrometers and a display of nickel-chromium resistor alloys. Represented by Charles S. Kinnison, W. D. Little, C. F. Busse and W. A. Gatward.

I

IMPERIAL DROP FORGE CO., Indianapolis—Showing manufactured automobile parts. Represented by George O. Desautels, E. E. Russell and E. B. Van Horn.

INDIANAPOLIS DROP FORGING CO., Indianapolis—Dies and drop forgings. Represented by Ferdinand Barnickol, president; John C. Beyer, superintendent; Ferdinand Barnickol, Jr., and L. M. Fehrenbach, purchasing agent.

INDIANAPOLIS LIGHT & HEAT CO., Indianapolis—Industrial electrical appliances.

K

KINNEY MFG. CO., Chicago—Small motor-driven positive pressure rotating plunger pump in operation. Represented by A. J. Munday.

L

LEEDS & NORTHROP CO., Philadelphia—Exhibiting potentiometer pyrometers of the indicating, recording, signaling and controlling types; also complete equipment for heat-treating steel according to the Hump method. Practically the entire exhibit will be in operation. Represented by Henry Brewer, Oscar Brewer, Jordan Korp, C. A. Martin, G. W. Tall, Jr., and A. E. Tarr.

M

MARSCHKE MFG. CO., Indianapolis—Electric-driven tool grinders and swagers, both bench and pedestal type.

MIDVALE STEEL & ORDNANCE CO., Philadelphia—The exhibit will feature what the company is able to accomplish with its tool steels at its own works. Represented by H. E. Rowe, in charge of the tool steel department, and George A. Richardson, in charge of advertising and exhibits.

O

OAKLEY CHEMICAL CO., New York. Exhibiting the powers of Oakite cleaning materials for removing quenching and tempering oils. Represented by Maxwell Lakeman and C. A. Ormsby.

Q

QUIGLEY FURNACE SPECIALTIES CO., New York—Featuring special material used in construction and maintenance of furnaces, boiler settings, kiln ovens, etc., including "Hytempite," high temperature cement, for bonding refractory materials; "Insulbrix," a cellular insulating refractory brick for conservation of heat, and "Carbosand," a highly refractory granular material for making rammed-in linings, special tile, patches and repairs in furnace structures, used with "Hytempite" as a bonding agent.

R

W. S. ROCKWELL CO., New York—Charts and other data to show the principles governing heat-treating operations and their application in modern practice. Represented by M. L. Hollister, Detroit, and H. J. N. Voltmann, New York.

P. H. & F. M. ROOTS CO., Connersville, Ind.—A horizontal low pressure blower, motor driven (to be used for furnishing air to one half the live exhibits); an Acme gas pump, arranged for constant speed motor drive and equipped with diaphragm operated by-pass, used for boosting the gas pressure to hardening furnaces and other industrial appliances; an Acme blower for tight and loose pulley drive; an Acme blower for single pulley drive; an Acme hand blower for portable forges and blacksmith fires; horizontal low pressure blower, pulley drive, with case and headplates cut away to show the rotating parts; also the original Roots blower, made in 1859. Represented by E. D. Johnston, president; C. C. Abbott, vice-president; J. B. Patterson, Chicago district manager, and Y. R. Schively, engineer.

S

SIMONDS MFG. CO., Fitchburg, Mass.—Exhibiting in a double booth, half of which will be devoted to showing the products of the Simonds steel mill, Lockport, N. Y., consisting of carbon and high-speed steel sheets and bars, high-speed steel bits and some of the products made from Simonds steel, half to be occupied by a demonstration of a Simonds inserted tooth metal cutting saw in operation on a cold cutting-off machine. Represented by H. B. McDonald, G. R. Bird, H. D. Weed and R. A. Shaffer.

SMITH GAS ENGINEERING CO., Dayton, Ohio—A few small American Gas Furnace Co.'s furnaces, operating on clean, cold producer gas and a Smith recording gas calorimeter. Represented by R. M. Chatterton, William P. Duff and Earl E. Adams.

SPENCER TURBINE CO., Hartford, Conn.—Turbo compressors for use in supplying air to oil burning furnaces Represented by S. E. Phillips, secretary, and H. M. Grossman, sales engineer.

STROMBERG ELECTRIC CO., Chicago—Process timing and signalling instruments for controlling the time element and preventing the process from running too short or too long a time; Stromberg No. 35 job time recorders, printing exact time of start and completion of work on any job or operation; Stromberg in-and-out employees' recorders for payroll and time records; Stromberg electric time stamps for stamping exact time on all kinds of papers passing through various departments; Wm. P. Martin, Jr., in charge of booth.

SURFACE COMBUSTION CO., New York—A combination oven furnace for heat-treating high-speed steel, a Glory hole furnace operated at 3000 deg. Fahr., and impact and tunnel burners operated with the company's high pressure system. Represented by Messrs. Hollinger, Evans and Harris.

T

TAYLOR INSTRUMENT COMPANIES, Rochester, N. Y.—Pyrometric instruments for determining temperatures from 500 to 4500 deg. Fahr. Instruments will be in operation showing the method of application for determining temperatures, also for the control of temperatures. Represented by H. B. Brown and A. J. Wagner.

V

VANADIUM ALLOYS STEEL CO., Pittsburgh—High speed, carbon and alloy tool steel and ferrotungsten; also boards displaying various tools, such as milling cutters, threading cutters, dies, forgings, rolls, etc. Represented by J. P. Gill, metallurgist; William R. Mau, Chicago district manager; A. G. Henry, special representative; R. D. Guisewite, Indiana representative.

W

WESTINGHOUSE ELECTRIC & MFG. CO., Pittsburgh—Small furnaces for laboratories, instrument manufacturers, tool shops, etc., with temperatures up to 2000 deg. Fahr.; also, heavy duty industrial furnaces for any kind of heat treating process, any size, any capacity, temperatures up to 2000 deg. Fahr., including single end and double end furnaces. Furnaces in operation.

WILSON-MAEULEN CO., New York—Multiple type pyrometer recorder, the tapalog, its mono-pivot pyrometer indicators and three models of the Rockwell direct-reading hardness tester. Represented by Harry Goldsen, Western representative, and S. C. Horn, Pittsburgh representative.

WITHEROW STEEL CO., Pittsburgh—Samples of continuous die rolled products, together with micro studies and test data showing the comparison of physical properties of forged, upset and rolled pieces. Represented by W. C. Emory, metallurgist; H. H. Bridge, Bridge-Richards Co., Detroit; F. L. Carroll, Steel Sales Corporation, Chicago; F. G. Baldwin and J. P. Tarvin, Baldwin-Tarvin Co., Cincinnati, all sales representatives.

Three Types of Alloy Sheet Steel—II.

Details of Heat Treatment Necessary to Attain Highest Tensile Strength—Hardness and Other Data

BY HORACE C. KNERR*

THE bend specimens and one set of tensile specimens were tested as received, not heat treated. The other tensile specimens were heat treated at quenching temperatures recommended by the steel manufacturer. Two drawing temperatures were used on duplicate sets of specimens to note the effect of variations in drawing temperature. The higher temperature was aimed to give approximately 150,000 lb. per sq. in. ultimate strength.

The specimens were placed in an electric muffle furnace at approximately room temperature, heated gradually to the quenching temperature within about one hour and held for 15 or 20 min. They were then instantly quenched in oil (Houghton's No. 2 soluble), with vigorous agitation until cold. The specimens were reheated to the required drawing temperature in the same furnace, held 20 to 30 min., and allowed to cool in air. Water or oil cooling after drawing might have been preferable for the nickel-chromium steel, on account of its known tendency to temper-brittleness, but it was considered that the specimens were thin enough to insure a sufficiently rapid cooling in air. The temperatures of heat treatment were as follows:

Steel	Quenched in Oil, Deg. at	Drawn, Deg. Lot No. 1	Drawn, Deg. Lot No. 2
Chromium-vanadium steel.	1,650 F. (900 C.)	800 F. (425 C.)	950 F. (510 C.)
Nickel-chromium steel.....	1,500 F. (815 C.)	800 F. (425 C.)	900 F. (480 C.)
Nickel steel, 3.50 per cent.	1,500 F. (815 C.)	700 F. (370 C.)	800 F. (425 C.)

The limited amount of material available prevented further experimentation with heat treatment. Brinell and Shore hardness readings were taken after quenching and drawing. The weld specimens, both acetylene and electric spot, were given the same heat treatment as the 150,000 lb. per sq. in. tensile specimens.

The drawing temperature for Lot No. 2 was shown to be about correct to give 150,000 lb. per sq. in., except for the chromium-vanadium steel, which might have been better drawn at about 1000 deg. Fahr. or upward.

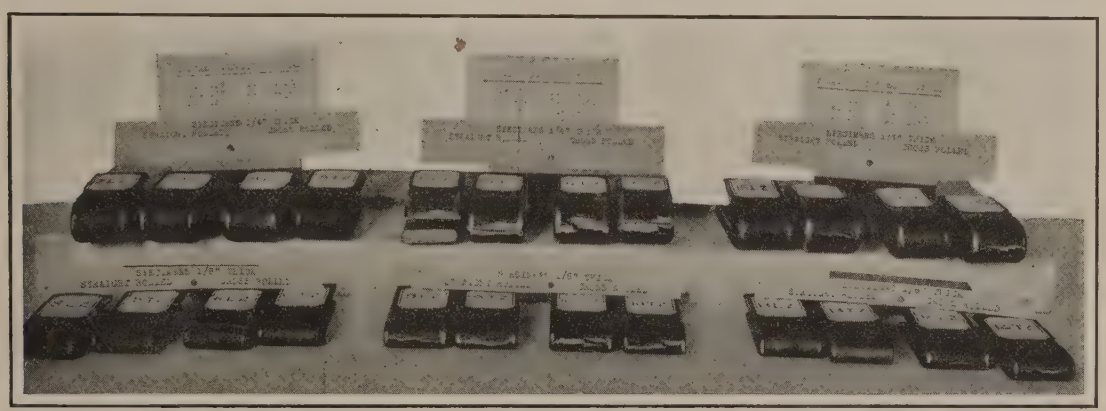
Note—In heat-treating chromium-vanadium steel fittings of slightly higher carbon content (0.30 to 0.40 per cent), satisfactory results have been obtained in production during the past year by regulating the drawing temperature according to Brinell hardness after quenching, which varies with thickness of piece and with tolerance variations in chemical composition, as follows:

Quench in oil at 1600 to 1625 deg. Fahr.
Brinell hardness after quenching, 375 to 420, 425 to 470, 475 to 525.
Drawing temperature, 1050, 1100, 1150 deg. Fahr.
Brinell hardness required after drawing, 275 to 350.

Variations in quenching temperature of plus or minus 25 deg. Fahr. do not greatly affect the tensile strength, ductility or hardness of chrome-vanadium steel. This was shown in a test on samples of steel of similar composition (No. 6135) quenched at varying temperatures, the results of which are given in one of the illustrations.

Bend Tests and Results

The bend specimens were tested in the condition as received from the manufacturer, or box annealed.



Bend Specimens of the Various Alloy Sheet Steels for Aircraft Parts. They were annealed and were 1 in. wide and bent over a diameter equal to their thickness

A V-block with rounded edges was used to start the bend under the compression head of a testing machine, and, after bending to about 90 deg., the specimen was flattened over a sheet of its own thickness in the machine.

The results of bend tests were very positive and are clearly shown in one of the illustrations. Two longitudinal and two transverse specimens from each sample sheet were tested. One complete set (specimen No. 2, of each pair) is shown. The results were as follows:

Bend Test—Material Box Annealed

Chromium-vanadium .....All satisfactory
Nickel-chromium .....All failed badly
Nickel steel, 3.50 per cent.
Unsatisfactory, only a few specimens passed

The 3.50 per cent nickel steel specimens, marked L, withstood bending slightly better than those marked T, otherwise there was no noticeable difference in any type of steel, between either longitudinal and transverse specimens, straight and cross rolled specimens or ⅛ and ¼ in. specimens.

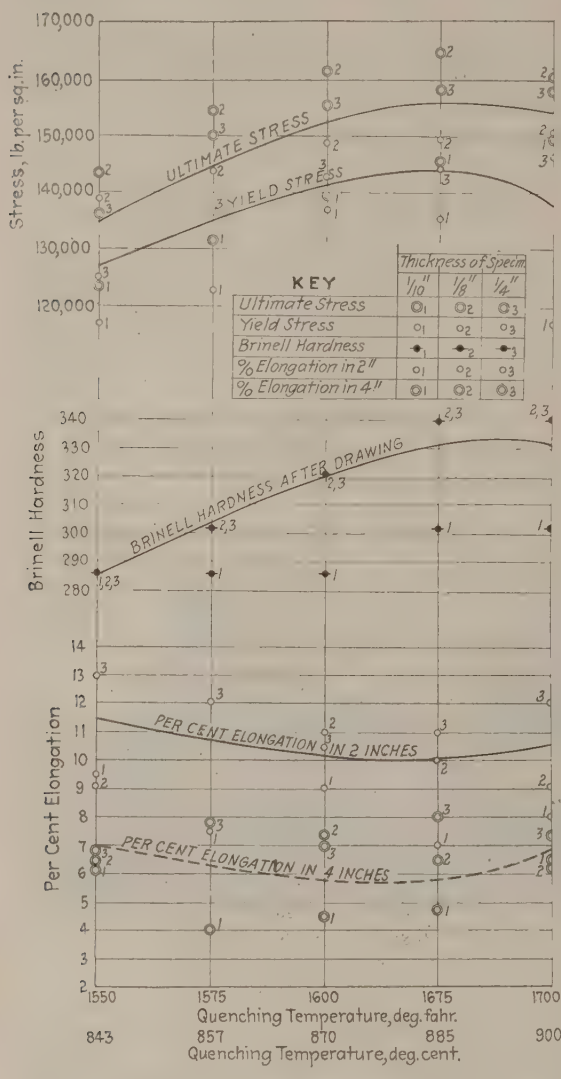
That the distinctly superior quality of the chromium-vanadium specimens in the cold bend test is due mainly to the alloy, rather than to questions of manufac-

*Metallurgist Naval Aircraft Factory, Philadelphia. The first installment appeared in THE IRON AGE Sept. 8.

ture, rolling, annealing, etc., appears probable for the following reasons:

The carbon content of the three steels is alike and the content of other elements common to two or more of them is similar.

The samples were manufactured in the same mill by the same process and presumably with the same degree of skill and care.



Effect of Variation of Quenching Temperature on Physical Properties of the Three Alloy Sheet Steels. Specimens drawn at 1100 deg. Fahr. or 593 deg. C.

All the sheets were box annealed together. (It may be that an annealing treatment best for one alloy would not be best for another.)

Considerable quantities of chromium-vanadium steel and of 3.50 per cent nickel steel of analyses similar to the corresponding samples in this investigation, but furnished by a different manufacturer, showed similar characteristics in bending. The chromium-vanadium steel was entirely satisfactory, whereas the 3.50 per cent nickel steel failed in spite of systematic efforts to improve its quality by special annealing or heat treatment. (It is also worthy of note that a quantity of carbon-vanadium sheet steel, received from a third manufacturer, at an earlier date, failed badly in the bend test. The specified analysis of the latter steel was: Carbon, 0.35 to 0.45 per cent; manganese, 0.70 to 1.00 per cent; sulphur, 0.05 per cent max.; phosphorus, 0.045 per cent max.; and vanadium, 0.15 per cent min. Vanadium is in itself, therefore, not an assurance of satisfactory cold bending qualities.)

Possible causes of the tendency to split longitudinally in bending have been discussed in another report, No. 2M20-3.

Tensile Tests: Material, Box Annealed

A tensile specimen, direction L, from each sample was tested in the condition as received from the manufacturer, or, box annealed, corresponding to the condition in which the bend specimens were tested and in which the material is worked in fabrication. Test results are given in Table No. 1. (Specimens in direction T were not made on account of lack of material, but tests on the heat treated specimens showed little difference with direction of grain. Longitudinal and transverse tensile tests on similar material from another source in the annealed condition differed little, even when there was a pronounced tendency to split longitudinally in bending.) The following points are of interest:

The annealed chromium-vanadium steel showed the greatest average elongation and the lowest tensile strength and hardness. (The other steels, especially nickel-chromium, might have been made softer by different annealing treatment but lack of time and material prevented further experiments in this direction.)

The low ratio of yield strength to ultimate strength of all types is notable, compared with their high ratio when heat treated.

The yield point and elongation are about the same for all three alloys as would be expected from corresponding annealed carbon steel, but the ultimate strength is higher.

There was more variation in the tensile strength of the annealed specimens than was indicated by Brinell hardness readings.

Tensile Tests, Heat-Treated

The results of tensile tests on heat-treated specimens are given in the tables, with a tabulation of the qualitative differences between cross rolled and straight rolled specimens in Table No. 5. It should be borne in mind that each test represents only one specimen of a given type, thickness, condition and treatment. However, in such small samples, little if any variation between specimens is likely and Brinell hardness readings, especially after heat treatment, showed marked uniformity.

Table No. 1—Tensile Tests of Materials

STEEL, BOX ANNEALED, AS RECEIVED FROM MANUFACTURER—BEND TESTS MADE AND FABRICATION DONE IN THIS CONDITION

Chromium-Vanadium Steel (No. 6135)

Thickness	⅛ In.		¼ In.		Aver-
Rolled	Straight	Cross	Straight	Cross	age
Mark	5L	6L	7L	8L	
Brinell No.	156	163	163	156	160
Shore No.	30	36	38	41	36
Yield lb. per sq. in.	54,000	49,000	42,500	46,800	48,000
Tensile lb. per sq. in.	75,000	100,000	76,400	73,400	81,200
Elong. in 2 in., per cent	27.5	22.5	27.5	32.5	27.5
Red. of area, per cent.	55.0	50.0	52.0	57.0	53.0

Nickel-Chromium Steel (See Analysis)

Thickness	⅛ In.		¼ In.		Aver-
Rolled	Straight	Cross	Straight	Cross	age
Mark	9L	10L	11L	12L	
Brinell No.	199	187	207	192	196
Shore No.	27	24	28	28	27
Yield lb. per sq. in.	53,300	44,200	42,800	40,100	45,100
Tensile lb. per sq. in.	75,100	91,400	96,500	93,200	89,000
Elong. in 2 in., per cent	21.5	23.5	21.0	25.0	23.0
Red. of area, per cent.	51.0	45.0	42.0	39.0	44.0

Nickel Steel, 3.50 Per Cent (No. 2330)

Thickness	⅛ In.		¼ In.		Aver-
Rolled	Straight	Cross	Straight	Cross	age
Mark	13L	14L	15L	16L	
Brinell No.	163	179	170	179	173
Shore No.	35	37	26	27	31
Yield lb. per sq. in.	45,300	47,600	46,500	39,100	44,600
Tensile lb. per. sq. in.	82,400	87,900	107,800	133,300	102,800
Elong. in 2 in., per cent	23.5	26.5	30.0	25.0	26.0
Red. of area, per cent.	46.0	45.0	53.0	51.0	48.0

NOTE.—Shore hardness readings of questionable accuracy. Yield points taken by drop of beam. Brinell hardness readings, 10 mm. ball, 3000 kg. load in these and all following tests.

Analysis of the data reveals a number of significant points, among which are the following:

The tensile properties of the three types of alloy steel are much alike after appropriate (but different) heat treatment; that is, by quenching each steel at its proper temperature and drawing back to give the de-

Table No. 2—Summary of Tensile Tests—Lot No. 1 (Low Drawing Temperature)
(a) Chromium-Vanadium—Quenched 1650 Deg. Fahr.—Drawn 800 Deg. Fahr.

Thick. Spec.	After Q Hb	After Q Hs	After D Hb	After D Hs	Ult. Str.	Yld. Str.	Elong. % in 2 In.	Elong. % in 4 In.	Red. of Area, %
⅛ in. 5 and 6 L1	444	66	357	60	184,750	166,600	5.0	3.1	18.4
⅛ in. 5 and 6 T1	431	63	345	39	178,600	161,500	5.7	3.7	33.4
Aver. ⅛ in.	437	64	351	59	181,670	164,050	5.3	3.4	25.9
¼ in. 7 and 8 L1	418	61	364	56	187,600	164,800	8.0	5.0	40.5
¼ in. 7 and 8 T1	431	64	364	58	185,800	160,800	8.0	4.6	36.0
Aver. ¼ in.	424	62	364	57	186,450	162,700	8.0	4.8	38.2
Grand aver.	430	63	357	58	184,060	163,370	6.6	4.1	32.9
(b) Nickel-Chromium—Quenched 1500 Deg. Fahr.—Drawn 800 Deg. Fahr.									
⅛ in. 9 and 10 L1	431	64	340	58	167,600	141,900	7.7	4.1	44.7
⅛ in. 9 and 10 T1	418	61	330	57	170,000	142,500	6.2	3.6	37.5
Aver. ⅛ in.	424	62	335	57	168,800	142,200	6.9	3.8	41.1
¼ in. 11 and 12 L1	431	63	357	58	175,700	159,400	8.5	5.3	40.0
¼ in. 11 and 12 T1	431	61	357	58	171,800	153,600	10.2	5.8	48.0
Aver. ¼ in.	431	62	357	58	173,750	156,500	9.3	5.5	44.0
Grand aver.	427	62	356	57	171,270	149,300	8.1	4.6	42.5
(c) Nickel, 3.50 Per Cent—Quenched 1500 Deg. Fahr.—Drawn 700 Deg. Fahr.									
⅛ in 13 and 14 L1	437	57	311	53	178,300	150,300	7.0	4.0	49 5
⅛ in. 13 and 14 T1	418	57	325	55	179,700	151,200	6.7	4.2	49.2
Aver. ⅛ in.	427	57	318	54	179,000	150,750	6.8	4.1	49.3
¼ in. 15 and 16 L1	416	57	330	51	178,000	156,200	9.0	4.7	47.0
¼ in. 15 and 16 T1	418	58	340	55	187,300	163,000	8.0	4.9	44.0
Aver. ¼ in.	417	57	335	53	182,650	159,600	8.5	4.8	45.0
Grand aver.	422	57	326	53	180,820	155,170	7.6	4.4	47.1

N°95.—Values given are average of straight and cross rolled specimens. This table, and Table No. 3, permit comparison between L and T specimens of each type of alloy, and also comparison between ⅛ and ¼ in. specimens.

sired tensile strength. There is no marked advantage of one type over another in respect to the combination of tensile strength and elongation (Table No. 4).

There is a pronounced difference in tensile strength and elongation between the ¼-in. and ⅛-in. thick specimens of each type of steel. The ¼-in. specimens of all types exceed the specified requirements, whereas the ⅛-in. specimens fall slightly below, either in tensile strength or ductility, or both. (Table No. 3.)

The yield stress of all the steels is closer to the ultimate than required in the specifications and exceeds the given minimum (125,000 lb. per sq. in.) even in the ⅛-in. thickness. (Table No. 3.)

Average values of all the steels considerably exceed the revised minimum elongation of 8 per cent in 2 in. at 150,000 lb. per sq. in. ultimate (Table No. 4).

Any of these steels would meet the following physical requirements at a low drawing temperature, although this is not recommended:

Ultimate tensile strength	175 000 lb per sq. in.
Yield strength	150,000 lb. per sq. in.
Elongation in 2 in. (¼ in. thick)	8 per cent

For sheets under ¼-in. thick, the elongation or gage length to be some function of the thickness.

The tensile properties and Brinell hardness for a given thickness and drawing temperature are remarkably uniform in each type.

Cross rolling slightly improves the tensile strength and elongation of all the steels, taking the average of longitudinal and transverse specimens (Table No. 5).

(*Note.*—As stated specimens marked longitudinal (L) and transverse (T) may have been reversed in some instances, owing to the absence of means for determining positively which were the true directions in the samples).

The cross rolled samples show, in general, slightly less variation between L and T specimens than shown in the straight rolled samples. This was to be expected, but the difference hardly warrants extra expense in manufacture.

The variation of tensile strength and elongation between L and T specimens in the straight rolled samples is greater than for cross rolled, but is slight for all the steels and follows no definite rule. (In four cases out of 12 the specimens having highest tensile strength also show greatest elongation in 2 in.; in five cases the reverse is true, and in three cases the tensile strength or elongation is practically the same, with the other factor showing a very slight difference.)

The lower percentage elongation of thin specimens in a given gaged length may obviously be explained

Table No. 3—Summary of Tensile Tests—Lot No. 2

DRAWING TEMPERATURE, AIMED TO GIVE 150,000 LB. PER SQ. IN. ULTIMATE STRENGTH
(a) Chromium-Vanadium—Quenched 1650 Deg. Fahr.—Drawn 950 Deg. Fahr.

Thick. Spec.	After Q Hb	After Q Hs	After D Hb	After D Hs	Ult. Str.	Yld. Str.	Elong. % in 2 In.	Elong. % in 4 In.	Red. of Area, %
⅛ in. 5 and 6 L2	431	63	269	51	157,500	143,500	7.7	4.7	37.6
⅛ in. 5 and 6 T2	431	62	273	47	153,500	140,000	8.0	5.2	43.2
Aver. ⅛ in.	431	62	271	49	155,500	141,750	7.8	4.9	40.4
¼ in. 7 and 8 L2	431	63	316	46	164,200	148,500	9.7	5.7	41.5
¼ in. 7 and 8 T2	437	64	336	49	165,000	145,400	10.2	6.0	36.0
Aver. ¼ in.	434	63	326	47	164,600	146,900	9.9	5.8	38.7
Grand aver.	432	62	298	48	160,050	144,320	8.8	5.3	39.5
(b) Nickel-Chromium—Quenched 1500 Deg. Fahr.—Drawn 900 Deg. Fahr.									
⅛ in. 9 and 10 L2	418	63	294	47	147,700	135,300	9.0	5.5	45.1
⅛ in. 9 and 10 T2	416	63	302	49	147,700	134,500	8.5	4.7	39.4
Aver. ⅛ in.	417	63	298	48	147,700	134,900	8.7	5.1	42.2
¼ in. 11 and 12 L2	439	64	330	51	157,600	146,000	10.0	5.6	43.5
¼ in. 11 and 12 T2	431	63	336	49	158 600	141 600	11.7	6.5	47.0
Aver. ¼ in.	435	63	333	50	158.100	143,700	10.8	6.0	45.2
Grand aver.	426	63	315	49	152,900	139,300	9.7	5.5	43.7
(c) Nickel, 3.50 Per Cent—Quenched 1500 Deg. Fahr.—Drawn 800 Deg. Fahr.									
⅛ in. 13 and 14 L2	418	56	293	47	144,600	129,700	9.0	5.1	51.2
⅛ in. 13 and 14 T2	423	58	289	46	146,500	133,500	9.5	5.0	45.8
Aver. ⅛ in.	420	57	291	46	145,550	131,600	9.2	5.0	48.5
¼ in. 15 and 16 L2	418	57	307	46	152,600	138,000	10.7	6.6	50.7
¼ in. 15 and 16 T2	418	56	303	45	153,500	141,400	10.0	5.5	45.1
Aver. ¼ in.	418	56	305	45	153,050	139,700	10.3	6.0	47.9
Grand aver.	419	56	298	45	149,300	135,650	9.7	5.5	48.2

NOTE.—Same as Table No. 2, showing values with drawing temperature aimed to give 150,000 lb. per sq. in. ultimate stress.

by their smaller necking down. Strictly, the gaged length should be a function of the dimensions of the cross section in determining ductility by percentage elongation, or the required elongation should be a function of the thickness or area.

The lower unit tensile strength of the thinner specimens of corresponding analysis and heat treatment was probably caused by surface decarburization done in heating, rolling and annealing, which for a given depth would have a greater proportional effect on thin specimens than on thick.

Another possible explanation is that the thick specimens were not drawn as effectually as the corresponding thin specimens under the same heat treatment. This supposition is strengthened by the fact that the average Brinell hardness readings were, in general, about alike for ⅛ and ¼ in. specimens after quenching, whereas after drawing the thin specimens were all decidedly the softer. The temperature and time of drawing were identical, the specimens being treated together, but the thin specimens were doubtless penetrated more quickly by the heat. A longer time of drawing should equalize this condition, if it exists.

Hardness Tests

Hardness tests were made on all specimens, as received, after quenching and after drawing. Results are given in the tables with tensile tests. The following points are noteworthy:

As received, in the box annealed condition, the chromium-vanadium steel was softest and nickel-chromium the hardest in Brinell test. (Table No. 1.) This hardness gradation corresponds with the order of brittleness of the three types of steel under the bend test, but it is believed insufficient alone to account for the great difference in bending qualities of the steels.

Very roughly, the Brinell hardness number multiplied by 500, equals the ultimate tensile strength

Table No. 4—Final Summary of Tensile Tests
Averages, ⅛ and ¼ in. Specimens
Lot No. 1—Low Drawing Temperature (From Table No. 2)

Steel	Chromium-Vanadium	Nickel-Chromium	Nickel, 3.50 Per Cent
Oil quenched, deg. Fahr.	1,650	1,500	1,500
Brinell hardness, quenched	430	427	422
Shore hardness, quenched	63	62	57
Drawn at deg. Fahr.	800	800	700
Brinell hardness, drawn	357	356	326
Shore hardness, drawn	58	57	53
Ultimate stress, lb. per sq. in.	184,060	171,270	180,820
Yield stress, lb. per sq. in.	163,370	149,300	155,170
Elong. 2 in., per cent	6.6	8.1	7.6
Elong. 4 in., per cent	4.1	4.6	4.4
Red. of area, per cent	32.0	42.5	47.1

Lot No. 2—Medium Drawing Temperature
(Aimed to Give 150,000 Lb. Per Sq. In. Ultimate Strength)
(From Table No. 3)

Oil quenched from, deg. Fahr.	1,650	1,500	1,500
Brinell hardness, quenched	432	426	419
Shore hardness, quenched	62	63	56
Drawn at deg. Fahr.	950	900	800
Brinell hardness, drawn	298	315	298
Shore hardness, drawn	48	49	45
Ultimate stress, lb. per sq. in.	160,050	152,900	149,300
Yield stress, lb. per sq. in.	144,320	139,300	135,650
Elong. 2 in., per cent	8.8	9.7	9.7
Elong. 4 in., per cent	5.3	5.5	5.5
Red. of area, per cent	39.5	43.7	48.2

REMARKS.—It is noteworthy that Brinell and Shore hardness after quenching, of Lots 1 and 2, agree very closely, showing uniformity of material.

of the annealed specimens, but there are some pronounced exceptions to this rule in all three types.

The Shore hardness readings are given for what they are worth, but they do not appear to bear a constant relation either to the Brinell hardness, the yield strength or the ultimate strength of the annealed steels.

The Brinell and Shore hardness of all specimens is of the same order after quenching, independent of the alloy and thickness. (Tables Nos. 1a, 1b, 1c.)

The Brinell hardness after drawing, multiplied by 500, gives a fairly close approximation of the ultimate tensile strength, for all the steels at both drawing temperatures, and independent of thickness. The error is, in general, less than 10 per cent, and lies on the safe side for the chromium-vanadium and 3.50 per cent nickel steel (Tables Nos. 1a and 1c), but the estimated value is above the true value for the nickel-chromium steel.

The Brinell hardness after drawing was, in general, lower for the ⅛-in. than for the ¼-in. specimens (Tables Nos. 2 and 3). This corresponds with the lower tensile strength of the ⅛-in. specimens, but is contrary

Table No. 5—Straight vs. Cross Rolling
Qualitative Comparison, Ultimate Stress (S) and Elong. in 2 In. (E)

Drawn Deg. Fahr.	Thickness In.	
Chromium-Vanadium Steel		
800	⅛	Cross slightly greater S and greater E
	¼	Cross slightly greater S and greater E
950	⅛	Cross slightly less S and greater E
	¼	Cross slightly less S and same E
	(5 greater, 2 less, 1 same)	
Nickel-Chromium Steel		
800	⅛	Cross slightly greater S and greater E
	¼	Cross slightly less S and less E
900	⅛	Cross slightly greater S and less E
	¼	Cross slightly greater S and greater E
	(5 greater, 3 less)	
Nickel Steel, 3.50 Per Cent		
700	⅛	Cross slightly greater S and greater E
	¼	Cross slightly greater S and same E
800	⅛	Cross slightly less S and greater E
	¼	Cross slightly greater S and same E
	(5 greater, 1 less, 2 same)	

NOTE.—All types show a slight advantage in cross rolled specimens, that is, they tend to have a higher average ultimate stress and elongation than the straight rolled specimens. The differences are very moderate, however.

to what would be expected from their more rapid cooling in quenching.

The Brinell test is obviously of great value in the inspection of parts after heat treatment. (A load of 3000 kg. with a 10 mm. ball was used throughout, and found satisfactory for the ⅛- as well as the ¼-in. thickness, but for lighter gages a lighter weight and possibly a smaller ball would be necessary, to avoid penetrating the sheet.)

Shore scleroscope readings on the heat-treated specimens show considerable uniformity for each type of steel and may possibly be used as a check upon the heat treatment of parts. Brinell readings are believed to be more reliable when they can be satisfactorily made.

(To be concluded)

Land to Be Acquired, Despite Objections of Illinois Steel Co.

MILWAUKEE, WIS., Sept. 12.—Forty-three acres of land on the south end of Jones island, belonging to the Illinois Steel Co., and partly occupied at present as docks and storage of the Bay View blast furnaces and rolling mills, will be acquired by the city of Milwaukee under condemnation proceedings. The decision was made after a series of hearings conducted by a jury empaneled to determine the necessity for condemnation of the property as a part of the site of proposed municipal lake and rail terminals and docks to insure the completion of the outer harbor project, which is being hastened to execution with the prospect of the consummation of the Great Lakes-St. Lawrence River deep waterway. The Government will expend $4,000,000 in completing the outer breakwater, according to assurances given the jury by Col. W. V. Judson, United States division engineer.

The Illinois Steel Co. opposed the condemnation of its property and at the final hearing held Aug. 31, E. J. Buffington, president of the company, presented a formal statement which read in part as follows:

Absolutely no extension or addition to the plant could be made on account of the lack of room therefor.

On account of the limited space for the storage of raw material, present operations would be curtailed from 50 to 75 per cent.

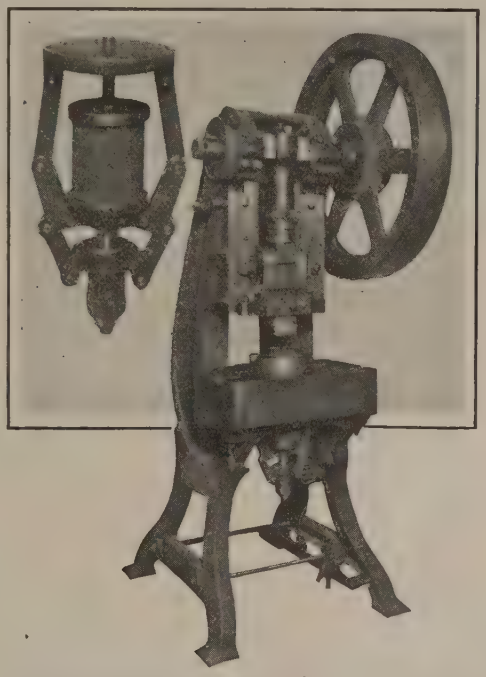
Blast furnaces could no longer be maintained for the reason that there would be no storage room. . . . Little likelihood that this company would wish to spend any money repairing, replacing or remodeling the present layout under such circumstances.

This company would eventually be compelled to abandon the plant on account of the inability to operate the same at its present capacity and on account of the inability to extend the same.

New Attachment for Combination Dies

The E. W. Bliss Co., Brooklyn, N. Y., is bringing out the combination toggle joint spring pressure attachment shown in the accompanying illustration. It is said to possess marked advantages for users of combination dies, particularly where lithographed metal is handled.

The attachment is designed to effect uniform drawing pressure on the blank during the entire draw, producing a more uniform edge and increasing the efficiency of the process by minimizing strain on the metal, reducing wrinkles, breakage and wear on the dies. The application of the toggle motion, in addition to giving a uniform pressure, reduces the total rubber or



The Application of the Toggle Motion Gives Uniform Pressure and Reduces Rubber or Spring Compression

spring compression materially. Strain on the press is reduced and saving in power effected by the elimination of accumulative spring pressure. The reduced compression adds considerably to the life of the rubber or spring, and is said also to permit of economical manufacture with combination dies of shells deeper than heretofore practical. Where reducing operations follow the first cutting and drawing the number of operations can be reduced and certain work that formerly required double action dies can be done in combination and reducing dies. A further advantage offered is that the reduced spring or rubber compression results in proportionate reduction of "back lash" of the press on the up stroke.

The attachment is regularly built in four sizes for standard Bliss presses and to install, no change in the press equipment is necessary. The dies can be removed as with the old style attachment. The depth of draw obtainable on presses No. 18, 19, 20 and 21 is 1¼, 1½, 2 and 2½ in., respectively. To obtain the maximum draws, given presses must have the same stroke and die space as necessary with the old style attachment. While a shell of greater depth may be drawn than with the old style, it is to be understood that to get the maximum depth of draw, correct working proportions between diameter and depth of shell must be maintained.

The Hendee Mfg. Co., Springfield, Mass., motorcycles, has reduced prices on its product 22½ per cent. Two new models have been added to the company's line.

Heavier Freight Movement at Pittsburgh

PITTSBURGH, Sept. 12.—A revival in business that is slow but still perceptible is noted in freight traffic figures for the Pennsylvania, the Baltimore & Ohio and the Pittsburgh & Lake Erie railroads. While purchases of goods and materials are held back in many instances on account of the adjustment of wages and costs, confidence is again an element in the business world.

The Pennsylvania Railroad reports that daily average loaded cars dispatched in the Central Region in August numbered 23,423, an increase of 509 over July, the daily average. The banner day was Aug. 27, when 27,527 were dispatched. For the same month last year, an average of only 16,000 cars was moved daily. Coke shipments from the Connellsville region reflected the low rate of production of blast furnaces and foundries. Shipments for August showed an average of only 400 cars, or 16,000 tons daily, as compared with about 800 cars a day one year ago.

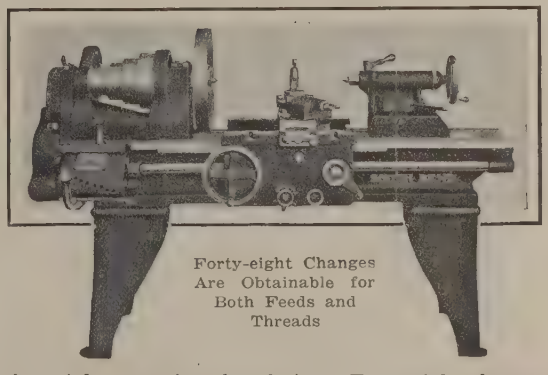
The Pittsburgh & Lake Erie Railroad reports a 10 per cent improvement in the movement of freight in August as compared with July. Shipments of steel, coke, builders' supplies and cement over the company's line from Pittsburgh to Youngstown all showed increases.

The Baltimore & Ohio Railroad reports improvement in shipments of iron, steel, road building materials and coal. Increases in shipments have been recorded in Pittsburgh, Cleveland and Youngstown. Coke shipments on this road are reported to be 10 per cent lower than for the same period a year ago.

New Quick Change Gear Lathes

The South Bend Lathe Works, South Bend, Ind., has added to its line of engine lathes a quick change gear pattern which will be furnished in sizes from 9 to 24 in., swing, inclusive. The plain change gear lathes will be made in the same sizes, as heretofore.

The quick change gear box used is the same as that on the Flather lathe, the company having secured the



Forty-eight Changes Are Obtainable for Both Feeds and Threads

shop rights covering that design. Forty-eight changes are obtainable both for feeds and threads, these changes applying also to the cross feed. All gears in the box are made from steel forgings. As shown in the accompanying illustration the index plate on the box is arranged to receive the plunger for the different changes, the crank lever above being used to operate the clutch of the inside which controls 1 for 2 and 2 for 1 gears. The lever is thrown up from the bottom. Opposite each hole on the bottom there is a notch and as the lever is brought up to make a change an extension on the inner side of the lever drops into the notch, no adjustment being necessary.

The regular equipment includes large and small face plates, graduated compound rest, follower rest (not on the 9 and 11-in. lathes) adjustable stop for screw cutting, semi-machined chuck back, gear guards, wrenches and countershaft.

The City of Youngstown, Ohio, has awarded a contract to the National Cast Iron Pipe Co. to supply pipe 20-in. or under for the first unit of a proposed belt line to be constructed around the city by the water works department. The company bid $38.10 per ton.

Screw Stock Heat Treated With Oil

Application of the Mircs System to Ferrous and Non-Ferrous Material by the Bridgeport Screw Co.—Operating Data

AN application of oil-burning equipment for annealing, heat treating and drying screw stock on a large scale was recently made by the Bridgeport Screw Co., Bridgeport, Conn. The type installed is of the Mircs design for which F. J. Ryan & Co., Philadelphia, are both the contractors and engineers, having recently taken control of the Mircs Fuel Oil Equipment Co. The installation is claimed to be typical of the flexibility of oil burning in heating problems and as an example of its economy. A description of the installation, furnished by F. J. Ryan, president of the company, follows:

The installation covers five pot muffle annealers, one small gage wire annealer used for both ferrous and non-ferrous products and two drying ovens. The Mircs No. 2 universal burner was used throughout the installation with air pressures of approximately 14 oz. The burner mechanically atomizes the oil and is adjustable for use of low or high gravity oils at either low or high pressures. Rearrangement for either operation can be made without the removal of the burner which allows for adjustment to oil market conditions. In the present operations described, Mexican oil of the standard grades now obtainable is used at a pressure of approximately 10 lb.

The manufacturing process surrounding the heat-treating departments is one of exacting demands and the question of uniform, regulated annealing and drying has a direct connection with the ultimate resulting product. The procedure in this department is, first, thorough annealing at temperatures ranging from 1400 to 2000 deg. Fahr. in accordance with the requirements of the charge; second, pickling by a special method developed by the engineers of the Bridgeport Screw Co., and third, a thorough and regulated drying at a temperature of approximately 475 deg. Fahr. The last operation is of keen interest because it is the correctness of this operation that decides to a large degree the quality of the finished product.

After annealing, when the wire is treated in the pickling vats, it must be dried over a proper period and at a proper temperature to eliminate and kill the action of acids that may remain after washing. Unless this remaining acid is thoroughly removed by this drying process, it gradually eats into the steel and the majority of screw head defects can be attributed directly to it. This drying must take place in an atmosphere entirely free of gases. It was therefore necessary to so design the ovens as to secure the heat without exposing the material to the direct action of the gases developed in the burning of the oil.

This was accomplished by building a system of refractory channels emanating from the main combustion chamber, the top of which was covered with interlocking curved cast iron cover plates, the interlocking edges having channel sections for luting. The heat therefore developed in the combustion chamber travels through these flues, heating up the cover plates, and the resulting temperatures in the oven are secured by the radiation from these plates.

It was found that by running two burners on each oven at approximately 800 to 1000 deg. Fahr., a resulting temperature of 450 to 475 deg. Fahr. was obtainable in the baking chamber. It was also found that this could be increased or decreased by adjusting the quantity of the oil being burned.

The pot annealers through which the wire first passes are so constructed that the entire combustion takes place in two combustion chambers at the bottom of each pot directly opposite to each other. The heat developed passes through flues into the annealing chamber by ports distributed in such a way as to give even distribution. Cast iron pots are used as retainers for the wire during annealing, having sealed covers to eliminate any possibility of action from the surrounding gases.

The main casing of the furnace is of riveted steel plate with a structural ring holding refractories constituting the cover. Exhaust gases pass through ports in this cover directly into the room and are exhausted through vents in the roof. No detrimental results have been experienced from these exhaust gases. The following is a brief summary of some of the many heats that have been run on this equipment:

Pot Furnaces

Fur. No.	Starting Furnace, p.m.	Temp., Deg. Fahr.	Heat Ended, a.m.	Temp., Deg. Fahr.	Fuel Used	Charge in Lb.	Gals. Per Hr.	Gals. Per Ton
1	11:00	1,602	8:00	1,681	77	10,667	8.66	4.33
2	11:00	2,048	8:00	2,113	65	10,667	7.00	3.50
3	11:00	1,589	8:00	1,663	74	10,667	8.00	4.00
4	11:00	1,700	6:00	1,800	100	10,667	14.28	7.14
5	11:00	1,333	6:00	1,427	94	10,667	13.28	6.71
1	6:00	1,682	3:00	1,773	91	10,667	11.11	5.55
2	6:00	2,115	3:00	2,204	89	10,667	9.88	4.99
3	6:00	1,666	3:00	1,750	84	10,667	9.32	4.66
4	5:00	1,801	3:00	1,902	101	10,667	12.62	6.31
5	5:00	1,428	3:00	1,507	79	10,667	9.87	4.93

It will be noted that the time of annealing runs between seven and nine hours and that the charge per pot averages slightly more than five tons.

The average oil consumption is in the neighborhood of 90 gal. per furnace or practically 20 gal. for each ton of material brought to temperature and carried through the proper time range. Taking oil at the present average market quotation of 5c. per gal., the cost of fuel is roughly $1 per ton. However, in this instance, nearly 40 per cent of the total weight is invested in the pot and the coil support which can not be considered. Therefore it can be conservatively estimated that $1.60 is the present fuel oil cost in this annealing process. The temperature in the furnaces at the start and finish varied very little which is an indication of the controlability of fuel oil where temperature control is of interest.

The small annealing furnace takes care of annealing of the special light gage wire products, some of which are of the thinness of thread and demand the most exacting attention through this process. The material is coiled in small light gage steel containers which have tight fitting covers. The quantity of the charge varies greatly in accordance with the size of the wire. The furnace has a rated capacity of one ton. The following is a brief extract of a six days' run on this furnace:

Small Annealing Furnace

Starting Furnace a.m.	Temp., Deg. Fahr.	Heat Ended p.m.	Temp., Deg. Fahr.	Fuel Used
7:00	77	6:00	128	51
7:00	128	6:00	171	43
7:00	171	6:00	199	28
7:00	199	6:00	254	55
7:00	254	6:00	298	44
7:00	298	6:00		

It will be noted that the temperature range on this equipment was also well under control.

The following are the results obtained on two runs in the No. 1 bake oven. Both of these ovens are of the same general design and it can therefore be con-

The Pot Muffle Annealers, Oil-Fired, for Annealing Ferrous and Non-Ferrous Wire Stock for Screws at the Plant of the Bridgeport Screw Co., Bridgeport, Conn.

sidered that the results will be approximately the same.

Run No. 1

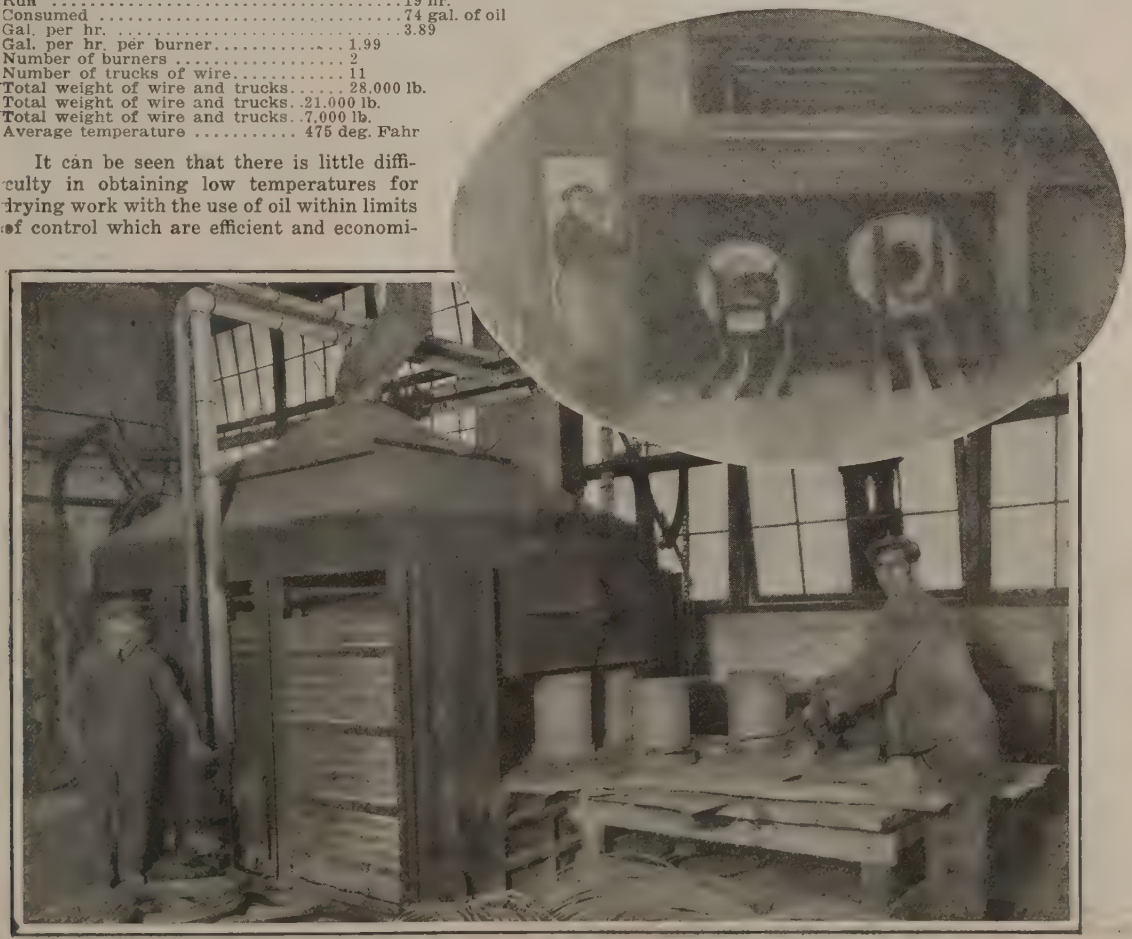
Run	19 hr.
Consumed	80 gal. of oil
Gal. per hr.	4.21
Gal. per hr. per burner	2.10
Number of burners	2
Number of trucks of wire	14
Total weight of wire and trucks	39,000 lb.
Total weight of wire and trucks	28,000 lb.
Total weight of wire and trucks	11,000 lb.
Average temperature	475 deg. Fahr.

Run No. 2

Run	19 hr.
Consumed	74 gal. of oil
Gal. per hr.	3.89
Gal. per hr. per burner	1.99
Number of burners	2
Number of trucks of wire	11
Total weight of wire and trucks	28,000 lb.
Total weight of wire and trucks	21,000 lb.
Total weight of wire and trucks	7,000 lb.
Average temperature	475 deg. Fahr

It can be seen that there is little difficulty in obtaining low temperatures for drying work with the use of oil within limits of control which are efficient and economical and in operations where the necessity of the entire elimination of gases is of prime importance.

The installation described herewith is presented to indicate clearly the fact that a modern, up-to-date organization producing high grade materials in a competitive market has determined that oil burning will give the results necessary and still solve the economical demands. It is believed to be a case which demonstrates that the industry and the technician must still give due consideration to the use of oil as fuel in certain heat-treating developments.



Oil-Fired Annealer for Small Gage Wire and One of the Two Drying Ovens for Drying the Screw Stock

Novel Mechanical Molding of Car Wheels

Foundry Has Moving Platform to Handle Molds from Molding Machines, Through the Pouring Stage and to the Shake-out Machines

FOUNDRIES producing car wheels have been confronted with a number of obstacles which have largely prevented the use of molding machines. The weight and size of the castings and the large amount of sand required for making the molds, together with the space required for the storage of these molds as ordinarily made, created the feeling that many of the economies obtained from the use of machines were difficult to obtain. The desire to cut costs provided the incentive that enabled the Brown Car Wheel Works, Inc., Buffalo, N. Y., to overcome many of these difficulties in rather an interesting manner.

The method of making car wheels is well known, and was analyzed into the following principal divisions:

1—Making the molds, together with the delivery of the sand to the molding floor.

2—Removing the molds from the molding point.

3—Pouring the metal.

4—Allowance of time for cooling.

5—Shaking the castings and sand from the flasks.

6—Removing the castings to the soaking pits.

7—Transporting the sand, properly tempered, back to the storage bins.

8—Returning the flasks to the molding point.

It was decided that, if substantial economies were to be obtained, it would be necessary, so far as possible, to perform these operations mechanically. The installation of molding machines would eliminate much of the labor of making the molds, and the handling of the molds was accomplished by a moving platform, composed of a number of cars, each of suitable size for carrying a mold.

In the outline plan of the installation it will be noted that the cars making up the platform *P* run on a track layout of rectangular shape. The design of the platform is unique in that each car, upon arriving at a corner, without turning, automatically starts in a direction at right angles to its previous motion.

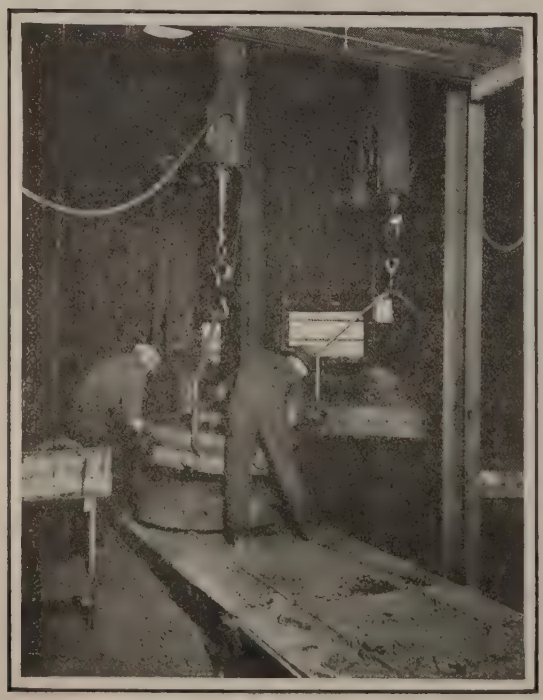
The platform has an intermittent motion, regulated to suit any required condition, and the lines of cars on each side of the rectangle are moved independently. It is operated by pneumatic equipment controlled from station *F*, which is elevated sufficiently for the control operator to get an unobstructed view of the foundry.

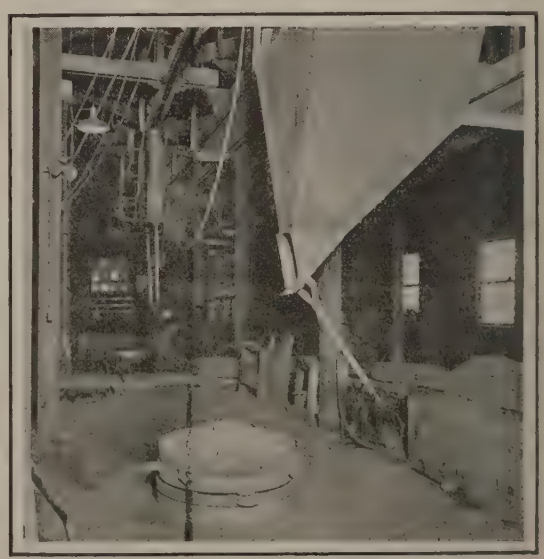
On two sides of the rectangle there is one less car than is required to fill the space completely, and the design of the control is such that, upon movement of the control lever by the operator, the platform on one of these sides is advanced a distance equal to one car, the open space at the end of the line permitting this. The line on the opposite side is next advanced the same distance, these two movements thus leaving vacant spaces at the end of each of the other two lines, thus causing the platform to be moved in increments, each equal to the length of one car.

As the action of the control is semi-automatic, the four sides of the platform cannot be advanced other than in correct sequence, and an emergency stop with which the control is equipped makes it possible instantly to stop any side. The intermittent motion of the platform allows it to have the very desirable feature of remaining stationary while the mold is being closed and during pouring. The cars start very slowly from rest, attain maximum speed and then are very gradually retarded, coming to rest with no appreciable jar.

There is little chance for sand and dirt to get on the track, as it is raised well above the level of the foundry floor, and the sides of the cars not only overhang the track, but, being accurately machined on all sides, are in close contact, thus preventing dirt from falling on the track.

The drags are made on a jar ram roll-over type of machine located at *B*, sufficiently removed from the platform *P* to allow a section of gravity conveyor *C* to be installed, upon which the drag is deposited after ramming and drawing the pattern. The cores are then set, being delivered by the truck *D* from the core room,

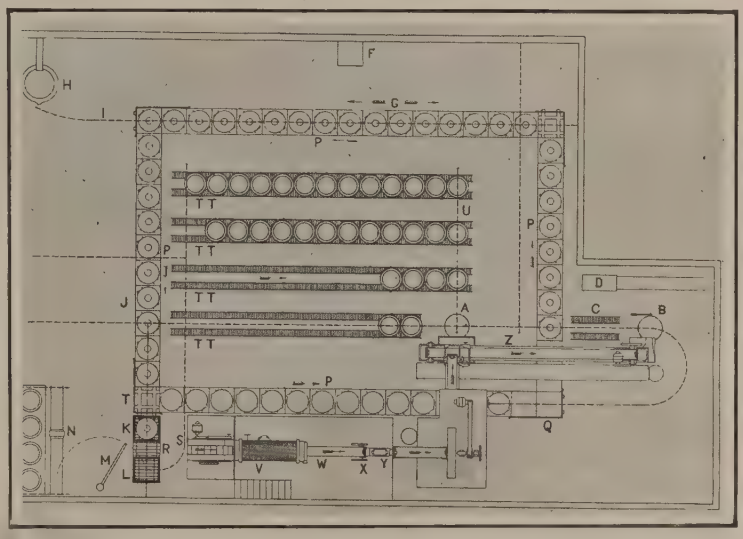




At Left, a Cope Is Being Closed on Its Drag, Resting on the Moving Platform; Another Hangs Near; a Third Is Behind the Column

Above, the Two Molding Machines Are Provided with Sand Chutes to Deliver Sand Directly to the Flasks. Moving platform appears at right, and then runs across between the two machines

Two Men Handle the Pouring, Which Is Done in the Center of Each Mold from a Ladle Carried by a Pneumatic Hoist on a Runway Over the Center of the Moving Platform. This platform remains stationary for the pouring of a mold, and then advances one car-length for the next one



At Right Is an Outline Plan of the Layout, Showing the Location of the Two Molding Machines at *A* and *B*, the Moving Platform *P*, the Pouring Location at G, Receiving Ladle at *H*, Control Stand at *F* and Shake-out Machines at *K* and *L*. Sand-handling apparatus is located at *S* to *Y*

and the drag is slid onto a car of the platform *P*. During this time, a cope has been completed on the machine *A*, and when finished is closed over the drag already resting on the platform. In the meantime, another cope and drag mold are being made on their respective machines.

The movement of the platform brings a succession of empty cars up to receive molds, and advances them to the pouring position *G*, the clamping being done at any convenient point between these two positions.

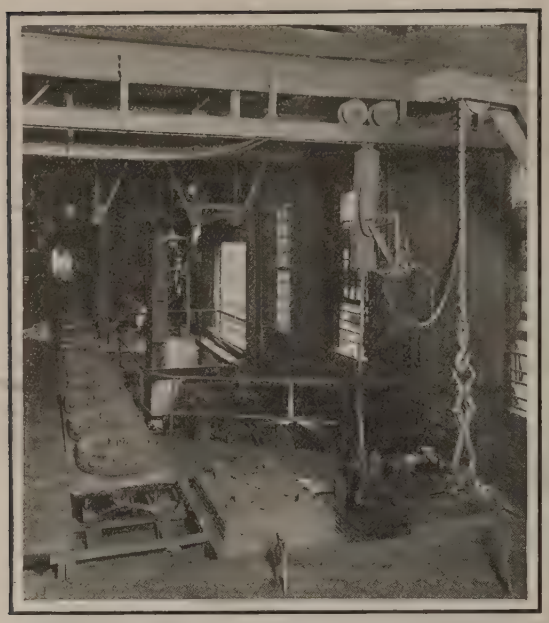
Iron is taken from the receiving ladle *H* in a secondary ladle suspended from an air hoist carried by a trolley running on the track *I*, located directly over the center of the platform. The pouring is done by two men, one standing on either side of the platform, and pouring into the center of the mold. After pouring, the molds are advanced to the position *J*, the time required to travel this distance being allowed for a preliminary cooling of the castings.

On arriving at *J*, the molds are unclamped and carried by an air hoist to the shake-out machine *K*, and the cope carrying the casting is removed to the shake-out machine *L*. After jarring the sand loose, the drag flask is placed on a car in the position *T* and carried by the platform to point *Q*, where it is removed by a trolley to molding machine *B*. The cope flask is carried by a trolley and deposited on the line of gravity conveyors *TT*, pitched toward *U*.

The chiller for chilling the tread of the wheel is bolted to the cope flask, and as it is desirable to allow time for these to cool, a surplus is provided, stored on these lines of conveyors *TT*. A trolley equipped with an air hoist takes them off from the lower end *U* of this gravity conveyor, and deposits them on the molding machine *A* as required.

Sand, as shaken out of the molds, falls through a grating onto the inclined pan conveyor, which delivers it to a rotary screen, where all heavy material is removed. From the screen, the sand falls onto a belt passing over a magnetic pulley removing any iron, and then into an elevator, where it is carried to the top of the building. Here it is automatically tempered, cut and delivered to sand storage bins over the molding machines.

In the view showing the cope being closed on the drag resting on the platform, it will be noted that another finished drag mold is suspended from an air hoist at the right, ready to be deposited on the next



Above Are the Two Shake-out Machines, with Sand-Handling Apparatus in the Pit, and One Line of the Moving Platform at Left

At Right Is Shown the Pouring Location, with Control Platform Against the Wall at Right and Receiving Ladle Beyond It, Under the Cupola Spout. The track overhead carries the pouring ladle

empty car. Still another drag may be seen resting on the gravity conveyor, ready for cores to be set. The view across the two molding machines gives their relative position to the platform and indicates the sand chutes for delivering sand to the flasks.

It requires only two men to pour for the entire foundry, as shown in another view. It should be especially noted that there are no obstructions around, the pouring being done under practically ideal conditions. The view of this section, taken when the foundry was not in operation, makes clearer the location of the pouring track over the platform. The control station can also be seen on the elevated platform in the center of this picture.

The location of the two shake-out machines with reference to the platform is shown in one view, as well as some of the sand handling equipment located in the pit below the floor level. The installation of all this equipment not only made it possible to get the greatest benefit from the use of molding machines, but also to reduce greatly the cost of labor.

One special feature worthy of notice is that the maximum distance that the hot castings are carried, from the time they are taken out of the molds until they reach the soaking pits, does not exceed 15 ft. This greatly improves the quality of the castings, as they all reach the soaking pits at a uniform heat, which is impossible to accomplish with the old method of pouring, where it was necessary to carry the castings varying distances, up to more than 100 ft.

It is now possible to obtain the same quantity production as formerly, in about one-half the floor space. The loss from bad castings has not only been greatly reduced, but the quality of the castings has been improved, and it is possible to obtain a greater uniformity in weight.

Designed by the Industrial Planning Corporation, engineers, Buffalo, the construction was supervised by E. B. Norris, general manager of the Brown Car Wheel Works. The Hermann Pneumatic Machine Co., Pittsburgh, furnished the molding and shake-out machines; the air hoists were made by the Curtis Pneumatic Machine Co., St. Louis. The Mathews Gravity Carrier Co., Ellwood City, Pa., furnished the gravity conveyors; the sand handling equipment was furnished by C. O. Bartlett & Snow Co., Cleveland. The trolley installation, known as the S-T system, was manufactured by the Whiting Corporation, Harvey, Ill.

French Iron and Steel Production Costs

Some figures on production costs were recently contributed to *Information* of Paris by Albert Despaux, who wrote with the evident purpose of pointing out the distress of the French industry in meeting the competition of Germany and that of countries having a depreciated currency. The cost of materials for producing a metric ton of basic pig iron, a ton of ingots, etc., as translated by the *Iron and Coal Trades Review* of London, is as follows:

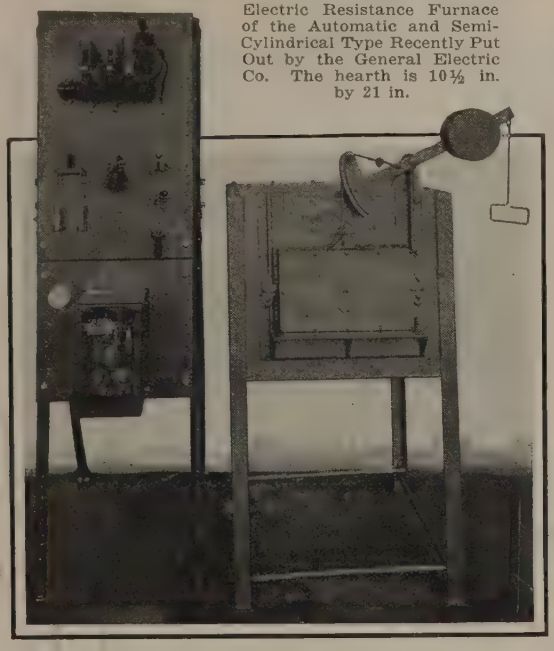
		Francs
3,250	kg. ore at 20 fr.	65
1,300	kg. coke at 125 fr.	162.5
60	kg. manganese ore at 200 fr.	12
1,000	kg. basic pig iron	239.5
1,100	kg. pig iron at 239.5 fr.	263 45
150	kg. coal at 110 fr.	16.50
	Addition of ferromanganese	7
150	kg. limestone at 90 fr.	13.50
1,000	kg. ingots	300.45
1,100	kg. ingots at 300.45 fr.	330.50
150	kg. coal at 110 fr.	16.50
1,000	kg. blooms	347.00
1,120	kg. blooms at 347 fr.	388.64
250	kg. coal at 110 fr.	27.50
1,000	kg. beams	416.14
1,150	kg. blooms at 347 fr.	399.05
300	kg. coal at 110 fr.	33.00
1,000	kg. merchant bars	432.05

If account is taken of the recovery resulting from the sale of scale, crop ends and cinder, etc., which represent approximately 35 fr. for a metric ton of blooms and 45 fr. for a ton of beams and merchant bars, it is found that the cost of raw materials comes to 312 fr. for blooms, 371 fr. for beams and 387 fr. for merchant bars. To arrive at the cost prices of merchant bars, it is necessary to add to the latter figure wages (100 fr. per ton), motive power, electricity, works transport, maintenance, supervision, general expenses, etc., which bring the total up to 600 fr. as the minimum for those works which are being operated at present under the least unfavorable conditions. But the home sale price is 380 fr., or 400 fr. at the most, for small orders, figures which only represent the value of the materials entering into the manufacture, but exclusive of all other charges.

NEW HEAT-TREATING FURNACE

Automatic and of the Semi-Cylindrical Type, Insuring Quick Heating

To overcome the objections that have been made to the small electric heat-treating furnace, especially as regards time of heating and flexibility of temperature control, the General Electric Co. has recently developed a new type of automatic furnace, known as the semi-cylindrical type. This furnace, which possesses new and improved features in design and construction, is primarily designed for operation at 1800 deg. Fahr., although by removing the temperature limit fuse it can be safely operated at 2000 deg. Fahr. A description furnished by the company follows:



Electric Resistance Furnace of the Automatic and Semi-Cylindrical Type Recently Put Out by the General Electric Co. The hearth is 10½ in. by 21 in.

The complete equipment consists of the furnace, transformer, automatic control panel and a temperature control instrument which is mounted on the subbase of the panel. The furnace consists of a sheet steel casing, supported on legs, lined with insulating material and having a semi-cylindrical chamber. It is in the design of the heating element that the most radical departure from former types has taken place, eliminating troubles experienced in many small types of furnaces.

The heating element consists of a continuous strip of resistor ribbon formed into an arch or succession of semi-circular turns conforming to the arch of the furnace chamber and extending the whole length of the latter, the proper spacing between turns being maintained by means of insulators. This gives a strong winding which is self supporting and still flexible to expansion and contraction. The two ends of the winding are brought out at the back wall of the chamber, so that the cables of the power supply may be attached. This not only gives a heating element that is strong mechanically but one that gives excellent heating characteristics to the furnace. The heat is radiated direct to the charge and the absence of a muffle allows a lower temperature gradient, as no heat has to be forced through it to reach the charge. Also, since the resistor is of large cross section, the combination of the two factors allows a high power input for the heating-up period with no danger of a burnout.

The heat distribution of the furnace is reported as excellent owing to the spacing of the resistor ribbon, which tends to give uniform temperature from front to back in the chamber. It is also possible to obtain rapid changes of temperature over the range from 1000 to 2000 deg. Fahr. Another feature is that the whole heating unit may be pulled out bodily for inspection or repair, by simply removing the front of the furnace and disconnecting the terminals at the back.

The transformer, which is mounted on the pipe frame of the control board, has four primary coils, insulated from the secondary. The coils may be connected in multiple, multiple-series or series, for 110:220, or 440 volts respectively, at 60 cycles. The secondary has two taps, one 70 volt giving 10 kw. for rapid heating, and the other 50 volt giving 5 kw. for normal operation. A small capacity extension to the secondary is also provided which supplies 110 volts to the contactor coil and for the motor of the temperature control instrument. The transformer is rated 7.5 kw. normal but will give 10 kw. for short periods such as mentioned above, or for one or two hour periods during the day when it is desired to change the temperature quickly.

The control panel carries the furnace contactor, line switch and a double throw switch, which, in its upper position puts the furnace on the 70-volt top of the transformer secondary, and in the lower position on the 50-volt top. The lower position is the normal operation. The temperature control instrument on the lower half of the panel has a scale range of 1000-2000 deg. Fahr., so that the furnace is protected from being set at too high a temperature. If for any reason the instrument should fail, or become inoperative, further protection is provided by a special fuse which melts a little above of 1800 deg. Fahr., opening the main line contactor when it melts, disconnecting the furnace from power supply.

The time required for heating is 1½ hr. from cool to 1560 deg. Fahr. on week-day mornings, when the furnace has been run the previous day, and 2 hr. on Monday morning, or when the furnace is cold.

American Trade with South Africa

Exports from the United States to South Africa increased from $54,891,000 in 1919 to $82,946,000 in 1920. During the same period, shipments from South Africa to the United States decreased from $38,743,000 to $19,063,000, and the "balance" in favor of the United States increased from $16,148,000 to $63,883,000. Principal among the items of iron and steel and other metals imported are those in the following table, which shows also the country of origin. The figures, which are for 1920, show how strongly the mother country is intrenched in the South African market, and at the same time something of what that market is, as a target for American exporters of manufactures of metals. The information was supplied by the United States Vice Consul at Cape Town to the Bureau of Foreign and Domestic Commerce at Washington.

	United States	Great Britain	Germany	All Other
Agricultural implements	$4,654,000	$3,531,000	$75,000	$2,020,000
Arms and ammunition	306,000	2,016,000	....	84,000
Brass and manufactures	76,000	369,000	....	52,000
Copper and manufactures	25,000	192,000	....	17,000
Electrical machinery and material	2,038,000	5,542,000	....	374,000
Enamelware	112,000	485,000	244,000	228,000
Hardware and cutlery	3,849,000	18,419,000	635,000	541,000
Iron and steel manufactures:				
Bars, bolts and rods	218,000	1,895,000	....	388,000
Girders, beams, etc.	75,000	453,000	....	1,000
Hoops	75,000	126,000	....	....
Pipes and fittings	69,000	2,022,000	....	16,000
Wrought iron and steel	228,000	2,121,000	....	120,000
Machinery and parts:				
Boilers	57,000	655,000	....	48,000
Engines	174,000	771,000	....	....
Manufacturing and milling	954,000	4,304,000	95,000	326,000
Mining	948,000	2,041,000	....	566,000
Pumps	249,000	492,000	212,000*	18,000
Windmills	617,000	114,000	....	18,000
Rails and railroad material	346,000	720,000	....	111,000
Tin and tinware	18,000	697,000	....	17,000

*Switzerland.

The New England Iron and Hardware Association will hold its annual fall outing at the Tedesco Country Club, Swampscott, Mass., on Tuesday, Sept. 20. Harry L. Doten, Boston, is chairman of the golf committee.

Rotary Furnace for Automobile Parts

Moving Hearth Is an Annular Ring—Heated Electrically and Controlled Automatically —Suitable for Large Variety of Parts

BY A. D. DAUCH*

HEAT-TREATING automobile parts varying in size and characteristics from a small spring clip to a large front axle is now performed at the plant of the Nash Motors Co., Kenosha, Wis., by a large rotary electric furnace, placed in operation a few months ago by the George J. Hagan Co., furnace and combustion engineer, Pittsburgh. The variety of parts to be treated made the problem of design unusually complex, but there was finally selected a rotary furnace with a moving hearth in the form of a continuous annular ring, electrically heated and automatically controlled. The same furnace performs annealing and carbonizing as well.

The furnace (Fig. 1) has the following dimensions:

Overall outside diameter	19 ft.
Overall outside height	7 ft.
Outside diameter of rotating hearth	15 ft.
Inside diameter of rotating hearth	5 ft.
Width of hearth	5 ft.
Height of heating chamber	2 ft.

The furnace walls are of standard construction, bonded throughout with adamant cement. The arch is formed of specially shaped refractories. The entire furnace is heavily insulated with standard material. The furnace structure is encased in sheet steel properly reinforced with structural beams. The furnace hearth is formed of structural members, is properly insulated and has a refractory hearth. The hearth rotates on a series of 20 roller bearings placed at regular intervals about the circumference of the table. Roller bearings mounted on the inner wall of the furnace prevent side play of the rotary hearth. The clearance space between the hearth and the furnace is closed by sand seals to prevent any infiltration of air into the heating chamber.

Two Adjacent Doors Provide for Charging and Discharging

The furnace is provided with two adjacent doors, pneumatically operated, one for charging and one for discharging. A baffle wall extends across the heating chamber between the two doors to prevent the heated pieces being chilled when cold material is charged.

The hearth is driven by an electric motor through a series of gears and gear reduction machinery (Fig. 2) so as to give six speeds of rotation varying from one complete revolution in 30 min. to one revolution in 75 min.

The electric heating equipment consists of 2 sets of nickel chromium ribbon heating elements mounted on the inner and outer walls of the furnace. The first section or heating zone extends approximately two-thirds the distance around, starting at the charging door, and has a connected load of 210 kw. The soaking or finishing zone has a connected load of 60 kw. (Fig. 3) installed to supply the radiation losses in this part of the furnace, at the same time giving enough additional heat to bring all of the charge to a uniform temperature. The main or heating zone is run at a temperature of 1580 deg. Fahr. and the soaking zone at 1525 deg. Fahr. The heating elements in each zone are separately connected to a General Electric control board (Fig. 4). The temperature of each section is automatically controlled and recorded by means of a two point Leeds & Northrup potentiometer. The temperature of each zone can be set at any desired value within the range of the instrument, i. e., 200 to 1800 deg. Fahr. The total connected load of 270 kw. is connected to 440 volts, 3 phase, 60 cycle power service. One hundred and ten volt, single phase, 60 cycle power service is used for control purposes.

In operation at 1525 deg. Fahr., the average efficiency of this furnace has proved to be 11.75 lb. of steel heated per kwhr. of power consumed. This is at the rate of 170 kwhr. per ton.

The charge per hour consists of approximately 3000 lb. of various automobile parts such as spring clips, steering knuckles, connecting rods and front axles. The weights of the different parts vary from 3 lb. to 180 lb. each. The time the different pieces are in the furnace naturally depends on the cross section and weight of the part. This feature of time in the furnace is very aptly taken care of by the different speeds at which the hearth may be revolved.

Castings and Forgings Are Annealed Over Night

After the furnace operator has removed the final charge of material to be hardened and the main line switch is opened, a charge of grey iron castings and steel forgings is placed in the furnace to anneal over night. The only heat employed for annealing is that drawn from the furnace walls. The temperature of the charge and the furnace in the morning averages about 1000 deg. Fahr. The annealed material is then removed and the furnace is again placed in hardening operation. Approximately 40 min. is required to bring the furnace temperature from 1000 deg. Fahr. to 1525 deg. Fahr.

This furnace is also to be used for carbonizing cam shafts. It is planned to charge a total of 18,000 lb. of carbonizing boxes, packing and material in the furnace at one time.

Advantages Over Oil Furnaces

Some of the advantages of this furnace over the box-type, oil-fired furnaces replaced are as follows:

Due to the uniform rate of heat absorption, distortion on long parts, such as axles, has been entirely eliminated.

In the fuel furnaces, regardless of the fineness of control, there was no assurance that all of the parts in the furnace had reached the proper temperature or had not been overheated. In this electric furnace the work is charged at one place and travels for a given predetermined time around the circumference of the furnace before it can be withdrawn. The temperature, heating time and rate of heating are under absolute control and are duplicated with mechanical precision day after day.

Scaling has been practically eliminated in the electric furnace.

The material annealed in the rotary electric furnace now requires only a flash pickle. This formerly was an item requiring 3 to 4 hr.

The scleroscope hardness test on all parts has been increased from 2 to 5 points. The quality of the material by individual test has proven to be more uniform in strength and other physical properties. The item of labor for handling the same number of parts has been cut in half. To date no material treated in the furnace has been rejected due to faulty heat treatment.

Heat Treatment Reduced to a Mechanical Operation

The most important factor, however, as mentioned by the metallurgical men who have charge of this equipment, is that they have been able to reduce heat treatment to a mechanical operation. The furnace operator is supplied with a heat-treating ticket on which is written the number of pieces, drawing number, speed of rotation of furnace hearth and tempera-

*George J. Hagan Co., Pittsburgh.

ture. It is then an assured fact that the particular product will receive the specified treatment regardless of any of the usual conditions affecting a heat-treating operation. Further, this furnace is so well designed and insulated that working conditions have been vastly improved with the resultant increase in productive effort on the part of the furnace attendants. Three men now do the work which formerly required six men.

Power and Load Factors Benefited

From the electrical superintendent's standpoint this electric furnace presents other advantages worthy of consideration. Due to the unity power factor and high load factor, this equipment has materially benefited power and load factor conditions throughout the plant.

The results secured have resulted in the Nash company's placing an order with the Hagan company for a duplicate equipment of smaller physical characteristics for similar work.

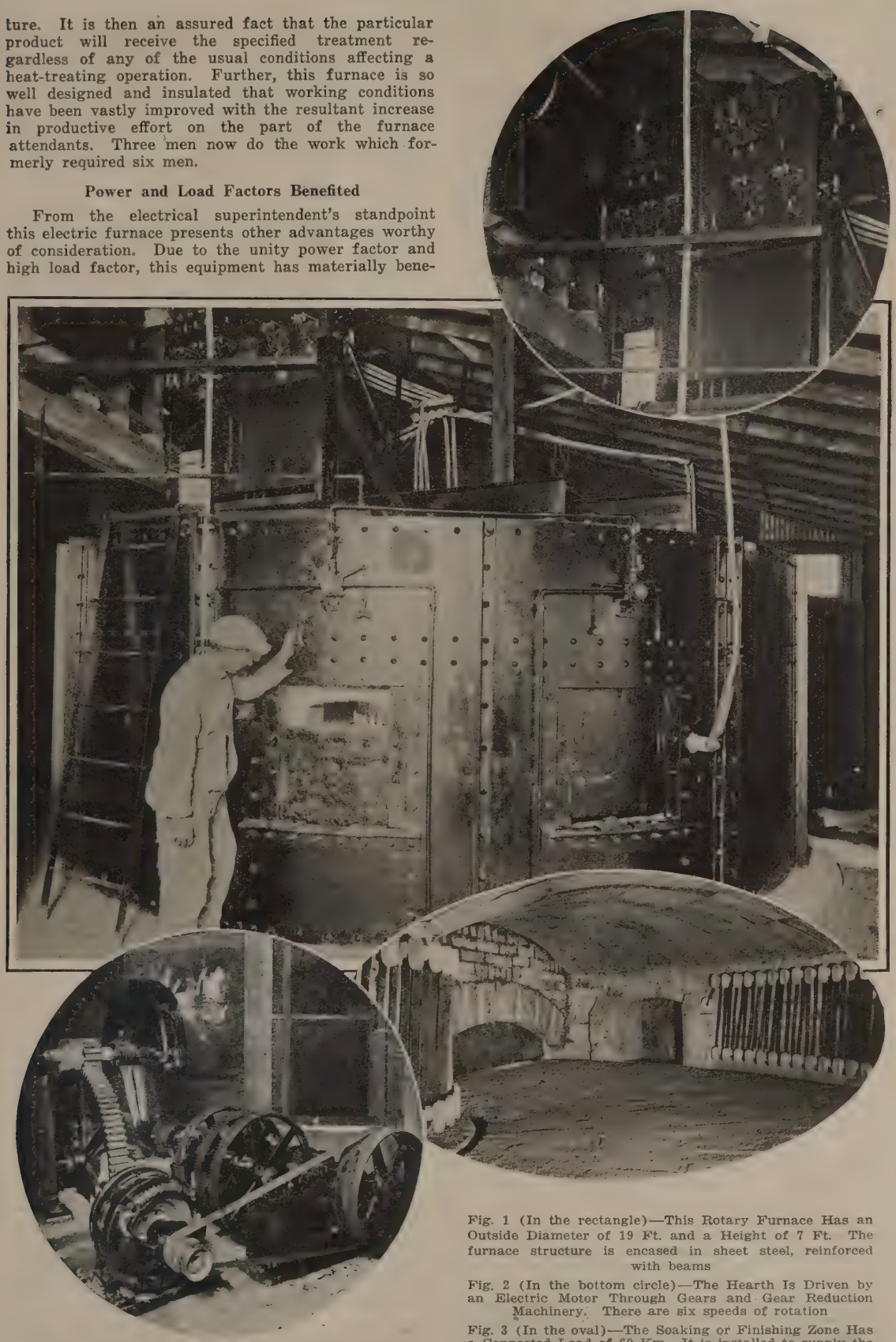


Fig. 1 (In the rectangle)—This Rotary Furnace Has an Outside Diameter of 19 Ft. and a Height of 7 Ft. The furnace structure is encased in sheet steel, reinforced with beams

Fig. 2 (In the bottom circle)—The Hearth Is Driven by an Electric Motor Through Gears and Gear Reduction Machinery. There are six speeds of rotation

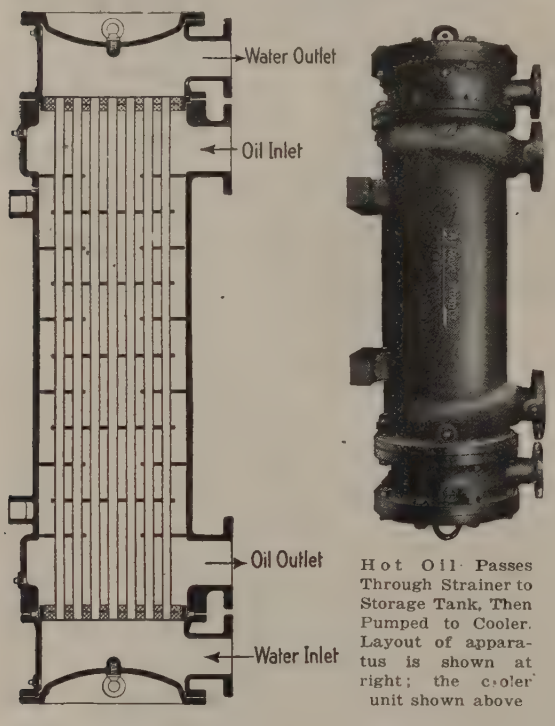
Fig. 3 (In the oval)—The Soaking or Finishing Zone Has a Connected Load of 60 Kw. It is installed to supply the radiation losses in this part of the furnace, at the same time giving sufficient additional heat to bring all of the charge to a uniform temperature

Fig. 4 (In the top circle)—The Heating Elements in Each Zone Are Connected Separately to a General Electric Control Board

Recooling Quenching Oil*

Proper speed of cooling is a determining factor in the degree of hardness bestowed upon steel. The rate of cooling depends upon the size of the piece to be hardened and upon the composition of the steel. It depends also and perhaps to a greater degree upon the rapidity with which the cooling or quenching medium removes the heat, which is in turn determined by the nature of the medium, its fluidity or viscosity, specific heat and temperature.

The particular cooling temperature of oil that will give the best hardening results should be ascertained first, then a suitable recooling system provided to maintain that temperature. Several methods of recooling



Hot Oil Passes Through Strainer to Storage Tank, Then Pumped to Cooler. Layout of apparatus is shown at right; the cooler unit shown above

quenching oil are in use, but circulating the oil in a closed circuit and recooling it in a separate cooler has met favor in modern practice. The accompanying illustration shows an arrangement of apparatus used in this connection. The heated oil is removed from the top of the quenching bath and passed through a strainer to a storage tank, from which it is forced by an oil pump to the cooler, wherein the oil is cooled and thereupon returned to the quenching tank.

The oil cooler unit is shown in the illustration. It is made up of a smooth bore cylindrical cast iron shell to the ends of which are attached cast iron headers. Within the shell there is a bundle of straight tubes of brass or copper through which cold water passes from one header to the other. The headers are separated from the cylinder by the tube sheets. The heated oil flows into the shell at the top, passes transversely across the tubes and around the annular baffles, and leaves the shell at the bottom. During its travel the oil strikes the tubes approximately at right angles, splitting into many fine streams. The water flows in an opposite direction to the oil.

The tube sheets are of composition metal into which the tube ends are cast. The upper tube sheet is rigidly secured to the shell, the lower one forming a floating head construction, which provides for the expansion and contraction of the tubes. The composition material of the tube sheets is dense and its melting point is around 550 deg. Fahr. It does not disintegrate at the temperatures met in practice. The packing between the headers and the shell consists of two rings of rubber separated by one of brass and practically prevents any mixing of the oil and water. All joints on the cooler are external and leakage can be quickly detected. The entire tube bundle is readily removed for cleaning and inspection, without breaking the oil connections. It will be noted that the oil pipe enters the quenching tank at the bottom and the overflow pipe leaves the tank at the opposite side and at the top, an arrangement designed to effect a thorough diffusion of oil through the tank and to effect a maximum cooling.

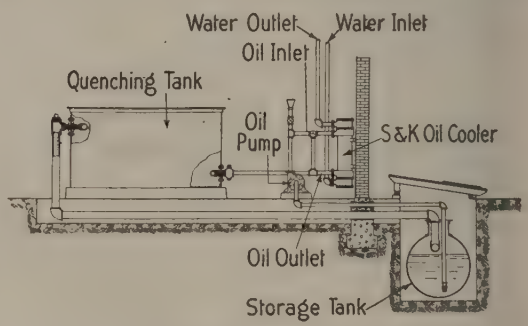
In an installation using a cooler of the type described 3000 gal. of oil were circulated per hour and 774 gal. of water. The oil inlet temperature was 118 deg. Fahr. and the outlet 96 deg., giving a drop through the cooler of 22 deg. The water inlet temperature was 35 deg. Fahr., and the outlet 75 deg., giving a rise in water temperature of 40 deg. The furnace temperature was 1500 to 1550 deg. Fahr. A No. 3 Gould pump driven by a 5-hp. motor, the pump running at 152 r.p.m., was used. The suction of the pump was 2 in., vacuum, and the discharge 32 lb. gage pressure. The length of the cooler described is 64½ in. overall, the diameter of the shell 14 in. and the weight 1000 lb.

The heat surrendered by 1 lb. of steel during quenching as for example, from 1550 deg. Fahr. to 150 deg., is 240 B.t.u. General practice is to specify 1 gal. of oil for every pound of steel quenched per hr.

If we assume a specific heat of oil equal to 0.487 and a density of 7.25 lb. per gal., the temperature rise produced in 1 gal. of this oil by 1 lb. of steel, is equal to $240 \div (0.487 \times 7.25) = 68$ deg. Fahr.

In other words, if the initial temperature of the 1 gal. of oil is 80 deg. Fahr., it will be increased to about 148 deg. by the quenching.

If 3000 gal. of oil are to be circulated per hr. through the cooler, the oil circulation per min. is 362.5



lb. If a water-to-oil ration of unity is chosen, that is, if the same weight of oil is circulated per min. through the cooler as weight of water, we can find the temperature drop of the oil circulated through the cooler. The temperature drop we find to be about 20.5 deg. Fahr. For 2 to 1, 4 to 1 and 6 to 1 water ratios, the temperature drops are 24, 26.5, and 27.5 deg., respectively. Thus, beyond a certain point, increase in the quantity of circulating water does not produce a proportionate temperature drop in the oil.

*From an article copyrighted by S. E. Derby, engineer, Schutte & Koerting Co., Philadelphia.

Less Unemployment in Pennsylvania

HARRISBURG, Sept. 5.—Public works projects, recalls of railroad workers to shops and resumption of industries here and there have improved the unemployment situation at a number of points in Pennsylvania, and reports to the State Bureau of Employment headquarters from Philadelphia and Pittsburgh are slightly more encouraging than in the middle of August. A summary of reports of branch offices of the State Department of Labor and Industry shows more than 250,000 workers listed as idle and registered at the bureaus. The summary of the unemployed registered for work by districts is as follows: Altoona, 18,860; Erie, 14,825; Harrisburg, 13,455; Johnstown, 18,840; McKeesport, 5075; New Kensington, 6050; Philadelphia, 127,000 men and 12,050 women; Pittsburgh, 5665; Scranton, 16,020; Williamsport, 5350.

Electric Furnace Tool Steel Qualities

Vital Considerations in Practice Insuring Regularity—Rôle of Purity of Stock—Some Specifications—Alloy or Reinforced Steels

BY W. J. AND S. STUART GREEN*

"IT is one thing possessing a fiddle and another thing being able to get good music out of it," said a prominent steel man in addressing a rather large gathering of local steel-makers in Pittsburgh, on electric furnace efficiency, which apt expression seems to us, to cover the case of electric furnace tool steels. Certain it is, the electric furnace has yet to come to its full fruition for, unlike all other processes of steel manufacture, its limits have yet to be reached or even correctly defined; hence there is abundant room for more highly technical skill of an exclusive character, bearing in mind that its ultimate product is largely sold on quality rather than price. It is not, except in rare circumstances, a competitor of the open hearth furnace for its quality is altogether beyond that, but it does frankly challenge the best work the crucible can do.

It is not the purpose of this paper to consider electric furnace costs, pit-practice or refractories, as each would require a separate paper were anything more than a shallow treatment attempted. It is furnace practice in-so-far as it controls quality to which the writers have confined their attention. The great majority of electric furnace tool steels being made in basic furnaces, the writers deal only with basic practice.

Materials for Furnace Bottoms

High grade steel cannot be made on a poor bottom; it is therefore emphasized that good bottom materials are as essential as good melting stock and should be sought with the same care. It is not economy to use up old stock already largely disintegrated and, while speaking of economy, the writers wish to say that they have not always found the most expensive bottom material the best, nor likewise have the cheapest materials, as far as first cost goes, proved ultimately so. Discrimination has to be used and, having once selected a satisfactory material, it is well to hold on to it permanently. The curb should be held tightly also on the purchasing department; very liberal powers should be given the electric furnace department in the purchase of all its materials. However, having secured good bottom materials by no means renders a furnace immune from bottom trouble; careful fettling, the thorough cleaning out of all steel puddles and very careful watching of the bottom height are absolute essentials, if one desires freedom from such.

Burnt lime used for basic slags should be selected with considerable care, probably more so than is generally accepted. Slags readily formed are a blessing worth searching for, likewise slags with strong sulphur reducing properties. These virtues are possessed by few limes but, where found, are probably one of the largest money savers handled. First cost is entirely secondary where such a commodity has been secured. A burnt lime of the following average composition served the writers very well:

Ignition loss	11.24 per cent
Silica	1.24 per cent
Iron and alumina	Trace
Lime	86.06 per cent
Magnesia	0.62 per cent

*Pittsburgh.

In spite of a very keen appreciation of the abilities of open-hearth men, the writers deplore the frequent employment of such skill in the control of electric furnaces. It seems to us very much like retaining a heart specialist on a nose and throat case. It should also be said that the electrical department sometimes possess advanced ideas as to the proper operation of a furnace. It has been our experience however that the safest course is to stear clear of all such ideas except where they affect the proper care of apparatus.

High Grade Stock Essential

In the making of best tool steel there is no room in the electric furnace for low grade melting stock, with its attending refining. Final analysis, however excellent, is liable to be highly deceptive if used alone for grading quality, as very much more than analysis is required to constitute the best tool steel. It should always be borne in mind that tool steel making is an art as well as a science. We of course thoroughly believe in analysis in adherence to specification, but we also emphasize the necessity of specifications being drafted by someone who knows where quality comes in, indeed some final latitude of revision should be left in the hands of the steelmaker.

The electric furnace is, fortunately or unfortunately, such an excellent refiner that there is great danger of this feature being very much overdone and cheaper stock being used where best and more costly materials would ultimately prove economical. It is with the foregoing in mind that the writers have itemized the following major considerations affecting quality, which are the result of many years experience in tool steel making, both crucible and electric. They are, however, purely the opinions of the authors, carefully tried in every day practice, and are advanced as such.

FIRST GRADE.—Duplicating First Quality Crucible Steel.

General Specification: Mn, 0.10 to 0.25; Si, 0.15 to 0.25; P and S, 0.020 per cent maximum.

Charge to consist of all heavy melting stock, insuring little oxidation, cleaner stock and only one charge.

Heavy melting stock to be well under above specification in manganese and phosphorus Swedish, "American Swedish" rolling mill iron, ingot iron or similar stock being desirable except as hereafter provided.

Charge shall contain not less than 10 per cent of washed metal or Swedish carbonizing iron, and up to 33 per cent where carbon will allow. Carbon should be figured to just under limit of the specification.

Not less than 20 per cent but preferably up to 40 per cent of heavy electric furnace tool scrap shall be used in all charges. This of course replaces, to the amount used stock described above.

Positively no ore additions, mill-scale or boiling of any kind tolerated. Manganese and phosphorus being well under specification as provided, without such manipulation This means also that no slag shall be taken off.

Final carbon to be adjusted with washed metal or its equal. Heat should be under a white slag for at least one hour before tapping.

No ladle additions of any kind excepting aluminum should be made.

Operating trouble of any kind degrades heat according to degree of trouble.

Every attempt should be made to duplicate crucible conditions both in melting and casting practice.

The following charge indicates a hypothetical first-grade heat:

Quality.—38D-E (first grade tool steel).

Specifications.—C, 0.95 to 1.05; Mn, 0.10 to 0.25; Si, 0.15 to 0.25; P and S, 0.020 per cent.

	Lb.
Electric furnace heavy 38D-E scrap	5,000
Rolling mill iron (C, 0.10 per cent)	7,000
Washed metal (C, 3.50 per cent)	2,000
	14,000

SECOND GRADE—A General Purpose High Grade Tool Steel. *General Specification:* Mn, 0.20 to .35; Si, 0.20 to .30; P and S, 0.015 to 0.030 per cent.

At least 50 per cent of the charge should be heavy melting stock, the balance medium or light, but not sufficient of this latter to necessitate a second charge, which should be avoided.

The heavy melting stock used other than described in next paragraph should be standard open-hearth heavy low phosphorus analyzing phosphorus and sulphur 0.03 per cent maximum; nickel and chromium, under 0.15 per cent each, or equivalent stock.

Not less than 20 per cent but preferably up to 40 per cent of medium and light electric furnace tool scrap should be in charge.

Sand cast low phosphorus pig iron (maximum 0.03 per cent P) or its equal should be in the charge sufficient to melt approximately where desired in carbon. A minimum of 10 per cent should be used.

Heats should be finally adjusted for carbon with washed metal or its equivalent; 500 lb. should suffice; where more than this is required, the jump or part of same should be made with carburite or other satisfactory method.

Partial refinement by usual boiling and slag off is to be tolerated, though not of a drastic nature; or reduction of manganese where necessary, by this means, is permitted. Of course where the previous paragraphs have been followed very little will be necessary and, where feasible, mixture should be designed to eliminate even this manipulation.

In the event of a slag off heat the bath should be carburized with crushed electrode or carburite immediately after the slag off on the bare metal by the usual method. This should be figured as close as possible to specification, but if a further big jump should subsequently be found necessary it should be made with carburite as explained above. Any first-grade heat that has had to be boiled to knock carbon, etc., or has been in other ways a trouble heat, should be included in this grade, always providing the trouble has not been serious enough to further degrade it. This heat should be under a white slag for at least one hour before tapping.

No ladle additions excepting aluminum should be made.

The following charge indicates a hypothetical second-grade heat:

Quality.—FA4 (high-grade general purpose tool steel).

Specification.—C, 0.95 to 1.05; Mn, 0.20 to 0.35; Si, 0.20 to 0.30; P and S, 0.025 per cent maximum.

	Lb.
Medium and light electric furnace FA4 and 38D-E scrap	5,500
Open-hearth heavy low phosphorus scrap	7,000
Sand-cast low phosphorus pig iron (C 3.50 per cent)	1,500
	14,000

A very light boil only will be required to bring this well in specification in manganese and phosphorus required amount of carbon will of course be beaten in immediately after the slag off and finally adjusted with washed metal.

THIRD GRADE.—The Electric Furnace Saleman's Conception of a First Class Tool Steel. *General Specification:* Mn, 0.20 to 0.70; Si, 0.20 to 0.30; P and S, 0.015 to 0.035 per cent.

Heavy, medium and light open-hearth or Bessemer melting stock for major portion of charge.

Free use of pit scrap, skulls, light electric, dirty scrap, etc. Second charging is permissible, i.e., light scrap may be used in quantities as available or desirable.

Crushed limestone may be used entirely for both slags replacing the burnt lime of the better grades.

No washed metal or low phosphorus pig iron should be used for carburizing.

Coke, crushed electrode or carburite should be used for carburizing; added in cold charge in single slag heats or on bare metal after slag off in multiple slag heats.

Final adjustment of carbon with carburite except in those cases where time might be saved with a minimum amount of washed metal.

A 5-point carbon coking in ladle is permissible.

Boiling with ore, etc., and subsequent slag offs of any severity, necessary to finish in specification, is permitted; no limit on amount of ore, excepting, of course, that as little as possible to come in limits will be used.

Short cuts assisting production are permitted, such as soaking electrodes, tapping on fair slags, the freer use of aluminum, etc.

Utilization of accumulations of undesirable scraps can be effected.

While this is a third-grade product, it should be firmly kept in mind that it is a general purpose tool steel and as such should be melted and poured with care and attention consistent with the economies above described, in fact, an attempt should be made to neutralize the deficiencies of melting stock, etc., by more scrupulous care.

It will be seen from the foregoing that native purity of melting stock is worth its price where quality is the first consideration. It will also be seen that no corruption of open-hearth ideas, which represent a very different process, is sought. It is recommended that standard mixtures be formulated and strictly adhered to, avoiding the habit of rigging up a fresh mixture for every heat. Time and thought spent in the exact classification and storage of melting stock is effort that is also well repaid; indeed it is futile to attempt any quality work on any other basis; for quality, if it means anything at all, is a definite standard that can be repeated identically and without deviation every time, not occasionally or by chance or accident, and the very essentials are fundamentals that cannot be conjured with by clever reckoning.

Purity of Melting Stock

The basis of a lasting connection built up by quality is only secured by the foregoing means. It was one of the outstanding features of the old "rule-o'-thumb" steelmakers that they were able to reproduce their qualities with unerring accuracy and it is doubtful, in so far as carbon steel is concerned, whether their first water carbon product has ever been excelled; such product being largely the result of skill and judgment, some of this needs applying to the manufacture of tool steel by the electric process, analysis notwithstanding. Of course training and experience is needed to gain this desideratum and it is only by such that the quality end of electric furnace practice can be fully exploited. We have always looked with some distrust on ingenious furnace manipulation, frequently discovering a formidable "nigger in the wood pile" on close investigation. Therefore we stand firmly for stable standard practice.

Alloy or Reinforced Steels

These are the days of alloy steels or "re-inforced steels," so much so that one is apt to forget the great weight of straight carbon tool steels produced by the crucible process, which is yet to be captured by the electric furnace. Wherever electric furnace qualities are judged almost entirely by analysis, the capture of this business can not, in the writers opinion, be any unqualified success.

The alloy steel field is largely an electric furnace one and the considerations, outlined for carbon tool steels, can be readily applied to their manufacture, imposing very few modifications and these in strict conformity with the basic ideas of quality grades outlined.

The writers have made a considerable quantity of alloy tool steels, including a large amount of high-speed steels, the manufacture of which has been strictly governed by the general principles laid down in the foregoing. It should be said however that the manufacture of alloy steels offers certain liberties, such as the use of alloy ores rather than the reduced metals. Their use is of questionable wisdom in steels of the first quality. A desire for tonnage has, in some cases, suggested the withholding of alloys till late in the heat

in order to facilitate quick preliminaries and consequent quick heats. This has never been the practice of the writers, it being their concern as to how soon they could have the alloys in. Late additions therefore are not advised unless it be possibly in third quality work.

It is also a weakness of some furnace operators to regard an alloy steel as a reinforced steel and therefore able to withstand a certain amount of abuse in melting, but unfortunately by so doing they undo the virtues sought after as this reinforcement is used up to a degree in neutralizing melting deficiencies. It is sometimes felt in alloy work that the actual stock is only a vehicle for the alloys and therefore not required to be of superlative quality itself.

All these ideas however are contrary to actual fact and tend only to place the electric furnace in a subordinate position to the one it should hold, that is, a modern economic tool steel furnace. A first quality alloy tool steel must have a first quality tool steel base, the melting stock and the melting practice must be of a quality strictly in accordance with the desired quality of the finished steel. The addition of alloys to a second quality carbon tool steel can not make it a first quality alloy steel.

In conclusion, the success of the plan depends on the strict and faithful adherence to the considerations set forth and it is the writers' experience that such adherence is very adequately rewarded.

Tax Payments on Appreciated Capital

WASHINGTON, Sept. 13.—Taxpayers who have included appreciated values in determining invested capital contrary to the decision of the United States Supreme Court in the La Belle Iron Works case may file amended returns and pay their taxes within 90 days from Aug. 26 without penalty. This important ruling of the Treasury Department has been issued as T. D. 3220 and relates to income and excess profits tax returns for 1917 and subsequent years.

The ruling follows:

An examination of income and excess profits tax returns for 1917 and subsequent years has disclosed that many taxpayers have used appreciated and inflated values in determining invested capital shown in such returns contrary to section 207 of the revenue act of 1917 and section 326 of the revenue act of 1918.

This office has held consistently that the use of appreciated or inflated values in determining invested capital is not permissible and this ruling has been sustained by the United States Supreme Court in the case of the La Belle Iron Works v. The United States.

All taxpayers who, in the preparation of their income and excess profits tax returns for 1917 and subsequent years, have used appreciated or inflated values in determining the amount of their invested capital are required to file with the collector of internal revenue within 90 days from date of this decision amended returns for each of such years, in which the invested capital shall be computed strictly in accordance with the law and regulations and without the use of appreciated or inflated values. It is not required that such amended returns shall include the figures shown in the original returns which are unaffected by this decision. Only such figures as are necessary to show the correct values used in the computation of invested capital and such totals as are necessary to a redetermination of the tax need be shown. Payment of the additional tax shown to be due on such amended returns must also be made at the time the returns are filed.

Failure to file amended returns within the time specified will subject taxpayers to the penalties provided for in section 3176, United States revised statutes, as amended.

The Colorado Fuel & Iron Co. has announced the virtual closing of its plant at Pueblo, Col. The company will also suspend operations at its iron mine at Sunrise, Wyoming, as well as at several coal mines.

The Reed Foundry & Machine Co., Kalamazoo, Mich., has increased its capitalization from $250,000 to $1,000,000.

Unusual Traveling Crane for Ford Railroad Shop

An electric traveling crane having some unusual features is now being built for the River Rouge plant of the Ford Motor Co. The crane will be installed in the locomotive repair shop where all the repairs to the motive power equipment of the Detroit, Toledo & Ironton Railroad are made. The shop is rectangular in shape and was originally designed for a general repair shop for the Rouge plant but later was converted into a locomotive shop. It was found desirable and necessary to move the locomotives with the crane the length and width of the building and in addition to spot the locomotives at any angle with the bridge girders of the crane. This necessitated a crane having a hoisting unit of the usual design mounted on a turntable with individual motor drive above the hoist truck, so that the hoist unit may be turned through a complete circle. The Shaw Crane Co., of Muskegon, Mich., submitted a design which was approved. The crane is to have a 100-ton main hoist with a 25-ton auxiliary and a bridge span of 55 ft. The hoist truck is of the eight wheel type mounted on two bridge girders. The equipment is to be electrically driven and controlled from a suspended operators cab.

To Survey Commercial Laws of Foreign Countries

WASHINGTON, Sept. 13.—The new division of commercial laws of the Bureau of Foreign and Domestic Commerce soon will begin a world-wide survey of the commercial laws of foreign countries on a scale greater than is said to have ever been attempted by a government agency. A. J. Wolfe, recently appointed chief of the division, is in New York, where he will remain until Thursday of this week, and is conferring with lawyers and business men interested in the undertaking.

A series of carefully prepared questionnaires, it is announced by the Bureau, will form the basis of the survey. These will be sent to legal authorities throughout the world selected by representatives of the bureau and through the co-operation of representatives of the Department of States in foreign countries.

When the material has been gathered it will be edited in the bureau and prepared in the form of special booklets as follows:

"Doing Business under Foreign Laws," with full particulars as to the operations of foreign branches of American firms, organizing companies under foreign charters, taxation, etc.; "Agency Laws of the World," with proper forms for powers of attorney; Bankruptcy Laws of the World; Negotiable Instruments Throughout the World; Sales Contracts and Foreign Laws; Commercial Disputes Before Foreign Courts.

High Cost of Metric System Compulsion

WASHINGTON, Sept. 13.—Compulsory introduction of the metric system would cost 31 companies $21,464,688 or an average cost for each of $715,489.60, which for each worker employed would be $227.40, according to the American Institute of Weights and Measures, which is conducting a campaign in opposition to such legislation. The figures are based upon a questionnaire canvass conducted by the institute. As already stated in THE IRON AGE, hearings will be held upon a bill introduced by Senator Ladd of North Dakota providing for the establishment by law of the metric system after 10 years.

Should the bill be passed, all trade, the Institute of Weights and Measures states, would have to be carried on at the expiration of the period named in a system now strange to the American people. All postage, excises, duties and customs charged and collected by the Government would also have to be based on the metric system, the units of which bear no simple or easily remembered relation to the weights and measures now in use.

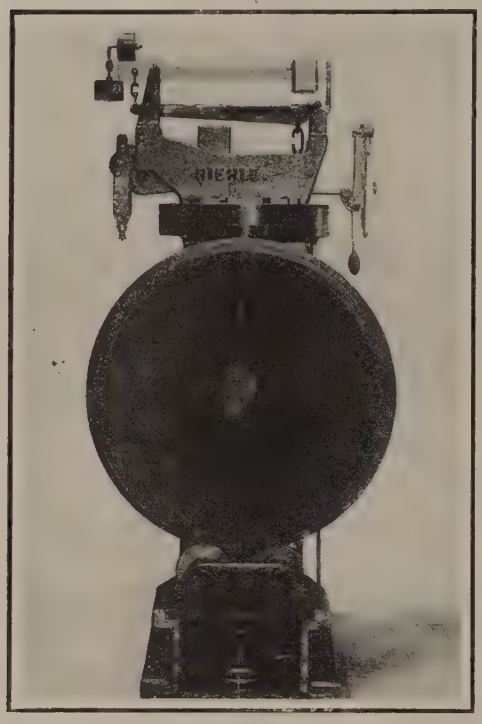
HARDNESS OF CHILLED WHEELS

Machine for Determining Brinell and Shore Values on Same Spot

The problem of making comparative Brinell and Scleroscope hardness test on identically the same spot of metal and on large size pieces has come to be a difficult task where speed of operation and the number of tests made are to be considered.

The Association of Manufacturers of Chilled Car Wheels determined upon an exhaustive study of the hardness of chilled wheels as compared to their wearing and breakage qualities. The makers want to know if any relationship exists and, if so, what it is. Incidentally they expect to determine the value of the hardness test as an indication of the general serviceability of the chilled iron wheel.

This study requires hardness tests by both the



The Special Hardness Testing Apparatus Devised by Riehle Bros. to Determine the Brinell and Shore Hardness of Chilled Iron Wheels at the Same Spot

Brinell and Scleroscope methods and on the same spot. No machine was available for this work. The problem was submitted to the Riehle Brothers Testing Machine Co., Philadelphia, and, after several conferences with representatives of the association, the machine herewith illustrated was designed and built in the Riehle works. It shows a 33-in., 700-lb. car wheel in position ready for the Brinell test. The method of registering the Brinell load is the Riehle lever and beam system which is said to be more dependable than a hydraulic gage reading. At the rear of the machine is shown the familiar Shore scleroscope. The scleroscope and Brinell weighing systems are both carried by the same housing which housing is bolted to a turn table so the whole upper part of the machine can be revolved with the Brinell ball and scleroscope dart in the circumference of the same circle.

To test a wheel the turn table is revolved 90 deg. from the position shown and a car wheel rolled into place resting on the two grooved rollers; an inclined track runs up to the rollers making it easy to push a wheel into place. The turn table is now revolved until the scleroscope comes over the wheel. When the center position is reached, a pin flies into a hole of the turn table and locks it. The scleroscope is now lowered by its rack on to the wheel and the test reading made. The scleroscope is raised, pin withdrawn by the eye shown, turn table revolved 180 deg., when the pin again locks it; the ball is in position directly over the spot tested by the scleroscope ready for the Brinell test. The rollers supporting the wheel rest on a hydraulic plunger and a few strokes of the hand pump shown raise the wheel against the ball. When the wheel touches the ball an initial reading of the depth indicating device is taken. A few more strokes of the hand pump put on the full Brinell pressure which is indicated by the beam rising in the gate. A by-pass valve is momentarily opened, wheel lowers slightly, a stroke or two of the hand pump again puts the wheel just in contact with the ball and another reading of the depth device taken. The difference between this and the first reading gives the actual depth of impression even eliminating any flattening there may have been in the ball.

The by-pass is again opened, the wheel lowers and it is then revolved to a new position for testing. Thus a series of tests can be made around the wheel.

The depth indicating device is entirely new and rests in the Brinell head directly above the ball. Two fingers rest on the wheel while a third one rests on the ball. The relative motion of wheel and ball is thus registered without any intervening mechanism and the most accurate depth readings possible are thus obtained.

British Bid Low for Uruguay Bridge

WASHINGTON, Sept. 13.—With a bid of 977,680 gold pesos, interests representing British fabricators submitted the lowest tender to build the Santa Lucia River bridge in Uruguay, according to a cable received by the Bureau of Foreign and Domestic Commerce. Interests representing American and German fabricators submitted bids also, the American figure being lower than the German bid. The American quotation was 1,081,444 gold pesos while the German bid was 1,084,595 gold pesos. At the present rate of exchange a gold peso is equivalent to 64.33c. The bids represent an almost complete reversal of those which have been made up to recently in South American countries. The German interests, now the highest bidders, have been the lowest, while the British interests, now the lowest, frequently were the highest. It is indicated that competition for business among steel interests of the world has developed to a keen point and that German interests are forced to ask higher figures than heretofore on business, some of which they are said to have been compelled to abandon because of inability to make delivery.

The Link-Belt Co., Philadelphia, will supply the machinery for two locomotive coaling stations for the New York Central Railroad at Solvay and Wayneport, N. Y. The plant at Solvay will consist of a 1000-ton reinforced concrete structure, equipped with 12 undercut gates and coaling chutes, and 12 sand gates and spouts, with necessary piping; two 24 x 36 in. gravity discharge elevator-conveyors having a capacity of 80 tons per hour of run-of-mine coal, etc. The station at Wayneport consists of a 400-ton steel pocket, six coaling gates and chutes; one 24 x 36 in. gravity-discharge elevator conveyor, etc.

An address on "Micro-Motion Study for Current Use," styled "a further indictment of stop-watch time study," is to be made by Dr. Frank B. Gilbreth, consulting engineer, Montclair, N. J., before a meeting of the New York section of the Taylor Society on the evening of Sept. 15, at the Flatiron Building Restaurant, New York. R. H. Wessmann, care of J. F. Tapley Co., Metropolitan Building, Thompson Avenue and Court Street, Long Island City, is in charge of the meeting.

Machinery for the manufacture of corn products and by-products is desired by the Standard Investment Corporation of South Africa, Ltd., Permanent Buildings, Harrison Street, Johannesburg.

New Trumbull-Cliffs 600-Ton Blast Furnace

Plant Completed in Record Time—Compact Arrangement for Labor Saving—Provision for Expansion of Plant and Enlargement of Furnace Hearth

WORK on the new 600-ton blast furnace plant of the Trumbull-Cliffs Furnace Co., Warren, Ohio, was started Aug. 15, 1920, and completed June 14, 1921. In less than ten months an open field on the Mahoning River, across from the Trumbull Steel Co., without railroad connections, was completely transformed: material and equipment were erected and placed in position, tracks were put in, the yard graded and fenced in, machinery turned over and the plant made ready to produce pig iron. This is believed to be record time for construction of a complete blast furnace plant.

Arrangement was made in the layout for the future installation of additional blast furnaces, as well as for a by-product coke plant. Throughout the design, provision is made for extension without interruption at the pumping, power and boiler houses, furnace and cast house, stock house and stock yard, casting, switching and other operations. Moreover, an extension of water lines, sewers, transmission lines, tracks, stock house and stock yard develops with minimum expense and effort from the existing units. As a typical example of provision for expansion, the boilers are so designed, with high settings and distinct combustion chambers for gas and coal firing, that stokers may be installed in the existing settings and the electric power output of the plant increased up to 12,000 kw. Improvements have been introduced which experience of the last few years has taught.

Present rail connections are the Pennsylvania and Erie railroads across the Mahoning River, but an additional connection is to be provided, at the opposite end of the plant, by the Baltimore & Ohio Railroad. As will be seen, the plant is laid out primarily for delivery of hot metal to the mixer at the open-hearth building of the Trumbull Steel Co., and for the time being all raw materials are routed into the plant over the three-track reinforced concrete bridge, which also serves as the delivery track for hot metal to that company.

A new feature is to be found in the provision for screening of the coke at the furnace bins. This consists of two rotary grizzly screens, each having eight motor driven shafts. These shafts and the disks upon them are so spaced that the rotary grizzly removes material under ¾ in. in size. Flow of coke from the bin to the grizzly is controlled by a cut-off gate, and also by a rotary vane feeder. This provides a steady and even flow of coke over the grizzly.

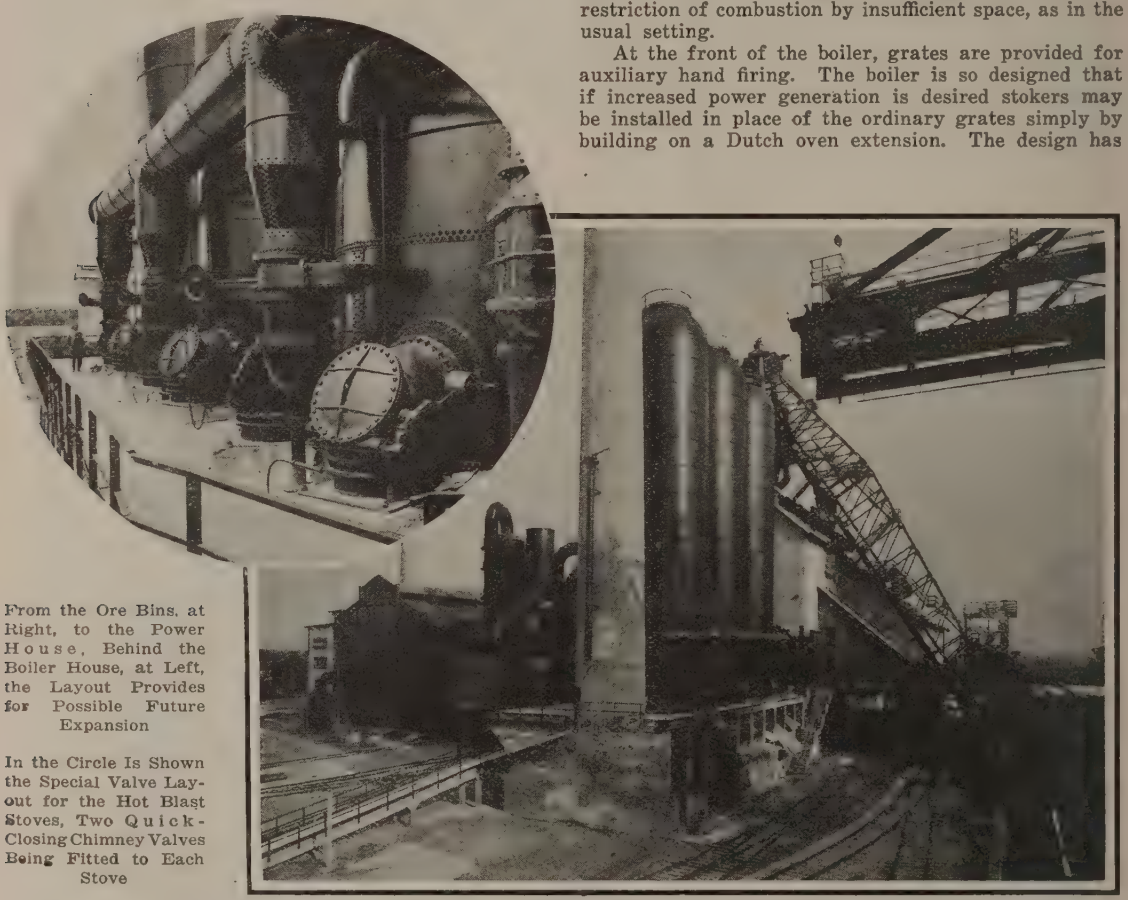
Emergency operation is provided for in a gate and a dead plate furnished over each grizzly, so that coke may be by-passed direct from the bin to the skip hoist bucket, in case the grizzly is out of operation. Underneath each grizzly is a hopper, one hopper delivering braize direct to a braize elevator, the other to an 18-in. belt conveyor discharging to the braize elevator boot. The elevator is a belt and bucket type delivering to a 24-hr. capacity bin. The motors driving the rotary grizzlies, the feeders and the belt conveyor and elevator are electrically interlocked, so that the

This View Shows the Compactness Which Is So Prominent a Feature of the Layout. The stack is as close to the stoves and to the gas-cleaning equipment as is permitted by considerations of ample working space. The passenger elevator and the blower's office and pyrometer house are conveniently located

motor driving the vane feeder and belt conveyor cannot be started until the motor driving the rotary grizzlies and the belt and bucket elevator is running. There is also provided a 20-per cent speed variation on the motors operating the rotary grizzlies.

The arrangement of cast house is the next outstanding feature. The cast house is 145 ft. long by 102 ft. wide, and has a 4-motor Cleveland Crane & Engineering Co. crane of 94-ft. 6-in. span, with 25-ton main hoist and 5-ton auxiliary hoist. This spans not only the cast house proper (70 ft. wide) from the foot up to the furnace front, but also spans two tracks, one the hot metal track and the other a track for spotting of cars, for removal of scrap and rubbish, and for unloading into cast house of coke braize, clay and sand.

This same crane is also utilized at the slag granulating pit at the foot of the cast house, and for this purpose is equipped with a Hayward 1½-cu. yd. bucket, having perforated bowl and manganese steel lips. The crane serves to unload from car or truck, and places upon the skip hoist house platform the motor armatures for the skip hoist or other material required. In the cast house is a brick and concrete structure providing storage for sand, clay and coke braize, in which there is also provided a mixing room for the preparation of these materials.



From the Ore Bins, at Right, to the Power House, Behind the Boiler House, at Left, the Layout Provides for Possible Future Expansion

In the Circle Is Shown the Special Valve Layout for the Hot Blast Stoves, Two Quick-Closing Chimney Valves Being Fitted to Each Stove

Convenient access is provided, not only by means of stairway but also by an easy incline up the stove foundation to the cast house floor. The grouping of a number of allied operations which must of necessity come under the eye of the blower at the furnace is very noteworthy at this point. The stove platform is at practically the same elevation as the cast house, the latter being reached by an incline not over 2 ft. in height from the stove platform. The stock bins are easily reached by a walkway from the cast house.

This walkway passes the skip hoist house, where the skip hoist, bell-operating cylinders, and distributing mechanism are placed, and also passes the skip incline. The blower foreman is thereby able not only to watch the work in the cast house and about the furnace, but also without going more than a few steps from the cast house, he can always check up on stove practice, or by watching the skip buckets, on the regularity of filling.

Provision is made so that the furnace can be rodded from the cast house, as a check upon the men in the stock house. The shutters in the iron runners are opened and closed by steam cylinders, these being operated from the central control station at the furnace front, where the snort valve wheel, the control for the Berg-Brosius mud gun and signal apparatus are located as one unit.

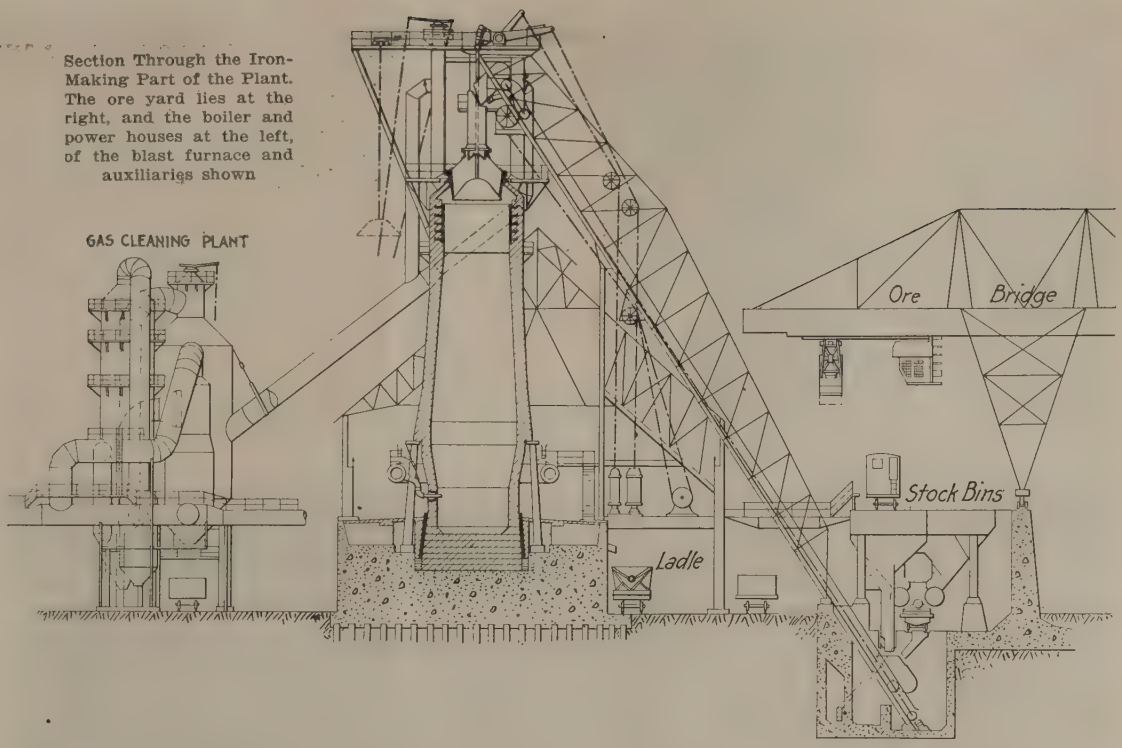
A new type of boiler setting places the boiler high, and gives an exceptionally large volumetric space per boiler hp. for complete combustion either of blast furnace gas or solid fuel. Four 14-in. Birkholz-Terbeck burners are installed at the back of each boiler. The combustion chamber for gas is under the mud drum, there being provided a distinct combustion chamber of large volume for the burning of the blast furnace gas without dilution by excess air through grate bars, or restriction of combustion by insufficient space, as in the usual setting.

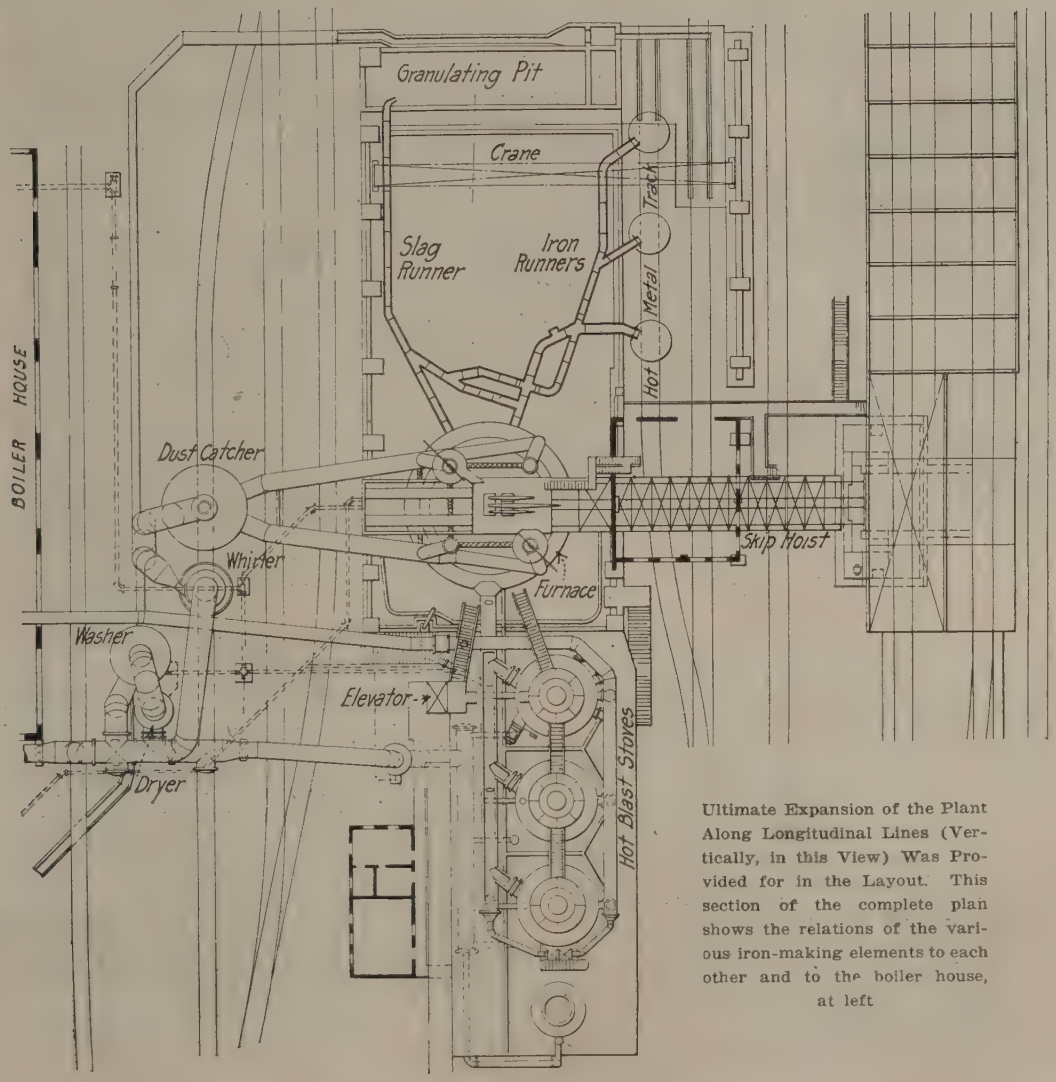
At the front of the boiler, grates are provided for auxiliary hand firing. The boiler is so designed that if increased power generation is desired stokers may be installed in place of the ordinary grates simply by building on a Dutch oven extension. The design has proved to have several very important advantages: it enables the boiler to be run at very high efficiency, due to complete combustion obtained in the large volumetric space; it enables considerable overload to be carried on the boiler, due to generation of high temperatures; it minimizes difficulties due to incrustation of tubes with dust or ash.

In the power house considerable advance in design is shown. Special attention has been paid to daylight lighting. Ample floor space is provided and all the successful features of modern power plant design are incorporated. Special mention should perhaps be made of the high intakes provided for the turbo blower, the advanced type of turbo blower installed, the completeness of the electrical equipment, and the well worked out system of water circulation and re-use.

In the blast furnace proper, the arrangement on the furnace top has been very materially improved as regards safety and convenience in work. The mantle and

Section Through the Iron-Making Part of the Plant. The ore yard lies at the right, and the boiler and power houses at the left, of the blast furnace and auxiliaries shown





Ultimate Expansion of the Plant Along Longitudinal Lines (Vertically, in this View) Was Provided for in the Layout. This section of the complete plan shows the relations of the various iron-making elements to each other and to the boiler house, at left

column have been increased in section and the manner of hanging the circle pipe, discharge trough and bustle pipe has been improved. An auxiliary cinder notch is provided. The iron and steel work of the furnace is so designed that the furnace can be enlarged at succeeding blasts if it should be found advisable. Other matters which should receive particular mention are the evident care devoted to economy in concrete in the foundations, trestle approach, highway bridge and pig casting machine; and the new type of cantilever skip incline, which affords greater rigidity of construction, and increased room in the cast house and on the furnace top.

Particular mention should be made of the improved gas main system, which originated with D. T. Croxton, manager of pig iron sales for the company. Contrary to the usual arrangement, where gas mains are led overhead both at the boilers and stoves, the gas mains here are placed underneath or outside of the stoves and boiler house. At the stoves the large main from the gas-cleaning plant goes to a water seal separator, whence it is led along the piers of the skeletonized stove foundation. From this main, pipes are led directly up through the stove platform to the stove gas burners. The main is given a slope which makes it easy to clean.

On the boiler house side, the large gas main from the cleaning plant goes to a similar water seal separator, whence it is led along at about yard elevation outside of the boiler house between the engine and boiler houses. This main is also given a slope and provided with downlegs for cleaning. Individual leads are taken from it to each boiler, the pipe for the gas burners coming up through the boiler house floor. This arrangement of mains is conducive both to cleanliness of the plant, ease in cleaning of mains and freedom from gas about the stove operating platform and inside the boiler house. The grouping together as one unit of all elements of gas cleaning is also noteworthy.

Starting with the receipt of raw materials, the ore and limestone are unloaded by a Mead-Morrison movable car dumper, with a 57-ft. cradle and a capacity of 320,000 lb. It is guaranteed to handle 30 cars per hr., and is provided with both dynamic and air braking. It has a travel the entire length of the ore and limestone yard.

Spanning the yard is a Mead-Morrison 11-ton man trolley ore bridge. It has a capacity of 600 tons per hr. from the dumping pile to the storage pile, or from the storage pile to the bins. The method of handling the ore and limestone consists in the movable car dumper placing material in a concrete dumping trough beneath the shear leg cantilever of the bridge. The 11-ton bucket picks up the material and delivers it to the main storage pile under the span of the bridge, or to the stock bins, or to the 50-ton Atlas transfer car, when the materials being handled out of the stock pile are not directly in front of the stock bins into which they are being delivered.

The ore bridge has a cantilever at the shear leg end of such length as to permit delivery by the grab into railroad cars on the track, approximately 32 ft. from the foot of the shear leg. This permits ore buckets to be changed, and also enables the ore bridge to handle repair work at the car dumper. A similar cantilever at the pier leg end allows the ore bridge to handle the skips when they have to be replaced on the skip incline. The bridge has a travel speed of 70 ft. per minute and is of the skewing type, permitting either the shear leg or the pier leg to advance five deg. ahead of the other. It is completely equipped with safety devices to prevent over-travel of either leg or of trolley, and it has magnetic solenoid brakes and rail clamps for provision against high winds.

The stock yard, 270 ft. wide by 505 ft. long, has a storage capacity for 250,000 tons of ore and 80,000 tons of limestone. Operating upon the ore bins is an Atlas 50-ton capacity side dump electric ore car, equipped with air-operated brakes, doors and car pusher arm. The bins are provided with a cross-over and suitable conductors so that the transfer car can work on either of the two tracks on the bins.

In the Foreground Is the Start of the System of Iron Runners. The slag runner appears at right; the gas-cleaning plant is outside the building, at right; the stoves are in the rear, behind the furnace. The ample working space is evident

Designed and installed by the Hoover & Mason Co., the ore bins consist of nine ore pockets with a capacity of 3120 cu. ft. each, four limestone pockets of 2900 cu. ft. each, and five coke pockets of 2900 cu. ft. each. In addition there is one central double compartment coke pocket, each compartment chuting coke to the skip bucket over a rotary grizzly screen. The rollers underneath the limestone pockets are perforated for screening.

The scale cars are Hoover & Mason double compartment type, equipped with air brakes, air operated doors and dial indicating and recording scales. Turn-out tracks for the spare scale car are provided under one part of the reinforced concrete trestle approach, the other part of the approach being bricked in to afford housing for riggers' tools, blast furnace spares, etc.

To give the skip operator a view of the skip pit, as well as of the skip hoist track and the furnace top, the control station for the skip hoist is on the yard level in proximity to the skip incline. The same station houses the control for the bell-operating cylinders, the McKee distributor, the grizzly coke screens and the bell indicating and rodding devices. Connection is provided to the cast house and furnace top by speaking tubes.

The skip incline is of the cantilever type, inclined 57 deg. from the horizontal. Its support is entirely independent of the blast furnace, so as to avoid any side thrust on the shell. It is 171 ft. 6 in. long, with double track for skip cars of the trailer truck type. Skips are operated by a Lidgerwood electric double drum hoist, driven by a single Westinghouse 200-hp. direct-current motor. The hoist has a rope speed of 300 ft. per minute and is designed for an unbalanced load capacity of 20,000 lb. Cutler-Hammer control is supplied.

This hoist is located in a concrete and brick house under the skip truss and above the tracks. This structure also houses the bell-operating cylinders, which are actuated by air from the cold blast main. An auxiliary air supply, provided from the high-pressure compressor line, is automatically admitted through a pressure regulating valve, in the event of drop in the blast line pressure. The control board for the McKee distributor is located in this house. This control is for six-station six-cycle operation, but provision is made for installation of additional panels for different cycles of charging.

The furnace top is of the standard double bell Freyn-Brassert design, having also a McKee distributor. The design of the receiving hopper and throat is worked out to give correct distribution, even when the charge is not revolved. The entire top of the furnace has solid plate guard rails, and special attention has been paid to accessibility of all working parts, and for observing both the distribution of material in receiving hopper and the dumping point of skip.

Pollock Short-Pour Hot Metal Ladles Are Used to Carry Iron from Furnace to Pig-Casting Machine (Here) and to Open-Hearth Mixer, Across the River

Gas Cleaning Plant, Viewed from Stove Platform. The whirler (center) is between the gas washer at left and the dust catcher, behind the corner of the elevator frame

Bleeders are provided with permanent rail platforms, as is also the outrigger. The outrigger has a trolley for facilitating work of repair or relining. Access to the furnace top is by interrupted flight stairs up the skip incline, and also by a bridge from the furnace top direct to the elevator, and by a bridge to the stove top. An extra large door is provided at the gas seal.

The six-passenger Otis elevator is a worm-geared traction type, having a capacity of 1500 lb. load, fully equipped with interlocking devices and emergency safety features. It has push-button control and four landings.

With a capacity of 25,500 cu ft., the furnace is 92 ft. high by 22 ft. 6 in. The iron and steel work includes a heavy continuous cast iron sub-base. The concrete foundation is reinforced by tension bands and the column base and columns are encircled by a reinforced concrete beam, extending between the columns up to within a short distance of the hearth jacket segments. There are ten cast iron columns, with ten tuyeres, placed centrally between columns, thus affording good working room. The columns are offset, which not only allows more room for work about the tuyeres, and places the columns and column base plates at a more remote location from possible breakout, but affords the possibility of enlarging the furnace hearth and bosh in the future. The columns are one piece and entirely free from any cast-on iron lugs.

Bustle pipe, circle pipe and waste water trough are suspended from the mantle. The bustle pipe is insulated with Johns-Manville vitro fire felt, and easement against thrust against the columns, by expansion of the hot blast main, is provided in an expansion joint. Special attention has been given the location of circle pipe connections and waste water trough overflow, so that there is ample room on the bustle pipe walk, and it is free from obstructions.

The hearth jacket is of the standard Freyn-Brassert cast iron segment design, having cooling pipe cast in, and heavily wedge banded and bolted. It is tapered, thus maintaining a safe thickness of hearth wall against erosion and breakouts, and also maintaining ample brick at the bottom to prevent short holes and to prevent the hearth block from rising. The tuyere breast

consists of a solid armor of 1½-in. plates, with openings for the ten tuyeres and for the bronze cooling plates.

Eight bands, 1½ in. thick, reinforcing the bosh, are held by cast steel distance pieces to prevent slipping. The mantle is of a specially heavy built-up plate angle construction, provided with a trough with drainage provisions for collecting shell spray water. The furnace shell, which is especially designed to meet modern furnace lines, is of butt strap construction on both the two bottom rings and the top ring. The intermediate rings are of double lap riveted construction. The shell is surmounted by a dome on which the large bell hopper ring is riveted.

General Refractories Olive Hill steam pressed fire brick lining is fitted with a heavier thickness in the lower inwall, where maximum thickness is required, than and arches, are made of stove quality. The gas main leading to the stoves has a butterfly valve which is intended later on to attach to a new design of gas pressure equalizing equipment to maintain constant pressure in the stove gas main.

The cast house is laid out to run cinder either to cinder ladles or to a cinder pit at the foot of the cast house. The iron runners are designed to deliver to three 75-ton Pollock short-pour hot metal ladles. They have a fall of ⅝ in. to the ft., to give a minimum amount of scrap. Coke dust, sand, loam, clay, furnace tools, copper, etc., are brought to the cast house by the 25-ton crane, and stored in a permanent brick and concrete shed inside of the cast house.

The working cinder notch is 45 deg. from the iron notch. An auxiliary cinder notch is provided, fitted

Skip Car Rails Appear at Left. The scale car is shown located over the skip pit

in the upper part, where an excessive depth of lining would be detrimental. No interior water cooling is given the lining above the mantle, but a permanent pipe spray with connection is affixed to the shell. A platform at the spray is reached by a short bridge from the skip incline steps.

A new design of bosh and tuyere breast plate is used, having baffles that give positive circulation of water and enable the plate to be more easily withdrawn if cracked or burned. The hearth walls are cooled by the cast iron cooling pipe of the hearth jacket, which extend approximately 9 ft. below the tapping hole. The stock line is afforded protection by cast iron wearing plates of high combined carbon content. These plates, laid integral with the lining, are of small surface dimension in each unit.

Three hot blast stoves provide a total heating surface of 285,000 sq. ft. They are of the two-pass side combustion type, with a built-in draft flue in the skeletonized reinforced concrete foundation, this flue leading to a Heine reinforced concrete stack, 8 ft. diameter and 225 ft. high, brick lined throughout.

Each stove is equipped with blow-off valve turned down into the chimney flue, with quick closing chimney valves, gas burners and gate type hot blast valves. Provision is made for a future additional hot blast stove. These stoves have 3½-in. checkers with 2-in. checker walls, the design of checkers, arch and draft chamber equalizing the flow of gas down through the checkers, thus overcoming the usual tendency toward segregation of flow of gas in a limited number of checker openings.

All stoves are insulated with "sil-o-cel" powder and brick, and are lined with General Refractories fire brick; handmade inwall quality is used in the combustion chambers and dome, and steam pressed inwall quality in the top of the checkers. The ring wall and bottom of checkers, as well as draft chamber piers up with a standard cooler and intermediate cooler, so that cinder can be withdrawn here in an emergency. The shutters are all of the Fraser remote control type, and the snort valve wheel, mud gun control and shutter control are all located at one point.

Special lighting facilities have been provided and there are abundant hose connections for both high and low-pressure water. Steam and air are piped to the cast house for use on the mud gun and for other casual requirements. There is a speaking tube from the cast house to the nearby operator's house, and to the furnace top, and there is also a duplex signal apparatus connecting the cast house with the boiler house and power house.

Gas is taken off the furnace by four offtakes from an annular space about the big bell hopper, which reduces the average gas velocity and the production of flue dust. These four offtakes lead to four uptakes, two of which are surmounted by Baer safety explosion valves. The uptakes lead into four downtakes, each two combining into one downcomer. The two downcomers enter the dust catcher radially.

The gas cleaning system is located between the boiler house and the blast furnace. There is one 22-ft. by 40-ft. dust catcher for primary cleaning of gas. The gas is then led to a 12-ft. 6-in. Brassert tangential whirler, where further amounts of fine flue dust are removed. From the whirler the gas is led through a series of goggle valve by-passes, so arranged that the gas can be handled in a variety of ways. It is contemplated to run—and the system is thus arranged—so that all the gas is led through the gas washer, thence through a water seal separator to the main leading to the hot blast stoves and to the boilers. If desired, only the stove gas may be washed and gas sent from the whirler direct to the boilers, or in an emergency rough gas may be sent to both stoves and boilers.

All these gas cleaning elements are located in one unit, completely equipped with platforms, thus making easy their supervision and care. The system includes standard equipment already used on upward of ninety installations, embodying well worked out means for obtaining gas with not to exceed 0.2 grain of dust per cu. ft. The washer has a novel arrangement of sprays which produces a large mass of spray having an intense whirling action. Not only is there an appreciable economy effected in the use of water, but the washer handles and cleans dirty gas even better than heretofore.

To eliminate the nuisance of dust, which has always been such an annoyance at blast furnace plants when the dust catchers are dumped, Mr. Croxton has evolved an arrangement which will deliver the dust from the dust catcher and whirler to the cars in a moist state. This consists of a Bartlett-Snow double screw inclosed conveyor attached to the dust catcher by a special screening casting. Dust flows through this screen and falls into the first stage of the double screw conveyor, which conveys it down into an inclosed trough of water and delivers it to the second screw conveyor, which again lifts the dust out of the inclosed trough and delivers it to the car. The dust, in passing through the double screws submerged in the trough of water, becomes thoroughly pugged and saturated with moisture. The coarse materials that do not pass the screen leading to the pug mill go to the bottom of the dust catcher, where they are removed by occasional dumping of the main dust catcher bell. In an emergency, the entire contents of the dust catcher may be removed in the usual way.

Branches from the gas cleaning plant carry the gas main system to both the stove and boiler gas mains. At both the stoves and boilers water seals are provided; in addition, a further complement of water seals is installed, so that the stoves or boilers may combinedly be cut off from the entire gas cleaning system at cast or shut down, so that the wet cleaning system may be isolated from the dry cleaning system, and so that the entire system can be isolated from the furnace. These water seals are provided with large capacity lines, so that water can be admitted and the seals filled in a very short time.

The blast main system starts at the turbo blowers, the discharge from which has an Ingersoll-Rand multiple-port disk check valve. Motor-operated cold blast valves are provided outside of the power house building. The cold blast main leads directly to the hot blast stoves, being provided with two counterweighted blast relief valves and the usual snort valve, the discharge of which is turned down into the stove flue. The bypass leaves the cold blast main at its end and leads around No. 3 stove, entering the hot blast main at the extreme end from the furnace. It is provided with a McCarthy check and regulating valve.

Hot metal is normally shipped to the mixer of the Trumbull Steel Co., but there is also provided, for the casting of chill iron, a double strand pig casting machine. This is standard Heyl & Patterson equipment, having manganese-steel links and pins. The pig machine strands are mounted on a reinforced concrete structure. This type of construction, originated at the blast furnace plant of the Otis Steel Co., was chosen because of elimination of deterioration encountered with structural steel supports, by reason of the large amounts of steam and water about the operation. The concrete structure provides a continuous platform under the strands, makes for easy replacement of molds, and provides a channel for spray water, which is carried into a sump at the pouring end. The length of rails is limited to 11 ft., to make convenient handling when replacements are necessary. All castings used in the machine and structure can be replaced by open sand castings poured at the cast house of the plant. The machine is laid out for additional strands, with the growth of the plant.

Integral with the pig casting machine is a combined ladle and pouring house. In this is a 55-ton Morgan pouring and ladle handling crane having 100 per cent overload capacity. This serves both to pour the ladles by means of the patented Pollock short pour device, shown in one illustration, and also to remove the ladles from the trucks for relining. A spare ladle is provided, to be held in reserve for lining.

After considerable study the track scales were so located that they serve admirably both for the light and heavy weighing of pig iron cars, as well as for check weights on receipt of raw material into the yard. In the scale house are also incorporated the yard master's office, locker rooms for train crews and washroom facilities. A larger locker and service room for the furnace men is located in proximity to the incline leading from yard level up to the furnace and stove foundation top. Additional toilet and locker rooms are located in the basement of the power house and boiler house, and at the machine shop.

Material quantities used in connection with this job are of interest. There were placed 2246 Raymond reinforced concrete piles, 20 to 30 ft. long; a total of 61,974 cu. yd. of excavation; 31,601 cu. yd. of concrete; 224,365 cu. yd. of fill; 750 tons of reinforcing steel; 1270 tons of plate; 729 tons of castings; 145 tons of structural shapes; 65 tons of forgings; 1251 tons of structural steel in buildings; 1,020,000 building brick; 2,083,000 fire brick, and an average of 371 men were employed per day for the ten months' construction period.

Fabrication and erection of structural steel in buildings and skip incline were done by the Lackawanna Bridge Co.; the Hill Clutch Co., Phoenix Iron Works and the Pennsylvania Engineering Works furnished some of the iron and steel castings. Fabrication and erection of iron and steel work other than structural were done by the William B. Pollock Co. All brick work in furnace, stoves, boilers, power house and offices was placed by the P. J. Brown Construction Co.; the concrete was put in by Arthur G. McKee & Co. Piping was installed by B. Floersheim & Co. Instruments for the blast furnace and power and boiler houses were supplied by the Bristol Co.; pipe covering by the Keasbey & Mattison Co.

Plans and specifications for the complete plant and plant equipment were drawn up by Freyn, Brassert & Co., Chicago. These engineers also had supervision of construction.

New Wire Products Company in Worcester

A new corporation known as the G. F. Wright Steel & Wire Co. has been organized at Worcester, Mass., headed by George F. Wright, son of George M. Wright, former president of the Wright Wire Co., and it has purchased the plant of the Standard Plunger Elevator Co. at Jamesville, a suburb of Worcester. The new company will manufacture wire rope, wire cloth, wire lathing and poultry netting. Some of the special machinery has already been constructed, and it is planned to begin manufacturing at an early date.

The company will be incorporated with a Massachusetts charter and capital stock of $100,000. George F. Wright will be president and general manager, A. B. Peavy vice-president and general sales manager, and Herbert N. Wright, former treasurer of the Wright Wire Co., and one of the founders of that business, will be treasurer and clerk of the company. Another director will be Albert S. Knapp, who was in charge of one of the weaving departments of the Wright Wire Co., and has specialized as a mechanical engineer in the designing of wire machinery.

George F. Wright, head of the business, has been connected with the wire industry for 10 years, learning the business in a practical way in the mills at Worcester and Palmer, Mass. He became assistant general manager of the Wright Wire Co., and continued in this office under the management of the Clinton-Wright Co., and when the larger Wickwire-Spencer Steel Corporation took over the business was made a director and a member and the clerk of the operating committee.

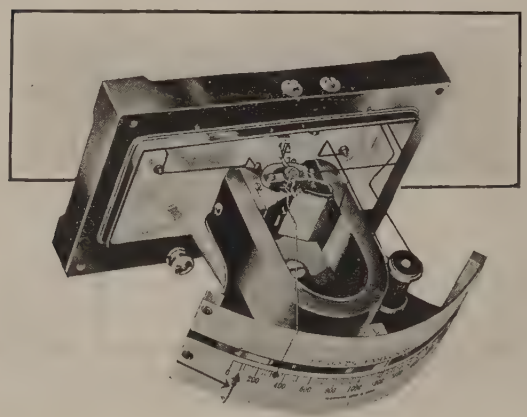
The Standard plunger plant consists of 5½ acres of land, with a main building 150 x 300 ft., one story with monitor roof, and served by a 10-ton electric traveling crane. It is on the Boston & Albany Railroad, with which it is connected by a spur track. It will lend itself readily to its new use. The Standard Plunger Co. recently went out of business.

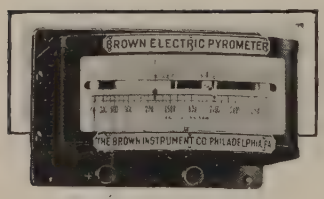
Cold Junction Compensated Pyrometer

The Brown Instrument Co., Philadelphia, is placing on the market a new thermo-electric pyrometer which is automatically compensated in the instrument for changes in cold junction temperatures. A means of setting the pointer of the instrument to zero in the usual manner is included.

It is generally known that the millivoltage developed by a thermo-couple is dependent on the difference in temperature between the hot and cold ends of the thermo-couple. To secure accurate measurements therefore, it is necessary that the cold end be maintained at a constant temperature or that the instrument be compensated for the changes in temperature at the cold junction of the thermo-couple.

It is common practice to use extension or compensating leads to transfer the cold junction from the binding posts of the thermo-couple to a distant point, locating the cold junction at the end of the leads in a cold well in the ground or in a compensating box, where the temperature can be maintained constant. In the pyrometer under consideration the extension or compensating leads are brought to the meter, changes in temperature at the end of the leads also taking place in the meter itself, which can be compensated for the change in temperature. To secure this compensation a Briguet spiral, similar to that used by Darling in England in 1909, is mounted in the instrument, controlling the springs and moving element directly. A second index controlled by thermostatic metal is mounted on the scale and works with change in temperature exactly in relation to the movement of the pointer controlled by the Briguet spiral attached to the moving element.





A Briguet Spiral Is Used for Automatic Cold Junction Compensation. The spiral also controls index for zero setting

In using the pyrometer the pointer is set by the zero adjustor to correspond with the index on the scale. If, for instance, the values for a thermo-couple are based on a cold junction of 75 deg. Fahr., the index will indicate 75 deg. provided the instrument is subject to this surrounding temperature. If the pointer does not correspond with this index, it is set accordingly. When the temperature around the instrument and the cold junction of the end of the compensating leads rises to 90 deg Fahr., the index automatically rises to 90 deg. and the Briguet spiral attached to the instrument pointer causes it to move up to 90 deg., automatically adjusting for the temperature of the cold junction of the thermo-couple.

Any number of thermo-couples with their extension or compensating leads can be brought to one instrument. Recording instruments can also be equipped with the automatic compensation and means for setting the point to zero.

Rubber-Tired Steam Shovel

The Osgood Co., Marion, Ohio, has completed the development of an 18¾-yd. traction revolving steam shovel equipped with solid rubber tires. It is designed especially for use of contractors having jobs that require frequent moves over paved streets or highways. For traveling under its own steam the shovel is provided with a 2-speed gear arrangement by means of which a speed of 3½ miles per hour can be obtained. A means for disengaging the traveling gears for towing has also been provided. Steering is accomplished by swinging the upper body slightly to the right or left. The tires are 40 x 14 in., ribbed-thread mounted on steel rims. They are pressed on the regular 34 x 16 in. cast steel wheels, an arrangement intended to permit the removal of the tires when desired, and by attaching cleats to the rear wheels rendering the shovel ready for service without the rubber tires.

Union Refusal of Coal Wage Modification

Attempts to interest the United Mine Workers of America in the necessity of a modification in the wage agreement in union fields so that operators in those fields can compete with non-union mines are meeting no success. The advisory board of the Northern West Virginia Coal Operator's Association held a conference with John L. Lewis, president of the United Mine Workers in Indianapolis, Sept. 7. The operators explained to Mr. Lewis that by reason of the wage reductions in the non-union fields surrounding northern West Virginia, any of the freight differentials, this region is at a great disadvantage in competition with other fields at the present wage scale. They asked for a reduction in the scale. Mr. Lewis told the operators' representatives that this is an inopportune time to make any reductions in wages; that every unionized mining district has similar arguments and to grant a reduction in northern West Virginia would disrupt the entire mining industry at this time.

Carnegie Veteran Association in Pittsburgh

Formal organization of a veteran employees' association in the city offices of the Carnegie Steel Co., Pittsburgh, was accomplished recently. The title of the organization is the Carnegie Steel General Office Veteran Association, and it is composed of those who have been in the company's service for 20 or more consecutive years. The organization starts out with 175 members, 10 of whom are women. Officers are: Honorary president, Homer D. Williams; president, L. R. Burnett; vice-presidents, W. W. Blackburn, Thomas Woods, Charles Orchard, John Longabaugh and John O. Leech; treasurer, Howard E. Jeffries; secretary, H. A. Beltz; trustees, J. B. McKillips, H. J. Baer, Anna M. Enright, J. M. Camp and John W. Brandon.

Less Unemployment in Buffalo

BUFFALO, Sept. 12.—Survey of the unemployment situation in Buffalo by officials of the New York State Employment Department, show a material increase in the number of workers who have taken jobs in August and to date in September. The investigation shows about 37,000 workers are now unemployed—a decrease of 2600 from June. Many of these were absorbed by steel interests which increased operation within the past thirty days.

A new application of liquid oxygen, the use of the material in mine rescue breathing apparatus, is being investigated for the United States Bureau of Mines by Dr. F. G. Cottrell, of the National Research Council, formerly director of the Bureau of Mines.

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The Wire Advance

The advance in the price of wire products, put into effect on Sept. 10 by the leading producer, and later by its competitors, coming when all other steel products were tending downward, arrests attention and calls for comment. The advance was made after buyers of wire nails and of all the various forms of wire had been told it was impending, and had been given opportunity to buy for two months or more ahead at the prices recently prevailing, based on $2.50 for plain wire and $2.75 for wire nails.

The first reaction to the announcement of a purpose to put up wire was no doubt a question as to the ability of any producer to cause a turn in the market under existing conditions. The pressure from buyers of steel in all lines was for lower prices, regardless of the fact that practically all steel companies have been operating at a loss, and that the steel trade, considering that labor and especially transportation are well above the levels of 1914, has gone further in readjustment than have the manufacturers of commodities entering largely into the cost of living. But the general thinking in the trade apparently had not taken in one important feature of the situation in wire, which was that in the two months since the $2.50 and $2.75 bases for wire and wire nails had been adopted there had been but little departure from those prices. In other words, no producer of wire had made a serious effort to increase his proportion of the going business and his rate of operations by further cutting of prices. With the market stationary—due to the fact, of which the wire companies were painfully aware, that in relation to cost wire products were the lowest on the list—the proposal to make a moderate advance had a foundation of good salesmanship as well as of good psychology.

The time-honored procedure of accepting orders at the prevailing level, pending an advance, was followed in the present instance, and the result was the booking in ten days' time of a larger volume of orders for wire and nails than had been taken over many weeks just preceding. The move disclosed a meagerness of stocks—in warehouses and at the plants of manufacturing buyers of wire—that has probably not been duplicated in the history of the trade. Buyers, sharing the general expectation that regardless of costs all steel products were headed for an indefinite decline, were working on barely more than week-to-week supplies from the mills.

Coming in connection with the recent advances in grain and cotton and the upward turn in pig iron, this effort of the wire manufacturers to get back their cost and to check the long and discouraging decline, will emphasize some possibilities in the situation that should not be overlooked. On a 20 to 25 per cent operation, steel works were plainly dropping below the actual rate of consumption. While rebounds do not mean entering upon a steady up-grade movement, they have always played their part in the preparations for that movement, and therefore have a significance that is not to be minimized.

The consumption of wire has so many ramifications both in manufacture and in the everyday buying of the people that the episode of the past week will have a wide influence. There is the suggestion also that in one or two other products, particularly sheets, in which the declines have been marked, the possibility exists of a similar upturn, even though in general the readjustment of iron and steel values may not have been completed, granting lower freight rates and further economies in labor cost.

Stages in Readjustment

The readjustment in business and industry that became necessary when the discovery was made that things could not continue as they were in the fore part of 1920 is a readjustment that must go by stages. One stage, that of price deflation, is nearly if not quite accomplished for the time being, but other developments must occur. It has become perfectly plain in recent months that business did not stop simply for a price readjustment. The "strike of buyers" was not merely for such lower prices as would induce a resumption of buying on a scale giving business the same appearance of activity as obtained during a large part of last year.

As to price readjustment, the index numbers have been practically stationary of late. In some districts retail prices for food have increased slightly. The cost of living, in general, is not declining notably, though rents are in line for further reductions. As to steel prices, THE IRON AGE index number shows finished steel prices to be about 35 per cent above their ten-year average before the war, which, with iron and steel works wages at more than 50 per cent advance over 1914, freight rates up 75 to 100 per cent and other fundamental items of cost high, represents substantially all the liquidation that can be expected since prices relative to cost are much lower than before the war.

The volume of business now being done in the United States is really very large in the aggregate, possibly larger than a year ago. It is certainly larger in some lines. A curious thing is that while the increased efficiency of labor is universally recognized, many men do not follow the point to its logical conclusion, that for everyone to be employed there must be more work to do, in other words, a greater demand for commodities and services than there was in 1920.

In this matter of changes in prices and in the volume of work done we are having since the armistice on a large scale what before the war we used to have periodically on a small scale. The principle is much the same. Before the war prices would get too high and business would slacken. When the cost of commodities and services got down sufficiently, demand would be created that did not exist at the higher prices and thus the slack would eventually be taken up.

The second stage in any of these readjustments is that of new classes of demand developing, the first stage having brought about deflation in prices for services and commodities. It is at this point that a difficulty arises. Before the war business in general had certain classes of demand to fall back upon. In particular, there were new railroads, skyscrapers and factories required. At the present time these outlets for our surplus potential activity do not exist to the same extent. In railroading, the objective is not so much as formerly an increase in the physical equipment as it is the attainment of greater efficiency in the employment of the facilities. Some skyscrapers are needed, and here and there some are being built or are projected, but we are not going to go in for skyscrapers on an enlarged scale. As to factories, there are some manufacturing lines in which there are too many factories, due to the war.

All this simply means that we are going to adopt new lines of activity, it being quite certain that we are resourceful and ingenious enough to find employment eventually for the unemployed. Every one cannot go back to his old job, for many were receiving wages without doing the corresponding amount of work. Just what the new lines of activity will be cannot be predicted definitely, but they can be found and must be found. We can have overproduction of specific commodities and overdevelopment of specific facilities, but we cannot have overproduction as a whole, for some new thing can be made that people will buy, or some new facility created that people will patronize. Eventually that will be the solution of unemployment. Everybody says we must work harder and be more efficient, and if we do that we are entitled to have more conveniences and luxuries. To get these things and at the same time to provide employment for every one, we must branch out into new lines of production and consumption.

Electric Furnaces for Heat Treatment

The already extensive use of electricity in the heat treatment of steel and non-ferrous products in American plants appears from a review given on other pages of this issue. This new development takes its rank alongside of the employment of electric furnaces in making steel and in melting non-ferrous metals and alloys, in which the United States is the acknowledged leader. In this newer field it is probable also that no other country can show that it now has at least 80 furnaces of various types employed in the heat treatment of steel alone, with nearly a half dozen on non-ferrous products. Already five American electric heat-treatment furnaces are credited to foreign countries.

Among the many products now heat treated electrically, gray iron castings are listed alongside of steel castings; also automobile and aircraft parts, sheets, bolts and nuts and various other steel products. The application to non-ferrous materials is greater than was generally believed and it would appear that this phase of heat treatment is only in its beginnings. Also the use of electricity in the enameling and glass industries is quite extensive. The size and types of furnaces, many of them automatic, are a testimonial to the inventive ability of American electrical engineers. Equally noteworthy is the development of the pyrometric devices which are so vital an adjunct to this industry.

Emphasis on the growth of electrical heat treatment is not intended to throw into the background the extensive application of oil and other fuels to heat-treating operations. Some notable achievements are reported of oil-fired annealers and heat-treating furnaces for steel and other materials. Gas, oil and coal have been used for these purposes for many years. However, the war, and particularly the demand of the ordnance departments of the Government for a quick and closely regulated and efficient source of heat, have been the prime causes of the rapid development in electric lines. Twenty-two electric furnaces of one type were in use during the war on the heat treatment of guns.

There is room for all systems and they will all develop as the demands of industry grow, for the trend is towards more exact results and more exacting materials.

It has been reported in the copper trade recently that Germany is not only the heaviest foreign buyer of copper, but that her purchases have been exceeding those of any other two countries. Official statistics of the exports for the first seven months of this year, just issued, confirm this statement. For the period mentioned Germany has taken 127,632,400 pounds of copper, as against

109,666,200 pounds as the combined exports to France and Great Britain. Germany's purchases are not only twice what they were for the same period in 1920, but they constitute nearly 40.5 per cent of the total exports. Germany is now buying more copper than in 1913, when preparing for war, her purchases then being 33 per cent of the total sold by the United States for foreign consumption.

Increased Steel Production

The 30 steel companies which make monthly reports to the American Iron and Steel Institute of their ingot production made 803,376 tons in July and 1,138,071 tons in August. The months had 25 and 27 working days respectively, so that if the rate of production had not changed the August report would have shown 867,646 tons, while the tonnage actually reported is 31 per cent greater. Plainly that is a remarkable percentage increase for a single month, a fact that is well brought out by the observation that if such a gain were compounded for about six months it would produce a full operation. Since nothing of that sort can be expected the August increase must be viewed as being in part simply a recovery from a particularly low rate.

The 1920 output of the 30 companies that report monthly was 84.2 per cent of the total steel ingot output of the year. The producers who furnished the other 15.8 per cent always provide an element of doubt in considering the monthly reports, for the reason that their operations may not be at the same ratio as obtained in 1920. Assuming that the ratio held good in August, the production of steel ingots by the entire industry was at the rate of about 15,600,000 gross tons per annum, or at the rate of about 30 per cent of capacity, the favorite estimate of actual capacity at the present time being about 52,500,000 tons.

Production in July was at little more than 20 per cent of capacity, regarding the month as a whole, but there was a time in the month when it was particularly light, and probably ran below 20 per cent. No one could assume for a moment that such a low rate could obtain for any length of time. The country is still doing business, and is really doing a fairly large business, but it has been liquidating stocks and it has been doing a smaller amount of construction work, in relation to the stage of general business activity, than is usual. Thus, even with no material improvement in the general tide of business, the quantity of steel production could be expected to increase.

As a matter of fact, that apparently is what occurred in August. The demand upon the steel mills had been in subnormal relation to the amount of steel that was actually being consumed or put into use in ultimate destinations. A dictum that had general acceptance before the war has frequently been recalled in recent months, that dictum having been that the rate of steel production could not go below about 50 per cent of capacity. The dictum rested both upon theory and upon the actual showing, for at no time in the history of the steel industry, until after the inception of the world war, and then for only a very short time, did the American steel industry operate at less than about 50 per cent of capacity.

An interesting question has arisen, whether the increase in productive capacity was responsible for the low percentage rate of operation in recent months. The increase, from 1914, may be taken at approximately 50 per cent. From one viewpoint this increase could not account for operating rates under 33 per cent, for 33 per cent with present capacity is equal to 50 per cent with the pre-war capacity. The matter might be looked at from another angle, possibly. If there had not been the increased capacity last year production would not have been as great, and perhaps some demand would have held over. Everyone knows, at any rate, that if steel consumers and distributers had all realized last fall and winter just what was coming, the stocks of steel that have stood in the way of steel operation in the past few months would not have been accumulated. The stocks are not entirely liquidated yet, so that steel production can increase further merely to get in normal relation with the general volume of work that is being done in the country.

CORRESPONDENCE

Effect of Seasonal Production on Building

To the Editor: The summary of the report of the Committee on Elimination of Waste in Industry in your issue of Aug. 11 makes very interesting reading. In the winter of 1919-20 we put up a small plant, and for a long time will remember many causes of delay and extra expense besides the inclement weather which prevailed.

It is gratifying to note that while the committee does not hesitate to place a large share of the responsibility for waste in building operations on the unions, it is fully alive to lack of efficiency on the part of the contractor and to the fact that there were acts of collusion between workers and contractors, the public at all times paying the piper.

It is evident from the statistics given that there could be much more work for the men in this line, as only one half of the idle time is due to weather conditions. A number of plants had to be expanded and office buildings constructed after our entry into the war and subsequent thereto. Notwithstanding the high costs, it was possible to secure some kind of a return on these investments; but dwellings, either single houses or apartments, showed almost no increase during the same period. It may be assumed that this phase of the situation was responsible for the days of idleness.

Real estate owners could not build at a price that permitted of a rent within reason. For the same reason the individual could not afford to build a home, knowing that to do so meant eventually decreased instead of increased value. In this latter class are many workmen in industrial plants throughout the country, besides many in the various building trades themselves. Even if building costs do come down to an appreciable extent many who desire to own their homes will have to forego ownership seeing that it is closely linked with seasonal production in many lines. There has been more or less agitation of this question but no real forward movement has developed. The fact is that a goodly number of our clerks and skilled workmen should take advantage of building and loan associations or other organizations formed to finance home building were they relieved of the fear of having to seek employment elsewhere because of regular or un-

certain periods of shut downs. Proper study and some education of the public in buying might eventually eliminate a large part of the seasonal periods of non-production or at any rate establish a better average of plant operation.

If the workmen in the building trades were assured of work the year round, save when debarred by weather conditions, perhaps they would in time see the advantage of such a condition with a reasonable daily wage, as contrasted with an extremely high rate of pay but at the same time many days of unemployment.

H. D. MURPHY.

Medford Hillside, Mass.,
Aug. 27, 1921.

Embrittling Effect of Pickling Upon Carbon Steel

To the Editor: On page 334 of THE IRON AGE, Aug. 11, appears a paper entitled "Embrittling Effect of Pickling upon Carbon Steel," which should prove of value to anyone interested in the microscope and its uses in metallurgy. It is not as a piece of research work, however, that it has its greatest value, but rather as an example of the false conclusions and erroneous impressions which can be drawn from metallographic work of inferior quality.

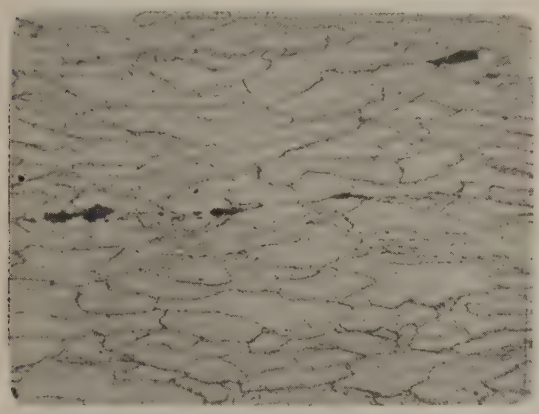

Fig. 1.—Photomicrograph of Section of Black Sheet Etched for 10 Sec. with Nitric Acid and Magnified 200 Diameters

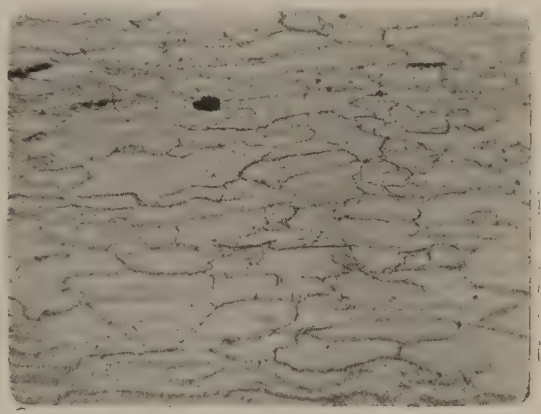

Fig. 2.—Photomicrograph of Pickled Sheet Etched for 10 Sec. with Nitric Acid and Magnified 200 Diameters

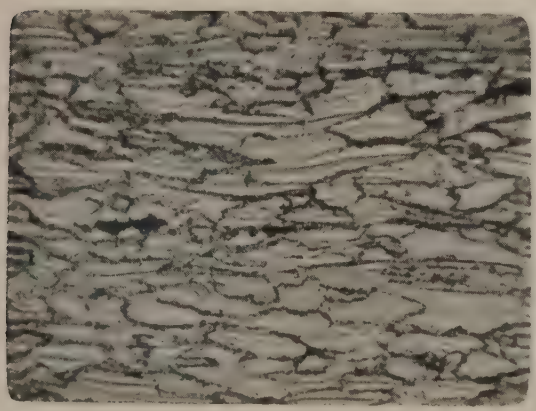

Fig. 3.—Photomicrograph of Section of Black Sheet Etched for 45 Sec. with Nitric Acid and Magnified 200 Diameters

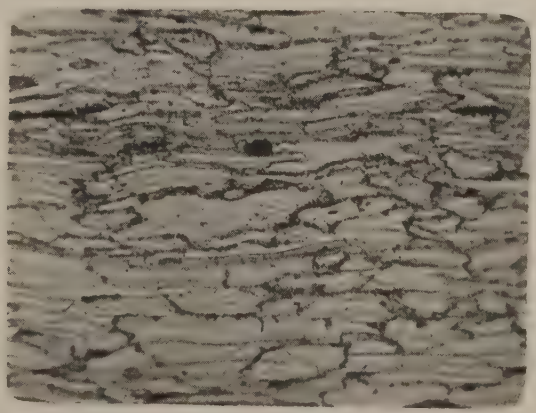

Fig. 4.—Photomicrograph of Section of Pickled Sheet Etched for 45 Sec. with Nitric Acid and Magnified 200 Diameters

All three photomicrographs included in the paper were taken out of focus, the principal difference between Fig. 2 and the others being that the former is more out of focus than the other two, and considerably over-etched. This would, of course, cause the grain boundaries to appear wider and the grain size correspondingly finer, as it is well known that etching causes a selective attack of the grain boundary rather than the grain itself, so that the boundaries become progressively deeper and wider as etching is continued. This effect occurs regardless of any treatment to which the specimen has before been subjected. Therefore, any measurement of the width of grain boundaries is of no significance in such a case, and it is furthermore rather improbable that any accurate grain size determinations could be made on a specimen prepared like the one shown in Fig. 2 of the paper.

Nevertheless, an experiment has been made to determine whether the conclusions might be justified in spite of the weak evidence for their support. Two strips of an ordinary low carbon black sheet were cut side by side and one was pickled for 10 min. in 5 per cent sulphuric acid by volume at 80 to 85 deg. C. Three bending tests were made in each of two directions at right angles on each of these sheets. The pickled sheet endured an average of 5.7 bends before failure, the other 7.7 bends. This showed the pickling to have been effective in causing the brittleness which is known to be due to hydrogen absorption.

Sections were then cut in both directions at right angles from each of these samples and were polished and etched for 10 sec. with nitric acid. The accompanying photomicrographs, Figs. 1 and 2, show the width of grain boundaries and size of grain to be practically identical in both samples. The specimens were then etched for 35 sec. more and the same spots were again photographed slightly out of focus. Fig. 3 will be seen to be the same spot as Fig. 1, and Fig. 4 the same as Fig. 2. The boundaries appear wider and the grains a trifle smaller, duplicating the effect shown in the paper under discussion. Undoubtedly the differences supposed to have been due to pickling were in reality due

to differences in the methods of preparing the photomicrographs.

GEO. F. COMSTOCK,
Metallurgical Engineer, and
A. B. WILSON,
Metallographist.
Titanium Alloy Mfg. Co., Niagara Falls, N. Y.
Aug. 23, 1921.

Device for Use With Oxy-acetylene Torches

To the Editor: The writer was very much interested in the article which appeared in the Aug. 11 number of THE IRON AGE, pertaining to a device which I devised to assist in the use of oxy-acetylene cutting torches. This article appeared on page 348.

In the last paragraph a statement was made that the idea was not patented. You will please be advised, however, that patent application has been made covering the device. Perhaps this fact should be called to the attention of your readers. I might state, as a matter of interest, that I have received several inquiries regarding the scale as a result of your article.

G. R. MCDERMOTT.
Engineering Department, Illinois Steel Co., South Chicago.

Future Increase in Railroad Ton-Miles

To the Editor: Your editorial in THE IRON AGE of Aug. 25 which states that the revenue ton-miles of railroads have consistently doubled every 12 years is thought provoking. The intent of this editorial evidently is that this rate of expansion cannot be indefinitely continued because if it were, such a preponderance of wealth and men would be employed in railroading as to strangle economic life. Such a proposition, being entirely academic, can be readily granted.

On the other hand, the inference of your editorial seems to be that we have already arrived at a time when the *rate* of increase in revenue ton-miles is about to decrease. If that is to be believed, the belief should be based on "sterner stuff" than the academic proposition that a doubling of revenue ton-miles every 12 years cannot be maintained indefinitely.

Being remotely located from technical libraries, I am in no position to state to what extent water-borne commerce and the motor truck will eat into railroad tonnage, so I suggest for the present discussion that we leave probable loss of railroad tonnage out of consideration and consider probable gains—gains in the way of new business.

Mechanical power has just begun to be applied to farming. Whenever a farmer buys a tractor, motor truck, stationary engine, or electric power plant, he increases both his purchase and production of railroad ton-miles. The haul of the tractor from the factory to the farmer's station is only a small part of these newly created ton-miles. Back of the finished tractor there is a still greater railroad tonnage of iron ore, coke, limestone, and a lot of finished and semi-finished parts, and innumerable supplies. Furthermore, the tractor (and all other farm power machinery) requires fuel, lubricant, spare parts and repairs. These all make additional railroad ton-miles. The horses displaced by this power machinery were produced on the farm, and their harness and shelter were all that produced railroad ton-miles. Power farming machinery enables one man to produce more, which means that the resulting surplus labor augments city populations with their big need of ton-miles for every human need.

But most important of all, many acres of home-grown feed that would otherwise raise and maintain home-grown horses or mules now are devoted to marketable crops. This is particularly true of our best agricultural acres where heretofore farmers have provided very grudgingly the necessary acres to grow horse feed.

Before the world war it was common to quote statistics to show that the then current rate of agricultural production compared with population prognosticated a need for importing foodstuffs—in other words, we should be unable to supply enough food for ourselves. The stimulus of war prices proved that we had an enormous potential agricultural production. In time, power farming probably will increase this potential, and our farmers will be such efficient food producers that we simply must have large foreign markets for our excess production.

Power farming means farmers who are less self-sufficient, farmers who are increasingly dependent on transportation, farmers who will come to demand and insist upon 365-days-a-year roads, and these roads will require many ton-miles of crushed stone, cement, road oil, and machinery. There is still another aspect of this same situation that has an important bearing on the railroad problem. This increase in ton-miles is largely out along uncongested trunk lines.

In other words, there is nothing alarming in a doubling of railroad ton-miles every twelve years provided the railroad's average gain in efficiency per man is equal to the average gain in efficiency for the shippers.

I am strongly inclined to believe that the railroads' greatest fear of a slackening rate of increase in revenue ton-miles lies in their own failure adequately to prepare for it, not only with commodious facilities, but also efficient personnel.

In view of the influential position THE IRON AGE occupies among the class that is most interested in the future of our railroads, I hope you will not be found partly responsible for a hardening of our commercial arteries when presently we shall roll up our sleeves for some real producing.

IVAR MATTSON.
Fairfield, Iowa, Aug. 28, 1921.

Marshal Foch Will Be Guest of American Iron and Steel Institute

A cablegram from Paris, dated Sept. 13, says: "Marshal Foch has received and accepted an invitation from Elbert H. Gary, chairman of the board of the United States Steel Corporation, to be a guest at a dinner to be given by the American Iron and Steel Institute in New York.

"Marshal Foch plans to sail on the liner Paris on Oct. 22, but his further plans are as yet undecided, except that he will stop in Washington for a day on his way to Kansas City, where he will attend the convention of the American Legion."

Since the beginning of 1921, changes in rates of wages reported to the British Ministry of Labor have resulted in a reduction of about £2,840,000 in the full-time weekly wages of nearly 5,700,000 wage earners, and an increase of about £75,000 for over 300,000 wage earners. The net result is a falling off of £2,765,000 ($10,370,000 at $3.75 per £) for 6,000,000 people, or an average loss of 9¼s. ($1.73) per week.

Pittsburgh has been selected by the directors of the Industrial Cost Association for the second national cost conference, to be held Nov. 2 to 4. The directors have elected Horace N. Peck, New York, as president, and added to the board, James P. McLean, Pittsburgh, Christopher Haigh, Lynn, Mass., and E. J. Wesson, Freeport, Ill.

The Iron Age and Its Readers

The service given THE IRON AGE's readers in the full reporting in recent issues of the tariff hearings at Washington, particularly in the issue of Sept. 1, is worth noting. The amount of space given to them is one item, as is also the promptness with which the records were put into print. Enough of the dialogue with members of the committee conducting the hearings was given to round out the picture and give the atmosphere from which the reader could know what degree of coloring to give to the facts and figures. Much economic information is crowded into the arguments.

Ferromanganese "Dumping" Not Sustained

Trial Examiner's Report in the Case Before the Federal Trade Commission Is in Favor of Agents of British Producers

DISMISSAL of the complaint of the Federal Trade Commission against American importers of English ferromanganese who are charged with dumping the alloy on the United States market will be ordered if the commission accepts the conclusions of Edward M. Averill, trial examiner, who had charge of the hearings in the case. The examiner has filed his tentative report and asserts that "there is not a scintilla of evidence that the respondents or their principals commonly or systematically imported and sold ferromanganese in the United States at prices substantially less than the actual market value of ferromanganese in England."

Dealing with the claim of domestic makers of ferromanganese that the alloy was dumped in the United States in an effort to injure the industry in this country. Examiner Averill says:

> There is no evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the industry of manufacturing ferromanganese in the United States, and there are no facts and circumstances proven from which such intent can logically or legally be inferred.

In conclusion, the examiner states:

> From the foregoing findings as to the facts, the examiner holds that the respondents were not guilty of using any unfair methods of competition in commerce as charged in the complaint and that there is no proof of any violation of section 5 of the Act of Congress approved Sept. 26, 1914, entitled "An Act to create a Federal Trade Commission, to define its powers and duties and for other purposes."

Further Steps in the Case

The report of the examiner being only tentative, it does not bring the case to a conclusion, but only represents his views for study by the commission to which the report has been submitted. The next procedure is the filing of the briefs of the commission's trial attorney, I. E. Lambert, and of the respondents, which are to be submitted by Oct. 5. The commission then will set a date for hearing the final arguments previous to rendering a formal decision. The brief of the trial attorney of the commission, it is expected, as a matter of course will take exceptions to the findings of the commission's trial examiner, while the briefs of the respondents will support the findings. The respondents include Crocker Bros. and C. W. Leavitt & Co., of New York, and Frank Samuel of Philadelphia. The complaint against Rogers, Brown & Co., New York, was dismissed in the course of the hearings, owing to the fact that they did not sell for the account of their principals in 1919 in the United States.

The Charge of Dumping

The tentative report of the examiner summarizes the case and explains developments that took place, which still are fresh in the minds of the trade, and on these bases his findings. The report states that the complaint charged that during 1919 the respondents imported and sold ferromanganese in the United States "at prices substantially less than the actual market value or wholesale price of ferromanganese prevailing in England at the time of exporting such ferromanganese to the United States, after adding to such value or wholesale price the freight and other expenses necessarily incident to the importation and sale thereof in the United States. That the said acts of importing and selling ferromanganese in the United States were done with the intent by respondents and their respective principals, of injuring the American industry of manufacturing ferromanganese and of monopolizing some part of trade or commerce in said article in the United States, and that said acts were unfair methods of competition in interstate commerce in violation of section 5 of an Act of Congress approved Sept. 26, 1914, and commonly known as the Federal Trade Commission act."

Market in War Time and Later

After setting forth importations and American production of ferromanganese during the years 1913 to 1920 inclusive, the report explains how imports were shut off during the early part of the war by the British Government and the consequent growth of domestic production, and says that during the period of hostilities the prices asked by American producers for ferromanganese ranged from $200 to $400 per ton. It is stated that a slump in the market followed the cessation of war and that during the early months of 1919 there was practically no market, with the result that most of the commercial American producers ceased the production of ferromanganese. In an endeavor to create a demand, it is pointed out, the price was cut early in 1919 from $250 and $300 to $125 per ton, but with few takers. Specific mention is made of a number of sales in the fall and winter of 1919 when prices dropped to $110 to $130, delivered. Crocker Bros. having disposed of 9720 tons for American producers and 12,095 tons for English producers. Conditions like those in the United States, it is declared, prevailed in England, which found itself with large quantities of high priced manganese ore on hand, facing strikes and a paralysis of industry and finance.

"The five years of titanic struggle," it is stated, "had reversed the financial position held for centuries by England, and from a creditor nation she passed to a debtor nation. The pound sterling was yielding to the American dollar its place as the ultimate measure of value." Drops in sterling exchange are set forth and nominal prices, in the absence of an active market, are given for ferromanganese in England.

The report says that there is no proof as to whether the American or the English producers made the first cut down to $115, but it is declared that during September, October, November and December Crocker Bros. sold ferromanganese at $95 to $110 for the account of Darwen & Mostyn Iron Co., Ltd., Darwen, Lancashire, England, while largely similar sales were being made both by importers and domestic producers, with evidence that the English makers were closely watching the market and expressed willingness to meet prices where it was claimed they had been lowered.

No Collusion

"There was no collusion between the English principals of the respondents and none on the part of respondents to fix prices. Each was in active competition with the other and incidentally they were all in competition with such American producers as had ferromanganese to sell; the efforts of the English producers were solely directed to the sale of their own product, but at the same time they were anxious to obtain the highest price possible and were reluctant to reduce the selling price. . . . .

"During the entire period from June to December, 1919, the market was strictly a buyer's market and the offers came from the buyers and it was optional with the seller to either take or leave the offer made," the examiner says.

"The published English home market quotations show that the usual and customary rise or fall of ferromanganese is £2, and to be 'substantially less than the actual market value' there would have to be a drop certainly much greater than the customary market fluctuation," the report points out. "The evidence shows

that in comparatively few instances was the sterling equivalent of the American money received by the respondents less than £2 under the trade journal quotations for the home market even after taking into consideration the cost, insurance and freight and the majority of the sales were above the alleged home market quotations."

Program of National Safety Congress

The program of the tenth annual congress of the National Safety Council to be held in the State House, Boston, Sept. 26 to 30, inclusive, shows that there are the following sectional meetings, among others:

An automotive section is scheduled for Tuesday morning, Sept. 27, with Robert A. Shaw, Ford Motor Co., as chairman. Besides reports of officers and committees, papers are scheduled by J. A. Dickinson, mechanical engineer Bureau of Standards, Washington, on "Fundamental Principles of Safeguarding"; by A. L. Kaems, safety engineer Simmons Co., Kenosha, Wis., on punch press safeguarding, and by E. W. Dodge, assistant to general manager Abrasive Co., Philadelphia, on "Why Grinding Wheels Break."

A metals section will have a session also on Tuesday morning, Sept. 27, under the chairmanship of J. A. Oartel, chief of safety bureau, Carnegie Steel Co., Pittsburgh, with John A. Northwood, superintendent safety and welfare department, Cambria Steel Co., Johnstown, Pa., as vice chairman, and J. R. Mulligan, supervisor accident prevention and education, Bethlehem Steel Co., Bethlehem, Pa., as secretary. The papers scheduled for this session include one on "Safe Practices in Pouring in a Foundry," by A. B. Root, Jr., mechanical engineer Hunt-Spiller Mfg. Corporation, Boston; on "Elimination of Steam During Pouring," by R. E. Shaw, district manager B. F. Sturtevant Co., Boston, and on "Electrical Hazards in Foundries and Steel Mills" by Walter Greenwood, safety engineer Carnegie Steel Co., Youngstown, Ohio.

A second session of the metals section, scheduled for Wednesday afternoon, Sept. 28, lists a paper on "Safe Practices in Rolling Mills" by Fred Johnson, superintendent of rolling mills South Works, American Steel & Wire Co., Worcester, Mass., and one on "Safe Practices at By-Products Coke Plants" by F. F. Marquard, superintendent by-products plant Clairton Works, Carnegie Steel Co., Clairton, Pa.

A general round table meeting, scheduled likewise for Tuesday morning, Sept. 27, and to discuss safety bulletins, will be under the chairmanship of George T. Fonda, manager safety and compensation division, Bethlehem Steel Co., Bethlehem, Pa. An education section, also scheduled for Tuesday morning, Sept. 27, will be under the chairmanship of A. T. Morey, general manager Commonwealth Steel Co., Granite City, Ill.

A joint meeting of manufacturing sections is scheduled for Thursday morning, Sept. 29, and the program covers industrial lighting and the need of accident prevention work and the methods to be employed during the present industrial depression, the latter to be opened by W. E. Worth, International Harvester Co., Chicago.

J. F. Tinsley, general manager Crompton & Knowles Loom Works, Worcester, is to contribute to the discussion of what is called the A B C session, Tuesday afternoon, Sept. 27, on "The Essentials of a Plant Safety Organization," and Harry Gilbert, manager safety department, Haskell & Barker Car Co., Michigan City, Ind., is to discuss "The Foreman as the Determining Factor."

Consideration will be taken of the recent tentative classification of scrap put out by the American Railway Association at the quarterly meeting of the scrap iron division of the National Association of Waste Material Dealers at the Hotel Astor, New York, on Sept. 22, 11.30 a. m. The classification contains provisions including terms of sale. A report may be made by the committee appointed to draw up a set of trade customs for scrap iron dealers and consumers.

COMING MEETINGS

September

National Association of Cost Accountants. Sept. 14 to 16. Fall convention, Cleveland Hotel, Cleveland. Session on morning of Sept. 15 on cost methods of trade associations. Offices of association at 130 West Forty-second Street, New York.

American Society for Steel Treating. Sept. 19 to 24. Annual convention and exhibition, Manufacturers Building, State Fair Grounds, Indianapolis. Secretary, W. H. Eisenman, 4600 Prospect Avenue, Cleveland.

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

Fabrication in Transit Granted for Sheets

WASHINGTON, Sept. 13.—In a decision handed down last Thursday, the Interstate Commerce Commission held that failure of the railroads to accord fabrication in transit at Parkersburg, W. Va., on iron and steel sheets is not unreasonable, but is unduly prejudicial, and entered an order requiring the carriers on or before Dec. 1 to abstain from such undue prejudice. The complainant is the Parkersburg Rig & Reel Co. The B. & O. at the hearing expressed its willingness to accord fabrication in transit at Parkersburg on all forms of structural steel, but not on sheets. The decision, after pointing out that fabrication of sheets is allowed in western territory, enters into a discussion as to the meaning of plates and sheets and states that the complainant in its brief quoted from an authority on metallurgy to show that the terms plates and sheets are used interchangeably and that, technically, plates are sheets and sheets are plates up to No. 20 gage. No distinction between the two products is made by the carriers in western territory in their tariffs, and it is stated that the evidence is not convincing that the granting of fabrication in transit on sheets of No. 16 gage or heavier would result in any undue extension of the fabrication arrangement. Pointing out that competition exists throughout the country between sheet and plate tanks, the decision quotes the complainant to the effect that unless accorded fabrication on sheets it will be compelled to abandon manufacture of sheet-metal tanks because the difference between the combination rates on Parkersburg, which it is now obliged to pay, and the joint rates with fabrication at that point, amounts on the average to about 23c. per 100 lb.

Chicago Building Trades Still Troubled

Decision of Judge Landis Not Accepted by All Unions and Outlook is Uncertain—The Arbiter's Graphic Description of Conditions

CHICAGO, Sept. 10.—After deliberations lasting throughout the summer, Federal Judge Kenesaw M. Landis, umpire in an arbitration of wage differences between employers and employees in the Chicago building industry, announced his decision on Sept. 7. Wage reductions of from 10 to 36 per cent for skilled and unskilled labor were stipulated and hampering working rules and regulations were wiped out. "Reliable testimony," said the judge, "showed that a 20 per cent reduction in wages, other conditions remaining the same, would produce but a 6 to 7 per cent reduction in building cost. The real malady lurked in a maze of conditions artificially created to give the parties a monopoly and in rules designed to produce waste for the mere sake of waste, all combining to bring about an insufferable situation, not the least burdensome element of which was the jurisdictional dispute between trade members of the same parent organization."

According to the terms of agreement between the parties to the dispute when Judge Landis was appointed umpire, the rates he determined were to remain in force until May 31, 1922, when, or before, he would determine rates for the ensuing year. The announcement of the decision was at first hailed as the final settlement of a long disturbed industrial situation and as the harbinger of a long delayed building boom. Subsequent developments cast doubt on the finality of the award and revive uncertainties which have hitherto held back much projected construction work. Workmen belonging to a number of crafts have expressed their dissatisfaction with the decision by walking out. Four big Chicago jobs, the Federal Reserve Bank, the Northwestern Railroad grain elevator, the Commonwealth Edison Co. power plant and the Quadrangle Club building, are now at a standstill as a result of walkouts by hoisting engineers, steamfitters, plumbers and marble setters.

Unsatisfactory Attitude of Labor

Unless there is a decided change in the attitude of labor, it is unlikely that the local building situation will show any marked improvement. As stated by the judge, "it is no violation of confidence to say that building construction had gotten into bad repute in this community. There was a general disposition to keep away from it as a thing diseased. Capital avoided it. The wise dollar preferred almost any other form of activity or no activity. And this applied to the whole range of building construction, from the cottage to the skyscraper."

The loss of the public faith, the judge pointed out, was not due entirely to the wage question. Harmful and wasteful rules and agreements and jurisdictional strife were more important causes. Consideration of these facts led the judge to fix higher rates of wages for those crafts which agreed to the elimination of these abuses than for those which stubbornly refused to abandon certain practices. The "uniform agreement" applicable to all trades, as worked out by the judge, includes the following salient points:

Points of the Decision

1. That there shall be peaceful adjustment of disputes by arbitration, subject to appeal to the National Board of Jurisdictional Awards, with whose decisions all parties agree to comply.

2. That in case of scarcity of help non-union men may work with union men until such a time as union men may be obtained.

3. That any journeyman may use in his work the tools of any other trade.

4. That small tasks of not over 30 min. duration in any one day belonging to any trade may be performed by any other trade at the discretion of the employer.

5. That there shall be no restriction as to the amount of work a man may do, nor against the use of machinery, methods or appliances, nor against any raw or manufactured material except prison made.

6. That employers may employ or discharge whomsoever of the union they please, and employees may work for whomsoever they see fit.

7. That the foreman, if any, is to be exclusively the agent of the employer.

In fixing the wages of three trades which require work to be done by skilled men that laborers or helpers might do, the judge stated that he was obliged to consider the waste thus occasioned. If, however, these trades expressed their willingness to change their attitude, the judge will advance their wages accordingly. The following trades were not in the arbitration: Carpenters, elevator constructors, plasterers, sheet metal workers, painters, glaziers, fixture hangers.

Gradually Adopting Frick Scale

UNIONTOWN, PA., Sept. 12.—A number of independent coal and coke operations, including the Republic plant of the Republic Iron & Steel Co., Tower Hill No. 1 plant and the plants of the American Coke Corporation, posted notices late last Friday night of increases in wages to the present H. C. Frick Coke Co. scale in this region, being the scale of November, 1917. It is believed that majority of the other independent operations in the region will take similar action, which was started 10 days ago when George Whyel, head of the Whyel interests, announced that the Frick scale would be restored at his plants.

W. J. Rainey, Inc., whose plants are idle as result of refusal of the employees to accept wage reductions approximately 15 to 20 per cent under the Frick scale, adopted the latter, effective Sept. 12. The other independent operations had not followed the Rainey action in its latest cuts.

Action of the other independents means an increase of approximately 10 per cent in scales.

Similar notices, reverting upward to the Frick scale, are expected to be posted at most of the independent operations in the county within the next week.

In Rainey circles it was stated that their plants could not operate unless the present Rainey scale was maintained.

So far the H. C. Frick Coke Co. has taken no action toward a reduction in wages in line with announcement of such readjustment by the Steel Corporation effective Aug. 29. No reduction is expected in the region at this time. Frick operations are being maintained at about 40 per cent coal, with all ovens out of blast.

Some Improvement in Cleveland

The labor situation in Cleveland shows a little improvement, according to the monthly report of the committee on labor relations of the Cleveland Chamber of Commerce. Ninety-nine plants engaged in various industries, each normally having 500 more employees, showed an increase in working forces on Aug. 31 of 1.5 per cent as compared with July 31. The report a month ago showed a gain of 2.5 per cent as compared with June 30. Plants making iron and steel and their products, exclusive of the plants of the United States Steel Corporation, showed a gain of 3 per cent on Aug. 31 as compared with July 31. Automobile plants, and plants making automobile accessories, made a gain of 2.9 per cent. Metal working plants other than iron and steel, these including brass foundries, showed a decrease of 2.40 per cent.

Iron and Steel Markets

ADVANCE IN WIRE

Large Orders Placed at Recent Prices

Important Increase in Steel Output—August Betterment Continues

An advance of $2 to $3 per ton in the prices of the American Steel & Wire Co., effective Sept. 10, has broken the long succession of declines in steel products. Wire prices have been the lowest on the list in relation to cost, and the fact that there had been little cutting in the past two months seemed to invite an effort to turn the tide. Independent producers have followed the Steel Corporation advances, and all mills made large bookings at the old prices before the advances went into effect.

The heavy influx of wire and wire nail orders just before the advance showed the country to be bare of stocks to a degree never known. Jobbers covered 60-days requirements while manufacturing consumers in many cases bought for longer periods. Wire fence, in view of low agricultural buying power, remains at the old price.

The Steel Corporation's wire production, in response to the restocking orders, has gone up to 40 per cent of capacity and promises to increase further. In sheets and tin plate the corporation's rate is still 50 per cent. For all subsidiaries the average is 33 per cent, against 30 per cent in August.

A reduction of 298,000 tons in unfilled orders in August has a more favorable construction than was generally given when it is stated that shipments were 100,000 tons more in August than in July.

That the customers of independent steel companies also called for increased shipments last month appears from a steel ingot output for the country in August of 1,351,628 tons. At 27 working days this was 50,060 tons per day, or 31 per cent greater than the daily rate of 38,126 tons for the 25 working days in July.

While reports are not of one tenor, demand on the whole is better than in August, indicating that July was the low month of the nine. Apart from wire, prices tend lower, the heavy products, plates, shapes and bars lagging most.

In the past week 1.50c. was touched on steel bars, on an exceptional three months' contract, but most sales were at $2 to $3 per ton higher. A number of plate and shape transactions have established a range of 1.60c. to 1.65c.

Irregularity continues in wrought pipe and the discounts last formally announced have yielded by two to three points.

Automobile plants are reducing their stocks in anticipation of slackening sales in the fall. The largest producer expects to buy less steel in October than in September.

Shading of $1 per ton has been done on blue annealed sheets. Warehouse prices on black sheets have been reduced $5 per ton. A Cleveland mill has taken 750 tons of 30-gage black sheets for Japan.

Fully 25,000 tons of fabricated steel work was awarded in the week, including 15,000 tons for the Federal Reserve Bank in New York, and 3000 tons for viaducts in Pittsburgh. About 6000 tons of new work has been added to pending projects. The country's fabricating capacity is in excess of 41,000 tons per week.

Equipment inquiries show some increase. One from the Rio Grande is for 1000 steel cars and the Lackawanna is asking for 1000. The B. & O., which is in the market for 1000 cars and 1000 steel underframe box car bodies, is also figuring on the repair of 3000 to 6000 freight cars of various types.

The pig iron market has been enlivened by inquiries in the East amounting to about 20,000 tons, of which nearly half comes from companies closely connected with railroads. Chicago also shows considerable activity, with prices on foundry, malleable and basic advanced $1.

The stronger situation in scrap is a reflex of what has developed in pig iron. A slight advance in coke is due to the cutting down of output by strikes and in part to larger consumption of blast furnace coke. With wage restoration at independent works to the Frick Coke Co. scale, the strikes are ended.

British ferromanganese has been reduced this week to $58.35, Baltimore, as against a previous market of $65.

Our cable report puts the British steel output for August at 432,600 tons, indicating a marked recovery from the coal strike, as this is close to the January and February rate. Pig iron output at 93,600 tons in August is still abnormally low. Steel companies are working into a better market position as German and Belgian works become farther filled up.

Pittsburgh

PITTSBURGH, Sept. 13.

Increases in wire products ranging from $2 to $3 per ton and the development of a stronger market in scrap and coke have been the outstanding developments of the week in the iron and steel situation. Before advancing prices, the several makers permitted their customers to enter orders for their requirements over the next 60 days for the merchant trade and 90 days for manufacturers. The response has been fairly satisfactory in the matter of orders and now that market prices are above those which buyers paid, it is expected that there will not be much hesitancy about specifications.

The stronger tendency in scrap prices is a direct reflection of the upward trend of pig iron and the fact that production and available supplies are of moderate proportions. Coke prices have advanced because of the revision upward of independent wage scales in the Connellsville district made necessary by the labor troubles growing out of the wage cut made a few weeks ago by W. J. Rainey, Inc. Many of the Connellsville district mining companies were feeling the effects of the strikes. All but one or two of the independent operators have put wages back to the Frick scale, which means an increase of about 10 per cent over the recent scale. W. J. Rainey, Inc., is among those which have adopted the Frick scale. More inquiry and larger sales also have played a part in this advance.

Reports about business in steel vary considerably,

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 13, 1921	Sept. 6, 1921	Aug. 16, 1921	Sept. 14, 1920
No. 2X, Philadelphia‡	$20.84	$20.84	$20.34	$53.51
No. 2, Valley furnace†	21.00	21.00	19.50	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2 foundry, Chicago*	**22.00**	21.00	20.00	46.00
Basic, del'd, eastern Pa.	**19.25**	19.00	19.00	51.26
Basic, Valley furnace	19.00	19.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	**22.00**	21.00	20.00	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	33.50	58.50
Ferromanganese, del'd	70.00	70.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	30.00	60.00
O.-h. sheet bars, P'gh.	30.00	30.00	32.00	67.50
Forging billets, base, P'gh.	34.00	34.00	35.00	75.00
O.-h. billets, Phila.	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	38.00	38.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	1.70	1.70	1.75	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	*1.95*	2.00	2.05	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.65	1.65	1.75	3.25
Steel bars, Chicago	1.85	1.85	1.93	2.84
Steel bars, New York	2.03	2.03	2.13	4.13
Tank plates, Pittsburgh	*1.65*	1.70	1.80	3.25
Tank plates, Chicago	1.75	1.75	1.98	3.03
Tank plates, New York	*2.03*	2.08	2.18	3.63
Beams, etc., Pittsburgh	*1.65*	1.70	1.85	3.10
Beams, etc., Chicago	1.80	1.80	1.98	2.83
Beams, etc., New York	*2.03*	2.08	2.23	3.48
Steel hoops, Pittsburgh	*2.15*	2.25	2.25	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 13, 1921 Cents	Sept. 6, 1921 Cents	Aug. 16, 1921 Cents	Sept. 14, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	3.00	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	4.00	9.00
Sheets, blue an'l'd, 9 & 10.	*2.20*	2.25	2.25	5.50
Wire nails, Pittsburgh	**2.90**	2.75	2.75	4.25
Plain wire, P'gh	**2.60**	2.50	2.50	3.75
Barbed wire, galv., P'gh.	**3.55**	3.40	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	*$13.50*	$13.75	$13.00	$37.00
Carwheels, Philadelphia	17.00	17.00	16.00	43.00
Heavy steel scrap, P'gh.	**13.50**	13.00	13.00	28.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	26.50
Heavy steel scrap, Ch'go.	11.00	11.00	10.75	24.50
No. 1 cast, Pittsburgh	**17.00**	16.50	16.00	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.25	13.25	13.00	34.50
No. 1 RR. wrot, Phila.	**15.00**	14.50	14.00	34.00
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.00	24.00
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	**$3.25**	$3.00	$2.75	$16.50
Foundry coke, prompt	**4.25**	4.00	3.75	17.50
Metals,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	**12.25**	12.00	12.00	18.75
Electrolytic copper, N. Y.	**12.00**	11.75	11.75	18.75
Zinc, St. Louis	4.20	4.20	4.20	7.80
Zinc, New York	4.70	4.70	4.70	7.80
Lead, St. Louis	**4.40**	4.30	4.25	8.25
Lead, New York	**4.60**	4.50	4.40	8.37½
Tin, New York	*26.75*	27.25	26.12½	45.00
Antimony (Asiatic), N. Y.	*4.45*	4.50	4.50	7.12½

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 13, 1921, Finished Steel, 2.279c. per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Sept. 6, 1921,	2.279c.
Aug. 16, 1921,	2.364c.
Sept. 14, 1920,	3.974c.
10-year pre-war average,	1.684c.

some companies finding that the gain in August has not been maintained, while others say that bookings so far this month compare very favorably with those of the same period last month. One important producer has taken a substantially larger tonnage this month than in the same period in August. Activity still is lacking in the heavy tonnage products, despite the fact that the outlook for structural business in this district is brighter to-day than it has been in more than a year. In some quarters there is a tendency to ascribe the increase in structural inquiries to a desire on the part of the general contractors to get under cover before snow flies. Building laws of the city of Pittsburgh are to be amended so that in the future no structures of more than 10 stories will be permitted in the downtown business section. Investors have been seeking permits for higher structures to escape the new law. Actual awards in the past fortnight, however, have been larger than they were previously in some time and because of this some are inclined to believe that the period of waiting is almost at an end.

Demand for prompt tonnages of tin plate still is good and general sheet business is fairly active, although the independent companies have not been getting as many orders this month as were coming to them in August. Buying of tubular goods is entirely hand to mouth, but must be said to be pretty constant as far as standard or merchant pipe is concerned. A cut in resale prices of pipe by jobbers handling the product of the National Tube Co. last week brought reports that this company would cut mill quotations, but there is official denial that any such step is under consideration. Considerable irregularity still marks prices, but with the exception of wire products the drift is lower. It is now admitted that plates and shapes can be bought as low as 1.60c. base, while hoops have gone as low as 2.15c. and bands down to 2c., as compared with 2.25c., the recent quotation on both products.

The pig iron market again has become extremely dull. Makers, however, are holding tenaciously to the advances recently established.

There is no appreciable change in plant activities in this and nearby districts except that there is a possibility of one merchant and one steel works furnace blowing in at an early date.

Pig Iron.—Business is very slack again with prices of all grades well maintained, but based upon only small tonnages. The largest sale reported is one of 1000 tons of Bessemer, which sold at about $20, Valley furnace, but was not for this district. Interest in basic is not particularly keen because melters either have no pressing needs or cannot see their way clear to pay the present asking price of most makers of $20, furnace, in view of the fact that the recent rise from $18 to $20 has not been accompanied by a corresponding increase in prices of finished steel products. Since the advance in iron has enhanced scrap prices, the opportunity for cutting steel costs is slight. All makers evidently are not holding religiously to $20, furnace, since one melter who has been in the market pretty constantly lately insists he has not been obliged to go that high. Foundry iron sales are few and small. Merchant producers are getting $21 for the base grade for carloads, but there is a fairly authentic report that

one of the steel companies recently sold 10,000 tons of foundry iron at $19.50, Valley furnace. It is reported that the A. M. Byers Co. has put out the inquiry for the coke required for its Mattie furnace at Girard, Ohio, but blowing in of this furnace still is in doubt and the decision rests upon the company being able to secure 12,000 tons of forge iron at a price lower than it can make it, and as to whether there is going to be a market for the surplus over its own requirements.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.00 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys—Interest in the market is almost nil. The Valley inquiries for ferromanganese, one for 100 tons and the other for 200 to 300 tons, have been deferred because prices named have been above the ideas of the prospective buyers. The company seeking the larger tonnage has set $60 delivered Youngstown as its maximum. Foreign material, said to be English, has been offered as low as $57 c.i.f. Atlantic seaboard, which would mean $63.16 delivered Youngstown. The nominal quotation of English makers is $65 c.i.f. Atlantic seaboard, while domestic makers are quoting $75 delivered, though no recent business has been done at above $70 delivered. We note sales of only one or two carloads of spiegeleisen within the range quoted. A Pittsburgh jobber is seeking a car of 50 per cent ferrosilicon. Most makers are quoting $65 furnace, freight allowed, on this alloy but $60 is about as high as sales can be done to-day.

We quote 78 to 82 per cent domestic ferromanganese at $70 delivered; 76 to 80 per cent, $68; 78 to 82 per cent British ferromanganese, $58 to $65, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Hardly enough is going on to clearly determine prices. Non-integrated sheet makers do not seem to be any busier than they have been and consequently are not very large buyers of sheet bars. The common quotation is $30, Pittsburgh or Youngstown, but reports continue that sales have been made from $1 to $2 per ton lower. There is even less interest in billets and slabs than there is in sheet bars, due to the fact that the demand for plates remains limited and few of the merchant mill products are selling at all freely. There is no reason to change quotations.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—The American Steel & Wire Co. has announced a price of $41 for the base size of common soft steel and this price probably will become the "official" quotation of independent makers. There is not much demand and some uncertainty exists as to whether the new price can be obtained, in view of the fact that the bulk of recent business was done at $38 to $40. Prices are given on page 703.

Structural Material.—The American Bridge Co. has taken 3000 tons for the viaducts for the Boulevard of the Allies, Pittsburgh, its bid being $195,265. The same company also has secured 13 all steel deck barges with the option of taking two more, placed through the United States Engineer's Office, Memphis, Tenn., for service in the Memphis and Vicksburg districts, at $9,250 each. About 3000 tons of steel will be required for these barges. The Jones & Laughlin Steel Co. has taken 550 tons for a new plant at St. Louis for the Standard Underground Cable Co., Pittsburgh. The McClintic-Marshall Co. has taken 125 tons of I-beams for the Palatka Bridge, South Jacksonville, Fla., 100 tons for a storage building for the Union Ice Co., Pittsburgh, and 150 tons for the New York Steam Corporation placed through Stone & Webster, Boston. The Bell Telephone building, which will take 2000 tons, the Y. M. C. A. building, requiring 1500 tons, and the Joseph Horne Co., building, which takes 3500 tons, are expected to be placed before long. Plain material does not reflect in demand the orders which have been placed or are pending. As low as 1.60c. has been done but on small lots 1.70c. and 1.75c. still are quoted. Prices are given on page 703.

Iron and Steel Pipe.—A report late last week that jobbers handling the product of National Tube Co. had revised downward resale prices of standard pipe $6 to $7 per ton and 5 per cent on oil country pipe, started much speculation as to the possibility of a reduction in mill prices by that company. It is officially stated that a reduction in mill prices has not been considered and that the cut in resale prices merely is the result of competitive trade conditions. Until recently the National Tube Co. was not meeting competition and naturally resale prices of jobbers handling its pipe were somewhat above those distributing the product of independent mills. General conditions in tubular goods otherwise are much as they have been during the past two weeks. There is a very fair run of orders from jobbers in merchant pipe and no important deviation from published discounts. Oil well pipe still is very slow of sale and no improvement is looked for until along toward the end of the year or the early part of 1922 when the oil companies are figuring on next year's drilling program. Standard Oil companies are reported to be interested in line pipe and one of them is reported to have placed 30 miles of 6-in. pipe. Prices of this class of material do not have very close relation to published prices. Discounts are given on page 703.

Nuts, Bolts and Rivets.—Outside of the fact that specifications against old orders are somewhat larger than they have been, there is no special change in the situation. Pittsburgh makers are not particularly anxious for business at the prices they would have to meet in competition with those in other centers. Prices and discounts are given on page 703.

Iron and Steel Bars.—The attempt to obtain tonnages of merchant steel bars at less than 1.65c. does not seem to be succeeding and important makers now report that not much difficulty is experienced in obtaining that price. Some makers still are quoting 1.75c. on business in this district because they would be obliged to absorb the freight. Such business as has been done, however, is within a range of 1.65c. to 1.70c. Concrete bars rolled from billets take the same range as mild bars, while those rolled from old rails are quoted at 1.60c., but business in both kinds is limited. Orders for iron bars are reported to be more numerous than they were recently.

We quote steel bars rolled from billets at 1.65c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—Railroads are inquiring pretty constantly for small lots of standard spikes, but actual business still is of limited proportions. Makers here are quoting $2.50 per 100 lb. base, but find it necessary to shade this price to meet competition from other districts. Similarly, small spikes are quoted at $2.75 per 100 lb. base by local makers, but competitive offerings necessitate going as low as $2.65 to get some orders. Prices are given on page 703.

Steel Rails.—Some improvement is noted in specifications against old orders for standard rails, but light sections still are in slow demand and the quotation of 1.75c. for new steel rails is merely nominal. An attractive inquiry undoubtedly would develop a price of 1.70c.

We quote 25 to 45 lb.- sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Plates.—There is still room for considerable improvement in the demand and competition for passing

orders is so keen that the price advantage is entirely with buyers. On the basis of what is going on, the market is quotable from 1.60c. to 1.70c.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.70c. f.o.b. Pittsburgh.

Sheets.—While the American Sheet & Tin Plate Co. continues to report an improvement in business and has added further to its active capacity since a week ago, when it had 50 per cent of its mills in operation, the experience of most of the independent makers is that orders this month have not been as large as they were in August. Automobile sheets are not in as good demand as they were recently due to the seasonable decline in production, and also to the fact that some plants have lost business because of price competition and are obliged to curtail schedules. Cutting of the regular market prices of sheets no longer amounts to much and the market may be regarded as steady at 2.75c. base for black, 3.75c. base for galvanized and 2.25c. base for blue annealed. Prices are given on page 703.

Wire Products.—Independent manufacturers have followed the American Steel & Wire Co. which, effective at close of business last Saturday, advanced nails from $2.75 base per keg to $2.90 and plain wire from $2.50 per 100-lb. to $2.60. Coated nails were advanced 10c. to $2.45 per count keg. From the standpoint of costs, no one disputes that the increase was justified, because all products, nails in particular, were selling at a loss at the old quotations. The advance will have the effect of making solid the business now on the books of makers, but there is also the well-known fact that, when there is not enough business to go around, difficulty is often experienced in maintaining new prices. Business was showing improvement when the advance was announced and a good many additional orders than otherwise might have been placed have been taken by manufacturers and jobbers, who were allowed to cover for requirements for 90 and 60 days respectively.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Tin Plate.—Demand is holding up unusually well for this time of the year, and the market is firm, due to the fact that manufacturers of perishable food containers underestimated their requirements, while several independent manufacturers, who formerly operated under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers and now are figuring on adopting the open shop policy, are out of production. Stock tin plate has become pretty well cleaned up, and while occasional sales are made at less, the more common price is $4.75 per base box. Production tin plate is firm at $5.25. The American Sheet & Tin Plate Co. has more than 50 per cent of its tin mills under power.

Hoops and Bands.—The market is weaker, notably on bands, which the past week or so have sold as low as 2c. On hoops the common quotation is 2.25c. base, but business has been done as low as 2.15c. Demand is moderate and competition for passing orders is sharp.

Hot-rolled and Cold-rolled Strips.—The automobile price war is finding reflection in orders which so far this month have fallen off somewhat as compared with August. Automobile makers who have not reduced prices are getting fewer orders and are curtailing production. Some demand is coming from builders' hardware manufacturers, but it is of a piecing out character. Business in hot-rolled strips has been done and lost at 2.25c. base, the market being quotable from 2c. to 2.25c. Cold-rolled strips are quotable from 3.75c. to 4c. base, but the higher figure is passing except for small lots.

Cold-Finished Steel Bars and Shafting.—The market still lacks activity. Slowing down in automobile plant activities, common to this time of the year, is affecting the demand for cold-rolled and cold-drawn steel and has led to some holding up of shipments against orders already in. The common quotation is 2.40c. base, Pittsburgh, but it is reported that the American Steel & Wire Co. is going as low as 2.35c. to secure orders and that some independents are meeting that figure. Shafting demands are limited. Cold-rolled or drawn shafting is quotable at 2.35c. to 2.40c. base, Pittsburgh, and ground shafting at 2.75c. base, mill, in carloads.

Coke and Coal.—The coke market still is feeling the effects of the labor troubles in the Connellsville district. The market has advanced at least 25c. per ton on both furnace and foundry grades. The spot or prompt market on furnace grade now is not quotable at less than $3.25 per net ton, oven, which is believed to be the price paid by the Wickwire-Spencer Steel Corporation, Buffalo, for 10,000 tons for immediate delivery. Brokers lately have been paying this price and this means that the cost to consumers is around $3.35 to $3.40. On contracts covering the remainder of the year, the common quotation is $3.50 per net ton, oven, and some operators who are well sold ahead on coal are not willing to take future business even at that price. The A. M. Byers Coal Co. again is considering blowing in its furnace at Girard, Ohio, and is asking for prices on 15,000 tons a month for last quarter. Foundry coke is moving steadily in small lots at $4.25 to $4.50 per net ton, ovens. The coal market is fairly firm at $1,75 to $2 for mine run steam and by-product coal and $2.25 to $2.75 for gas coal.

Old Material.—The market still has a strong undertone, although the consumptive demand often before has been greater than it is at present. The situation derives its strength more from the fact that available supplies are moderate than because there is a really good demand. This market also is affected by the fact that competing markets are netting shippers higher prices than are obtainable here. All dealers have rather sizeable stocks of steel works grades on their yards, but average costs are so high that none of this material is being offered. Production of scrap, meanwhile, reflects sub-normal building and machine shop activities, not to mention the fact that the automotive industry is slowing down as is usual at this time of the year, while the farmers of the country seem to be making their old implements do. The common bid for heavy melting steel is $13 per gross ton, delivered, but none of this grade recently has sold that low and some melters willing to throw such material down on their yards at $13.50 have failed to secure any. It is really doubtful whether any of this grade today could be bought at less than $14. One company, although a little fastidious as to quality, is paying $14 for material which ordinarily is graded as heavy melting steel. The recent stiffening in the price of pig iron tends to increase the use of scrap and to enhance its value. Machine shop turnings cannot be bought at less than $8.50, although some users are trying to obtain supplies at $8. The United States Cast Iron & Foundry Co. is reported to have bought some tonnages in the East of cast iron wheels and No. 1 cast scrap for its Scottdale, Pa., works, paying about $17 for wheels and from $17.50 to $18 for No. 1 cast, delivered Scottdale. These prices are well above what dealers here claim to be able to get. They report bids of $15.75 to $16 on cast iron wheels and $17 to $17.50 on No. 1 cast.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	13.50 to 14.00
No. 1 cast cupola size	17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	16.00 to 16.50
Compressed sheet steel	10.75 to 11.00
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.50 to 9.75
Railroad knuckles and couplers	14.50 to 15.00
Railroad coil and leaf springs	14.50 to 15.00
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.00 to 17.50
Railroad malleable	13.00 to 13.50
Iron car axles	19.00 to 20.00
Locomotive axles, steel	18.50 to 19.00
Steel car axles	14.50 to 15.00
Cast iron wheels	15.75 to 16.25
Rolled steel wheels	14.00 to 14.50
Machine shop turnings	8.50 to 8.75
Sheet bar crop ends at origin	12.50 to 13.00
Heavy steel axle turnings	10.00 to 10.50
Short shoveling turnings	9.50 to 10.00
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.25
No. 1 railroad wrought	12.00 to 13.00

Chicago

CHICAGO, Sept. 13.

Recent changes in market conditions have been slight but favorable. There is a healthy demand for sheets, which is reflected in better mill operations, the local independent having all of its capacity under power. Buying of plates, shapes and bars is still far below normal and prices are weak, although no weaker than heretofore. An advance in wire prices brought out a concentration of orders from widely distributed points, including the South, where the rise in cotton has had a favorable effect on general business conditions.

Additional orders for cars and car repairs are being placed by the railroads and a steady increase in purchases by the carriers is looked for. It is noted that railroad car loadings are growing larger every week and that the monthly deficits of a few months past have been transformed into profits. The net earnings of 202 class one roads in July were the largest for any month since October, 1920, and those of an important Western road in August are reported the largest in history.

The local building outlook looked exceptionally bright last week when Judge Landis, umpire in the dispute between contractors and unions, announced his decision. Various crafts, however, are dissatisfied with the award and the judge, upon being advised that they had struck in violation of their agreement, has denied them a rehearing and employers are preparing to introduce the open shop. Notwithstanding the disturbed local situation, building work is expanding in other sections of the West, numerous good-sized fabricating jobs being in prospect and others having been already placed. An export inquiry for 20,000 tons involved in a bridge over the Yellow River, China, is being figured on by one important Western fabricator, and is expected to be awarded before the end of October.

Foundries throughout this territory are expanding their operations and pig iron is steadily growing stronger, having advanced again to $22, local furnace.

Pig Iron.—The improvement in consumption in this section is gradual but widespread, as indicated by sales to diversified industries, including stove makers, sanitary manufacturers, sewing machine manufacturers, pipe shops, wheel companies, malleable foundries serving both the railroads and the automobile plants, jobbing foundries and others. The only important consumer which has failed to show signs of revival is the agricultural implement industry. The increase in demand has been reflected in another advance in price. The Inland Steel Co., which is operating the only blast furnace producing merchant iron in this territory, advanced its prices on foundry, malleable and basic to $22, base furnace, early last week, and was followed a few days later by the leading Northern merchant. A number of important sales were made on the eve of the advance, among them being 700 tons of foundry bought by a Milwaukee melter, and 500 tons of malleable purchased by a local foundry. A sanitary manufacturer located south of here has bought 600 tons of foundry at $22 base furnace, and sales of from 100 to 300 tons at the new prices are also reported. The American Brake Shoe & Foundry Co., with purchasing office in New York, is inquiring for 8000 tons of iron for its various plants, of which about 1000 tons will go to its Chicago foundries. The advance in Northern iron has materially bettered the chances of Southern iron entering this territory again. A Milwaukee melter, in fact, has issued an inquiry for 1000 tons of Southern foundry. There is now only $3 difference in the Chicago delivered prices of Southern and Northern iron and another advance of $1 a ton by the local producers would permit Southern iron to compete on a parity at various points in this territory, among them certain sections of Illinois, Indiana and Michigan. There is little activity in silvery charcoal or low phosphorus. A Milwaukee melter bought one carload of resale copper bearing low phosphorus at $36, delivered. There is little resale material to be found, however. Beehive foundry coke is growing firmer, the minimum going price being $4.25, Connellsville, with most sellers holding at $4.50.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	22.00
Northern high phos	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	22.00
Basic	22.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—A Wisconsin melter has bought 100 tons of ferromanganese at $75 delivered. Two Milwaukee foundries bought a carload each, the price on one being $70, freight allowed, and on the other slightly less than that. A local melter is in the market for one carload. A sale of one car of spiegeleisen is reported at less than $36, delivered. A large Chicago user is inquiring for a car of 50 per cent ferrosilicon and is reported to have been quoted $65, freight allowed. A Milwaukee melter also wants a carload.

We quote 78 to 82 per cent ferromanganese, $70 to $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment: The Denver & Rio Grande is inquiring for 1000 steel general service cars of either 50- or 70-ton capacity. The Chicago, Rock Island & Pacific has let 200 composite gondola cars of 50-ton capacity to the General American Car Co., and repairs on 125 steel gondola cars to the Western Steel Car & Foundry Co. The Delaware, Lackawanna & Western is inquiring for 1000 steel hopper cars of 50 tons capacity. The Baltimore & Ohio, reported last week as being in the market for 1000 all-steel 50-ton hopper cars and 1000 steel underframe box car bodies, is also asking for figures on the repair of from 3000 to 6000 freight cars of various types. The Toledo, St. Louis & Western has ordered five consolidated type locomotives from the Lima Locomotive Co.

Structural Material.—The long-awaited wage award of Judge Landis, umpire in the local building dispute, was hailed as the harbinger of a period of active construction, but, as explained elsewhere in this issue, subsequent developments indicate that a real settlement has not yet been reached. Dissatisfied with the decision, several crafts have thrown down their tools, holding up work on a number of important construction projects, among them the Chicago Union Station. At the same time the umpire has announced that if either party to the dispute files application for a rehearing, it will be granted. Although local construction has not received the impetus anticipated, there are signs of increased activity in other sections of the West. The amount of work actually let has not yet reached sufficient proportions to affect materially the condition of the mills, and prices on plain material are still decidedly weak. The largest fabricating project in this territory now being figured is the Government airship hangar at Belleville, Ill., involving 3600 tons. One important Western fabricator is preparing a bid on a bridge for the Pekin & Hankow Railroad over the Yellow River, China, and it is reported that this structure will call for 20,000 tons of steel. Recent fabricating awards include:

San Jacinto Life Insurance Building, Beaumont, Tex., 950 tons, to Christopher & Simpson Iron Works.

Riley Creek viaduct, Alaska, 467 tons, to Phoenix Bridge Co.

South Side High School, Fort Wayne, Ind., 400 tons, to the Engineering Co., Fort Wayne.

Tomahawk Steel & Iron Co., foundry and machine shop, Tomahawk, Wis., 143 tons, to Worden-Allen Co.

Consolidated Water Power & Paper Co., power plant, Wisconsin Rapids, Wis., 125 tons, to Worden-Allen Co.

Standard Underground Cable Co., plant at St. Louis, 600 tons, to Decatur Bridge Co.

One hundred shaft sets for Montreal Mining Co., Ironwood, Mich., 130 tons, to Worden-Allen Co.

Pending business includes:

Roosevelt Office Building, Indianapolis, 600 tons, Vonnegut & Bohn of that city, architects.

Terrace Theater, Indianapolis, 150 tons, Vonnegut & Bohn, architects, bids in Sept. 20.

Highway bridge, Sauk City, Wis., 586 tons, bids to be at office Wisconsin Highway Commission, Madison, Oct. 7.

Abraham Lincoln High School, Des Moines, Iowa, 800 tons, bids in Sept. 27.

Paul J. Kalman Co., Chicago, warehouse, Youngstown, Ohio, 280 tons.

Consolidated Stone Co., plant Bedford, Ind., 400 tons, to Kenwood Bridge Co.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rail and Track Supplies.—The mills are receiving a fair run of small orders for standard railroad spikes and track bolts, ordinarily ranging from 200 to 1000 kegs. Prices are somewhat confused owing to the fact that some mills are quoting f.o.b. works instead of f.o.b. Pittsburgh, but the ruling market does not appear to exceed 2.40c., Pittsburgh, on spikes and 3.40c., Pittsburgh, on bolts.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills. Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—This commodity continues weak with the price situation as unsettled as heretofore. The unsatisfactory character of current demand is reflected in intermittent mill operations. One local plate mill was shut down last week and is still inactive. Notwithstanding the present dearth of orders, there are indications of slowly expanding demand, particularly on the part of the car builders and railroads. Inquiries and orders for car repairs as well as for new rolling stock are steadily becoming more numerous and at the same time the railroads are gradually increasing the forces in their own shops. The Chicago, Rock Island & Pacific has ordered 200 composite gondola cars of 50 tons capacity from the General American Car Co., and the steel for this equipment, amounting to 2,000 tons, has been placed with a local mill. A number of large new inquiries for freight cars are noted in another paragraph. Another large project involving plates has been undertaken by an oil company, the Sinclair Crude Oil Purchasing Co. having awarded the fabrication of 2243 tons for 15 oil tanks at Humboldt, Kan., to the Chicago Bridge & Iron Co. This fabricator is reported to have most of the material in stock, so that the letting will not result in a correspondingly large order for the mills.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Demand is slack and the market remains exceedingly soft, with nothing resembling stable discounts in sight. For mill prices, see finished iron and steel, f.o.b. Pittsburgh, page 703.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅝ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅝ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—The improvement in the demand for soft steel bars is so gradual that mill output has not yet been materially affected and prices remain unsettled. As low as 1.75c., Chicago, has been done, but 1.85c. and 1.90c. are commoner.

Mill quotations are 2.75c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Sheets.—The demand for sheets continues to expand, with the result that mill operations are on a decidedly improved basis. The mill of the local independent, in fact, is running full. While the prices quoted below are fairly well maintained, there has been some shading, as low as 3.70c. base Pittsburgh, having been done on galvanized, and 2.60c. and 2c., base Pittsburgh, respectively, on black and blue annealed. Such concessions, however, are the exception rather than the rule.

Mill prices are: Mild steel bars, 1.75c. to 1.90c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Sheet Piling.—An Eastern mill has booked 300 tons of sheet piling for the Belle Isle Bridge, Detroit, and 100 tons for a bridge at Decatur, Ill.

Wire Products.—The American Steel & Wire Co. announced an advance of 15c. on wire nails and barbed wire and of 10c. on plain wire, effective Sept. 10. The new prices have been generally adopted by competitors. Purchases on the eve of the advances were the heaviest this year and buying has been at an accelerated rate since they went into effect. Jobbers who had permitted their stocks to diminish to the vanishing point because they looked for further price reductions are now buying. Those serving agricultural communities are particularly active, indicating a resumption of buying by the farmers. In the South the advance in cotton has been reflected in a marked improvement in business.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Cast Iron Pipe.—Although the season is growing rather late, there is still a considerable quantity of work in the market. The price situation is substantially unchanged, reports of stiffening heard in some quarters being balanced by low prices named elsewhere. The United States Cast Iron Pipe & Foundry Co. was the only bidder and was awarded 1928 tons of straight 54-in., 241 tons of lugged pipe and 376 tons of special castings by the city of Milwaukee, the price on the straight pipe being approximately $35, Birmingham. Other recent awards include:

Youngstown, Ohio, 850 tons of 4 to 12-in. to National Cast Iron Pipe Co. Bids on about 2000 tons of 12 to 30-in. were rejected.

Cedarburg, Wis., 600 tons, to American Cast Iron Pipe Co.

Troy, Ohio, 150 tons, to National Cast Iron Pipe Co.

Chicago, 255 tons, to United States Cast Iron Pipe & Foundry Co.

Prospective business includes:

Spring Wells, Mich., 450 tons, bids to be in Sept. 13.

Springfield, Ill., 250 tons, Sept. 19.

Forest, Ohio, 300 tons, Sept. 16.

Decatur, Ill., 400 tons, Sept. 12, to be let to contractor who will sublet.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $48.60; 6-in. and above, $42.60 to $45.60; class A and gas pipe, $3 extra.

Old Material.—Aside from a few scattered purchases by gray iron and malleable foundries, the market has been quiet so far as consumptive demand is concerned. Most users still refuse to consider recent advances as permanent and dealers are unwilling to make concessions. There have been few changes in the prices at which sellers are holding their material, but such changes as have taken place have been principally upward. Railroad offerings include: Northern Pacific, 2000 tons; Santa Fe, 1500 tons, and Soo Line, 500 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Relaying rails	27.50 to 30.00
Car wheels	14.00 to 14.50
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft	12.50 to 13.00
Heavy melting steel	11.00 to 11.50
Frogs, switches and guards cut apart	11.00 to 11.50
Shoveling steel	10.50 to 11.00
Low phos. heavy melting steel	13.25 to 13.75
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	10.50 to 11.00
Iron arch bars and transoms	14.50 to 15.00
Iron car axles	18.50 to 19.00
Steel car axles	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.00 to 10.50
Pipes and flues	7.00 to 7.50
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.00 to 10.50
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.00 to 13.50
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	10.50 to 11.00
Brake shoes	11.00 to 11.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	13.00 to 13.50
Country mixed	8.50 to 9.00

New York

NEW YORK, Sept. 13.

Pig Iron.—Inquiries which have developed during the past 10 days amount to about 17,000 tons of foundry and malleable iron. Though very little of this tonnage has been placed, it is confidently expected that contracts amounting to 10,000 tons will be made within a few days. The most interesting transaction was that of a Dover, N. J., melter who inquired for 1000 to 1500 tons for first quarter delivery and compromised with the seller, placing the order for deliveries starting in December and extending over January and February only. Inquiries from hardware interests amount to about 1400 tons, including 400 tons for the first quarter of 1922. No furnaces seem anxious to quote for delivery after Jan. 1, but some will sell for January-February delivery as in the case of the Dover buyer. The market is firmer and $19.50, furnace, seems to be minimum in eastern Pennsylvania for No. 2 plain, while No. 1X is now quoted $1 higher than No. 2X, showing that shading on high silicon iron is not being continued. Furnace operators point to the higher price of coke as one of the indications that the cost of making pig iron will not be lowered by reduced cost of raw material at any time in the near future The price of coke is, however, affected by strikes which may soon end. There is some evidence of increasing melt and foundrymen are showing decidedly more interest in the market.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25	$23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	22.02
Buffalo, sil. 1.75 to 2.25	25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—At least one British producer has today reduced its quotation for standard British ferromanganese from $65 to $58.35, seaboard. This value corresponds quite closely to the British official quotation of £14 10s. for export of this alloy to continental Europe at the present rate of exchange and adding the freight rate to this country. Inquiries consist of several lots of 100 to 200 tons, aggregating about 500 tons, as well as a few smaller lots, but no sales are reported. Inquiry for spiegeleisen is light and sales are few at the prevailing quotations. The market for high grade manganese ore continues lifeless with quotations nominal. Demand for 50 per cent ferrosilicon is small at prevailing prices. We quote as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton	$70.00
Ferromanganese, British, seaboard, per ton.	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Cast-Iron Pipe.—There has been a flurry of municipal askings and purchases, which has brought out low prices in case of attractive tonnages. For instance, the City of New York opened bids for 1200 tons of 16-in. and 20-in. pipe, the Florence Foundry & Machine Co. bidding lowest at $41.70, delivered. Boonton, N. J., purchased 100 tons of 12-in. pipe from the R. D. Wood Co., Philadelphia. Essex Fells, N. J., has awarded the job of furnishing and laying 100 tons to a contractor. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Finished Iron and Steel.—The week has brought a noticeable improvement in demand, particularly in structural shapes, bars and wire products. Plates, sheets, cold finished bars and some other forms of steel are still dull and featureless. The advance of $2 and $3 a ton on wire products by the American Steel & Wire Co., followed by its competitors, constitutes the strong feature of the steel price situation. Other products are soft and the measure of the decline which has quietly taken place in recent weeks is shown by open bids received up to Sept. 10 by the New York Central Railroad on 1000 tons of plates, shapes and bars. Nearly all of the mills which make all three products put in bids. On steel bars the Carnegie Steel Co. and some of the other independents bid 1.65c., Pittsburgh, but Buffalo companies bid 1.65c., Buffalo. On plates the bids ranged from 2.03c., delivered New York, which works back to 1.65c., Pittsburgh, to 1.75c., Pittsburgh, while on structural shapes most of the bids ranged from 1.70c. to 1.80c., Pittsburgh. One of the indications of a better tone in the steel trade was the placing of a 3000-ton stock order for shapes, plates and bars by a fabricating company, there having been little of such business of this character for more than a year. The price advance on wire products brought out a fairly good volume of business, many jobbers closing on 60-day contracts at the former prices and taking immediate delivery of part of their requirements. Though most of the current improvement is in domestic trade, there is also a slight spotty betterment in export demand. Following the shipment last week of 3000 tons of skelp to Scotland, a leading independent export seller received an inquiry from England for 2700 tons of skelp and plates. Bar business is made better by an increasing number of building jobs. Inquiries for reinforcing bars totaling several thousand tons are pending. The Donner Steel Co., Buffalo, last week started four open-hearth furnaces, and its 10-in. and 14-in. bar mills are in part engaged in rolling orders for a new deformed bar which it has placed on the market. Outside of the 15,000 tons involved in the Federal Reserve Bank Building, New York, the week in fabricated steel has been quiet. For the Federal Reserve Bank six bids in all were received, and while it is understood the contract has been let, announcement is as yet withheld. Among new projects may be mentioned a plant which the Lamson Store Service Co. is planning to build at Syracuse, taking 400 tons, and the George A. Fuller Co. is reported to have the general contract for a building to occupy the Park Avenue frontage of the old Grand Union Hotel site at Forty-second Street.

Awards include a building in New York for the Dodge Sales & Engineering Co., Mishawaka, Ind., 1500 tons, to the Hay Foundry & Iron Works, and the Excelsior Savings Bank Building, New York, 600 tons, to the Hedden Iron Construction Co. The Western Steel Car & Foundry Co. will do the repairs on 125 general service cars for the Rock Island and has been awarded the repairs on 250 hopper cars for the Wabash.

We quote for mill shipments, New York, as follows: Soft steel bars, 2.03c.; plates, 2.03c. to 2.08c.; structural shapes, 2.03c. to 2.18c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—August sales by warehouses showed a general improvement, which is evidently continuing. Prices are weak, due to the uncertainty of mill quotations. It is reported that sales of steel bars have been made by a warehouse in this district at 2.68c. per lb., 10c. per 100-lb. below the prevailing quotation. Sheet prices continue to show a slight decline, galvanized, No. 28 gage being obtainable as low as 4.75c. per lb., black sheets at 4c. per lb. and blue annealed, No. 10 gage, at 3.28c. per lb. While most warehouses handling wire quote bright basic and annealed soft at 3.75c. per lb., a large independent interest still maintains its prices of 3.53c. and 3.38c. per lb. Although we quote Swedish iron bars at 10c. per lb., there is no market on this material, and any quotation is nominal. Discounts on wrought iron pipe have been increased proportionate to the recent mill reduction. We quote prices on page 718.

High Speed Steel.—Business is better, most sellers reporting considerable increase of sales in August over the July business. Quotations on 18 per cent tungsten high speed steel are maintained at about 90c. to $1 per lb.

Coke.—Prices have risen about 25c. the past week, the lowest price of guaranteed foundry coke being $4.25 per ton, Connellsville, and this price is not shaded. The range extends to $4.50. A sale of furnace coke has just been consummated of 7000 tons a month during last quarter for $3.50, Connellsville, base. Many report better business in coke than in pig iron. The strikes of oven operators is a reason assigned to the rising prices.

Old Material.—The advance in prices was more pronounced the past week, several items having risen about $1. No more mills appear to be in the market, the advancing prices being caused by the efforts of dealers to lay down material in yards and of brokers and dealers to cover on old orders. Heavy melting steel, pipe and stove plate continue to be most in demand.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Heavy melting steel, rails or equivalent	8.50 to 9.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.00 to 11.50
Iron car axles	18.00 to 19.00
No. 1 railroad wrought	11.50 to 12.00
Wrought iron track	9.00 to 9.50
Forge fire	5.50 to 6.00
No. 1 yard wrought, long	9.50 to 10.00
Light iron	3.50 to 4.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	3.50 to 4.00
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.50 to 9.00
Stove plate	9.50 to 10.00
Locomotive grate bars	9.50 to 10.00
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$16.00 to $17.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Birmingham

BIRMINGHAM, ALA., Sept. 13.

Pig Iron—The question now is how long the $19 base for Birmingham iron will last, for it is expected to advance. No business was done under the $19 base last week. No silicons were sacrificed. The leading maker declined to sell 2.25 to 2.75 silicon in round lots at $19. Only one concern has well-assorted stocks. Eight have little or none. The Central Iron & Coal Co. will resume at its blast furnace at Holt Sept. 19 and at its principal coal mines Sept. 26. Forty of the 60 by-product ovens have started and will again supply the city of Tuscaloosa with fuel and light. The company has not a ton of iron on hand. The Alabama Co. has resumed at one ore mine and schedules furnace resumption in October. Stove plants are taking more metal. The largest foundry interest reports a larger outgo than in months and a greater influx of orders. No especially large tonnage has been booked in a single order, but the aggregate of the week must have been 10,000 tons. The rise in cotton has inspired and stimulated the entire South and all business has responded promptly without exception. It is believed that the Southern Wheel Co. has closed a deal for 2900 tons of pig iron in three grades running from base to 3.25 per cent silicon for the Southern plants at Birmingham, Atlanta and Savannah, although the seller cannot be positively located. The price quoted by Birmingham makers on all grades was the base of $19 for 1.75 to 2.25. Some Birmingham makers believe a portion of order was placed at St. Louis.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Cast Iron Pipe—A large sanitary pipe interest shipped the greatest amount of pipe in August in the history of its business. Much extra heavy pipe has gone to the East. The base remains at $40 for standard and $30 for extra heavy. Business is fair to good. The base of high pressure pipe seems to remain at $35 for 6-in. with shading on larger sizes. The Birmingham Water Works is taking a considerable tonnage of 30-in. and 16-in. pipe. Very little is moving to the Pacific Coast this month following 7000 tons last month. Many Southwestern cities are on the eve of ordering and will as soon as they can sell bonds.

Finishing Mills—Finishing steel mills in Birmingham continue to operate on an enlarged schedule. The Gulf States Steel Co. was on 55 per cent in August and is at the same pace now. The Tennessee company maintains a more than 60 per cent schedule with following plants active: Rail mill (9000 tons a week), structural mill at Fairfield, plate mill at Bessemer, car works, tie-plate plant, four furnaces on basic, six of its nine open hearth furnaces.

Coal and Coke—Coal is being mined at 70 per cent of normal and standard foundry coke is fairly active at $6 to $6.50.

Old Material—No. 1 heavy steel is firmer and up $1 with other materials tending upward, but no change in quotations last week. Cast scrap is quite active.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Sept. 13.

Pig Iron.—Eastern Pennsylvania iron appears easier in spots, although in all fairness it should be stated not enough has been sold at lower prices to establish the market. The Robesonia furnace is credited with offering No. 2 plain at $19, No. 2X at $19.50 and No. 1X at $20. The Gurney Heater Mfg. Co., South Framingham, Mass., this week purchased 600 tons No. 2 plain at an indicated delivered price of slightly better than $23.50. A week ago, eastern Pennsylvania generally was quoted at $20 furnace, base. Two 100 ton lots were taken this week on a basis of $20, furnace, for No. 2X and $21 for No. 1X. A New England malleable interest purchased 100 tons Northern special analysis iron at practically $25.50, delivered. Otherwise business was confined to scattered car-lots of Buffalo and eastern Pennsylvania, mostly silicons 2.75 to 3.25 and 4.25 to 4.75 at prices having varying relations to base quotations, the tendency being to shade regular 50c. differentials. Slight improvement is noted in the call for car-lots of Southern special analysis iron from manufacturers' foundries, willing to pay the difference between these and Pennsylvania and Buffalo to secure desired mixtures, on a basis of $19 furnace for No. 2 plain with 50c. differentials. Virginia iron appears weaker without actual transactions. Some inquiry is noted for first quarter, 1922 iron, but no furnace is willing to quote for that delivery. Delivered pig iron prices follow:

East. Penn., sil. 2.25 to 2.75	$24.06 to $25.06
East. Penn., sil. 1.75 to 2.25	23.56 to 24.56
Buffalo, sil. 2.25 to 2.75	25.46 to 26.46
Buffalo, sil. 1.75 to 2.25	25.46 to 25.96
Virginia, sil. 2.25 to 2.75	29.08 to 32.08
Virginia, sil. 1.75 to 2.25	28.58 to 31.58
Alabama, sil. 2.25 to 2.75	30.16
Alabama, sil. 1.75 to 2.25	29.66

Coke.—Foundry orders for winter supplies of coke have begun to make their appearance, but these are not sufficient in number to materially influence the daily output of the New England by-product producers. A large percentage of the foundries, especially the jobbing, have small stocks of fuel on hand and are buying only as absolute necessity requires. The outlook for increased meltings is not sufficiently bright at the moment to indicate a change in their coke buying policy. There is not enough prospective business from day to day to attract outside foundry coke interests to this market. Local producers continue to quote both spot and contract by-product foundry coke at $10.66 delivered.

Finished Materials.—Some fairly attractive tonnages of angles, plates and shapes are hanging over the market, for which mill representatives are quoting 1.65c. f.o.b. Pittsburgh. The market on wire nails is slightly more active, following advices from producers

to cover before the advances. That for other mill products has grown less active. Prices consequently appear firmer simply because there is less opportunity to quote. Jobbing house business is spotty, some concerns reporting greater consumption, while others say business is no more than holding its own. Sentiment regarding fall trade, however, generally is more hopeful among the jobbing interests.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—The limited buying of No. 2 plain pig iron the past two or three months and the more frequent calls for ground ferromanganese, suggests jobbing foundries are using larger percentages of machinery cast per melt than has been common practice heretofore. Old material brokers, on the other hand, as a rule secure only scattered car-lot orders. The inference is that foundries, with their limited weekly meltings, are securing all scrap needed from local junk dealers. Manufacturers' foundries occasionally come into the market for 100 or 200 tons, a textile machinery maker this week having purchased 100 tons textile scrap at $18 delivered, while another manufacturing interest asked quotations on 150 to 200 tons. There is no concerted buying movement on their part, however. Machinery cast prices take a wide range according to the quality of holdings, but in all instances are firmly held and, if anything, have an upward tendency. Pennsylvania steel mills apparently are not willing to raise bids on heavy melting steel, etc., and yard interests will not meet their prices, consequently the market continues in a deadlock.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.00 to $20.00
No. 2 machinery cast	15.00 to 16.00
Stove plate	15.00 to 15.50
Railroad malleable	11.50 to 12.00

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.00 to $6.50
No. 1 railroad wrought	9.00 to 9.50
No. 1 yard wrought	7.50 to 8.00
Wrought pipe (1 in. in diameter, over 2 ft. long)	7.50 to 8.50
Machine shop turnings	2.00 to 2.50
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.00 to 2.50
Forged scrap and bundled skeleton	4.00 to 4.50
Street car axles and shafting	12.00 to 12.50
Car wheels	11.50 to 12.50
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 12.

Iron Ore.—Two inquiries have come out, each for 10,000 to 15,000 tons of high phosphorus ore, on which sellers have quoted $5.35, the regular price for this ore this season, the price being 35c. below regular base on old range non-Bessemer. Furnaces claim, however, that they cannot make pig iron to sell at current prices unless they are able to buy ore at lower prices. With the large ore stocks on hand, it is believed that a furnace would have little difficulty in buying ore on dock at lower than regular prices. One steel plant having long time contracts for ore will require 30,000 tons more ore than it originally specified and this week placed an order for that additional amount. Ore receipts at Lake Erie ports during August were 3,158,447 gross tons as compared with 7,095,450 tons during August last year. Receipts at Lake Erie ports for the season till Sept. 1 were 10,407,882 tons as compared with 24,503,222 tons during the same period last year. August shipments from Lake Erie ports to inland furnaces were 2,135,104 tons as compared with 5,029,207 tons in August, 1920, and the shipments from these docks for the season till Sept. 1 were 7,842,336 tons as compared with 17,626,216 tons till Sept. 1 last year. In spite of the light ore movement this year, stocks on docks are considerably larger than a year ago, the amount on Lake Erie docks Sept. 1 being 9,285,708 tons as compared with 8,554,455 tons on the same date a year ago. August receipts at other than Lake Erie ports were 1,190,454 tons as compared with 2,159,686 tons during August, 1920. The same ports have received 3,659,097 tons this season as compared with 9,226,168 tons up to September, 1920.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—Sales during the past week, while mostly in small lots, indicate a broadening demand for pig iron and the market shows a further stiffening of prices toward the $21 quotation on this grade. While the $20 quotation is still being made by some lake furnaces, more business is being taken at from $20.50 to $21, so that the average price at which sales were made was advanced somewhat during the week. One Valley furnace made a number of small lot sales at $21, which it has adhered to recently, and the agency making these sales sold in all about 4000 tons during the week from various furnaces. Another interest that has been on a $20 basis at its several furnaces is now asking $21 for foundry iron and its sales include a small lot from a New York furnace at that price, f.o.b. Buffalo. Another interest sold 4000 tons during the week in small lots of foundry and including some malleable iron at $20 to $21. Locally the price remains at $20.50 to $21 at furnace, although one producer is now asking $22, delivered, basing this price on $21 Valley iron and giving the buyer the advantage of one-half of the freight rate. A local consumer has purchased 1000 tons of malleable iron and this sale is of particular interest in that the iron is for delivery until March 1. This is the first sale reported in many months for extended future delivery and while the price has not been announced it is understood that the buyer paid a little more for the iron than he would have been charged had he bought it for earlier shipment. An inquiry for 400 tons of foundry iron for the fourth quarter came out and brought a $21 quotation, but was withdrawn. Basic iron can still probably be bought at $19 from steel makers, although most merchant furnaces are asking $20. On an inquiry for 1000 tons of basic iron from a Pittsburgh district consumer, a Cleveland furnace during the week quoted $20 Valley, but did not get the order. We note the sale of a car lot of low phosphorus iron at $35, or $1 a ton lower than recent quotations.

We quote delivered Cleveland as follows, based on the new freight rate, there being a 56c. switching charge for local iron, a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and $6.67 from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	35.00

Alloy Steel.—Recent price reductions by some of the automobile builders upset production schedules and caused hesitancy in placing pending orders for alloy steels. Prices are weak and down close to the pre-war base. Mills quote 3½ per cent nickel steel at 5c. to 5¼c. per lb., chrome nickel steel at 4½c. to 4¾c. and chrome vanadium steel at 5c. to 5¼c., the lower prices being for desirable orders.

Hot and Cold-Rolled Strip Steel.—The market is rather quiet and prices are somewhat irregular. On desirable orders, mills quote hot-rolled strip steel at 2.10c. to 2.15c. and cold-rolled strip steel at 4c.

Bolts, Nuts and Rivets.—The demand for bolts and nuts continues to improve and local makers report prices a little firmer. Consumers are buying in somewhat larger quantities than they have been and a few have placed contracts for the remainder of the year. Orders are coming from jobbers and from about all classes of consumers except the implement manufacturers. The demand for rivets has improved slightly, but is still very light. Prices are weak and irregular with 2.25c. and 2.35c. the minimum quotations for structural and boiler rivets respectively.

Semi-Finished Steel.—There is a moderate demand for sheet bars in small lots and one mill reports sales during the week aggregating 2800 tons. The going price is $30, Youngstown. Since the recent $2 reduction in sheet bars, mills are not inclined to allow the $1 differential on slabs, which are also quoted at $30.

Finished Iron and Steel.—The volume of business changed very little during the week, although some of

the mills report a slight increase in orders and inquiries. The price advance on nails and wire caused a feeling among some customers that prices on other items may have reached bottom and the market might stiffen. However, steel bars, plates and structural material are still weak with average prices probably a little lower than a week ago. Although minimum quotations generally are unchanged, a new low price has appeared on steel bars. Independent mills have followed the American Steel & Wire Co. in advancing prices on nails, wire and wire rods, but before the advance the mills gave their customers an opportunity to cover at the lower prices and booked considerable wire tonnage. Sheet bars are commonly quoted at 1.65c. for car lots, but sales have been made at 1.60c., and even that quotation has been shaded. Plates are generally quoted at 1.65c. to 1.70c., the lower price being fairly common for a desirable order, and some sales are being made at 1.75c., but it is very probable that a good order would bring out a 1.60c. quotation. On structural material, 1.65c. is apparently the minimum quotation. A Cleveland mill which was reported last week to have taken 1000 tons of plates from an Eastern consumer has booked another 1000-ton order from the same source for oil tanks and stills. Lake shipyards are figuring on a 400-foot stone and coal boat requiring 2500 tons of plates and structural material. This is the first definite inquiry for a large freight boat that has reached these shipyards this season. Another inquiry is for 1000 tons of cold-rolled steel bars. The demand for steel from the automobile industry in Detroit is falling off. Car builders are evidently reducing their stock in anticipation of a slackening in sales during the fall. Mills supplying the Ford Motor Co. advise that this company will not buy as much steel for October requirements as it did for September, although it is stated that this company has not yet reduced production. Structural work is inactive. Hard steel bars are quoted with prices slightly lower, ranging from 1.60c. to 1.65c.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Shading to the extent of $1 a ton to 2.20c. is being done on blue annealed sheets, several orders being taken at that price. Black and galvanized sheets are apparently firm at 2.75c. and 3.75c. respectively. Some of the mills are now charging for certain extras that they have been waiving. Orders have fallen off somewhat. A Cleveland mill has taken 750 tons of No. 30 gage black sheets for Japan.

Warehouse Business.—Warehouses have reduced prices $5 a ton on black sheets and will make an advance on nails and wire corresponding to the advance in mill prices.

Old Material.—There is some demand for scrap for shipment to Valley and other mills. This is largely from dealers who have recently taken contracts and the activity is confined to heavy melting steel, borings, turnings and compressed steel. These grades are moving at $13 to $13.50 for heavy melting steel, $8.50 for shoveling turnings and cast iron borings and $10 to $10.50 for compressed steel. For Canton delivery, dealers are offering $12.50 for heavy melting steel. There is no demand from local mills. Prices are firm and unchanged.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.00 to 6.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.00 to 8.25
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	5.50 to 6.00
Drop forge flashings, under 10 in.	6.00 to 6.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Cincinnati

CINCINNATI, Sept. 13.

Pig Iron.—The market was comparatively quiet during the week, though several 100-ton lots were disposed of. Carload business has again become the prevailing activity. A few inquiries, the largest of which is for 400 tons, are being figured on, the bulk of the business coming from Indiana melters. The price situation is firm, southern Ohio irons having advanced during the week $1 a ton to a $21 base, for foundry and malleable. We note a sale of 200 tons of malleable from southern Ohio at the latter figure, and one of 800 tons of foundry iron to a St. Louis district melter at the same figure. Several carload sales of Southern irons were made on the basis of $19, Birmingham, but in one instance $19.50 was secured. The general asking price, however, is $19, and it is reported that a Southern railroad equipment company purchased 6000 tons at this figure. A sale of 100 tons of Chicago iron at $22 was made to a northern Indiana melter. While the week just closed was quiet, the trade is confident that better things are in sight, and preparations are being made to blow in several furnaces. One Marting stack in southern Ohio will go in blast on Thursday, and Tuscaloosa and Etowah in the South are scheduled to resume about Oct. 1.

Based on freight rates of $4 50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	23.52

Finished Materials.—The feature of the week was the announcement by the American Steel & Wire Co. of an advance of 15c. per keg on wire nails, 15c. per 100 lb. on barbed wire, 10c. per 100 lb. on plain wire, and approximately $4 per ton on wire rods. It has long been felt by the trade that wire nails and wire products were being sold at prices that eliminated any possibility of the mills securing a profit, but the advance, while expected at some time, nevertheless comes as somewhat of a surprise. At any rate, the announcement was the means of bringing out a fair volume of business, and several orders for 10,000 kegs of nails were placed at the old price of $2.75 per keg. The same condition holds in other products, it being estimated that 20 carloads of wire products were placed before the advanced prices went into effect. In other lines of finished materials, with the exception of sheets, business has been rather quiet. The sheet market is fairly active, and numerous carload orders are being booked for immediate delivery, many of these for shipment to the South, which is, in the opinion of a number of salesmen covering the territory, showing a steady, though somewhat slow, recovery from the business depression. Recent advances in the price of cotton have had a stimulating effect on all lines of business, and confidence in the future is rapidly being restored. While reports are heard that prices on finished material are being shaded, the last published prices are apparently holding on business booked in this territory. For instance, we note a sale of a carload of steel bars at 1.75c., and about 60 tons of shapes and plates at 1.80c. On reinforcing bars, 1.60c. is apparently a general quotation, with a price of 1.55c. reported on an inquiry for 300 tons. In the structural field, the American Bridge Co. was low bidder on 15 barges for Memphis, the tonnage involved consisting of 1400 tons of plates. The same company was low bidder on 200 tons of steel work for Ohio River dams, and the Pittsburgh Trolley & Forge Co. on 100 tons of similar work. Cincinnati Council, Knights of Columbus, are planning the erection of a 10-story club house, and plans for the Masonic Temple will likely be posted shortly. Plans are also posted here for a bridge at Cairo, Ill., to be erected by the Illinois Central Railroad.

Warehouse Business.—Jobbers of wire products report business as steadily increasing, the demand for wire nails and barbed wire being heavy the past week.

The orders for other products, while small, are more in number, and tonnages are increasing slightly. While there have been no further price changes, it is anticipated that one will be made within the next week or so, or as soon as the price situation at the mills becomes more stable. The announcement by the American Steel & Wire Co. of price advances on nails and wire products was received with much interest by local jobbers. It is expected that stiffening of warehouse prices will be noticed, as local stocks are not heavy.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c.; under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.25 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—A better movement in coke is reported, though inquiries are not large. Much of the business being done is in foundry coke for immediate shipment. Prices are firm and operators are not inclined to contract for the future. Some additional ovens are being lighted in the West Virginia field, one operator having added 50 within the past two weeks.

Old Material—Some inquiries are being received for No. 1 machinery cast which is reported to be very scarce. There is very little activity, however, in the scrap market and prices, while firmer, as quotably unchanged.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.50 to	11.50
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.50 to	3.00
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	12.50 to	13.50
Burnt scrap	7.00 to	8.00
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	5.00

Buffalo

BUFFALO, Sept. 13.

Pig Iron.—The Rogers Brown Iron Co. blew in a furnace Sept. 8, stocks having been considerably reduced recently. This is the first blast furnace operation by this interest since the winter. Less than 10,000 tons of iron has been sold in the district, but inquiry has improved in an encouraging way. One interest has total inquiry of almost 20,000 tons, of which two separate propositions are for 2000 tons each. The lowest price is $20 for No. 2 plain and an effort is being made to maintain differentials on the various silicons ranging from $20 to $23. Another producer sold less than 2000 tons at $20 and $21 and reports a falling off in inquiry since the Buffalo market showed a strengthening. With a majority of producers, business is limited to small quantities; one sold a few hundred tons of malleable and another about 300 tons of foundry iron at $20.50. There is evidence that little iron is in the hands of brokers. One furnace having a stack in operation on foundry iron throughout the dull period will go on basic production to fill its own needs and on this basis will operate all month. The company expects its stock of foundry iron will be exhausted before Oct. 1 and if the volume of business is maintained, may blow in a furnace before that date. Its sales for a week were 5000 tons and with the exception of two lots of 1000 tons each and two for 500 tons, the sales were for carload quantities.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75
No. 2 plain, 1.75 to 2.25 sil.	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Before the advance in wire prices became effective, some desirable business in various grades was closed by a local mill. The tonnage is in the neighborhood of 4000 and is made up of three orders. The advances of the American Steel & Wire Co. will be followed by local mills. Bar inquiry and in particular for reinforcing material has brightened. One bar inquiry is for 500 tons—larger than has been received here in some time. Sheet piling for the Detroit-Belle Isle Bridge has been purchased here from a mill, but figures as to prices and quantity are not available. Rail business has dropped to nothing; whatever contracts are made for rails within the remainder of this year will be for delivery next year, mills expect. Pipe business continues good and some better activity in tin plate is noticed, some buyers desiring to contract on a 60-day basis. Sheet and bar orders are light. Structural work on enterprises of any size is apathetic in contrast to unusual activity in construction business on small buildings. An order for a carload of bolts and nuts was placed with a local agency on which keen competition was met, but the price was not made known. Some fair galvanized sheet orders have appeared, but the same office receiving this business finds plate and shape business extremely dull.

Warehouse Business.—Sheet prices have been shaded and there is some falling off in the demand on all products, but it is particularly noticed in sheets, which for several weeks showed improvement. Some car business expected by warehouses seems to have been taken by mills. In general demand is well balanced and no material is more sought after than another.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.30c.; galvanized steel sheets, No. 28, 5c.; black sheets, No. 28, 4c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 4.05c.

Old Material.—Sales of steel ranging in size from 200 to 500 tons have been made; one buyer having paid $12.50 and another as high as $13.50. Some cast scrap has moved at $16, but other than a feeling of confidence on the part of the dealers, there is little activity except scattered sales in small quantities.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

St. Louis

ST. LOUIS, Sept. 13.

Pig Iron.—The pig iron market is $1 higher, and the price of $24.88, delivered St. Louis, is generally being well maintained. Here and there resales are being made by brokers who bought before the recent advances at less than this. There is a decidedly firmer tone to the market. Buyers are taking on iron more freely, and the fact that efforts are being made to buy for next year's delivery is taken to indicate that melters are convinced that the price has reached bottom. There is an inquiry out for 40,000 tons of foundry iron for export. Several inquiries are out for from 1500 to 2500 tons, some calling for delivery into the first half of next year. A local melter bought 1000 tons of basic iron for September delivery. Another sale of 1000 tons of foundry iron was for delivery commencing in October and continuing through April. Sales of Granite City iron during the last week were 2800 tons made up of lots of 600 tons and less. None of the local by-product producers is selling for delivery beyond October.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.80 freight from Chicago and $5.74 from Birmingham.

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.74

Finished Iron and Steel.—The only thing of interest in the structural steel line during the past week was

the report that the Omaha Technical and Commercial High School project had been revived, involving 1000 tons of plates, shapes and bars. The inquiry of the Baltimore & Ohio Railroad for 1000 all-steel 50-ton hopper and 1000 steel underframe box car bodies, as reported in THE IRON AGE last week, created unusual interest. The only railroad here that is buying regularly is the Missouri Pacific. Its purchases last week included a car each of plates and wheels, and smaller materials for immediate needs. It also is understood that it is in the market for steel underframes for repair work. The Missouri, Kansas and Texas Railroad, which recently decided to change from coal to oil in its locomotive fuel, has let contracts to the Graver Corporation, Graver, Ind., for four 100,000-barrel; three 55,000-barrel, and four 20,000-steel storage tanks. Warehouse business continues to grow better.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—Coke is showing increased movement. There is a little better demand for foundry coke. One order placed during the week was for 2000 tons for the remaining months of this year. There was one inquiry out for 2000 to 2500 tons for nearby shipment, and another for 600 to 1000 tons. There is an increasing demand for domestic coke. Standard Connellsville foundry coke is quoted at $4.50 to $5 per net ton at ovens.

Old Material.—Although consumers still decline to become interested in the old material market, the tendency is toward higher levels and some grades have again advanced 50c. per ton over last week's quotations. It is a strictly dealer's market, however, as the prevailing opinion among brokers is that the mills must surely come into the market and they are buying up material with this end in view. However, the mills feel that the small tonnage on their books does not justify them in paying the advancing prices and until the railroads commence to place orders with them they will refrain from making purchases of material. The following railroad lists are before the market this week: Great Northern, 2250 tons; Missouri, Kansas & Texas, 1500 tons; Frisco Railway, 750 tons; Toledo, St. Louis & Western, 700 tons; Chicago, St. Paul, Minneapolis & Omaha, 300 tons, and Chicago & Eastern Illinois, 400 tons.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron Rails	$13.00 to	$13.50
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft.	11.00 to	11.50
Relaying rails, standard section	29.00 to	30.00
Cast iron car wheels	12.50 to	13.00
No. 1 heavy railroad melting steel	11.00 to	11.50
No. 1 heavy shoveling steel	9.50 to	10.00
Ordinary shoveling steel	9.00 to	9.50
Frogs, switches and guards, cut apart	11.00 to	11.50
Ordinary bundle sheet	4.00 to	4.50

Per Net Ton

Heavy axle and tire turnings	6.00 to	6.50
Iron angle bars	11.00 to	11.50
Steel angle bars	9.00 to	9.50
Iron car axles	16.50 to	17.00
Steel car axles	12.50 to	13.00
Wrought iron arch bars and transoms	13.00 to	13.50
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	10.00 to	10.50
Railroad springs	10.50 to	11.00
Steel couplers and knuckles	10.50 to	11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to	9.50
No. 1 dealer's forge	6.00 to	6.50
Cast iron borings	5.50 to	6.00
No. 1 busheling	9.50 to	10.00
No. 1 boilers cut in sheets and rings	6.00 to	6.50
No. 1 railroad cast	12.50 to	13.00
Stove plate and light cast	11.50 to	12.00
Railroad malleable	10.00 to	10.50
Agricultural malleable	9.00 to	9.50
Pipes and flues	7.50 to	8.00
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.50 to	4.00
Railroad grate bars	8.50 to	9.00
Machine shop turnings	4.50 to	5.00
Country mixed iron	7.00 to	7.50
Uncut railroad mixed	8.00 to	8.50
Horseshoes	10.50 to	11.00
Railroad brake shoes	8.50 to	9.00

Philadelphia

PHILADELPHIA, Sept. 13.

Steel prices, with the exception of those for wire products, which were advanced last week $2 and $3 a ton, continue to show a declining tendency. Plates, shapes and bars may now be quoted at 1.60c. to 1.70c., Pittsburgh, the bulk of transactions being at 1.65c. on all three products. The 1.60c. price on bars is said to have been made only when combined with a tonnage of structural shapes and plates. In line with lower prices on steel bars, bar iron is off $1 a ton and is to be had at 1.60c. to 1.65c., Pittsburgh. The new prices on sheets recently announced by the leading interest and followed generally by its larger competitors are not holding. These prices—2.25c. on blue annealed, 2.75c. on black and 3.75c. on galvanized—are being shaded at least $1 a ton. An Eastern coal company is reported to have bought 300 tons of blue annealed sheets at 2.20c., Pittsburgh. In bolts, nuts, rivets and spikes there appears to be less price cutting than has prevailed in recent weeks.

No material improvement in the demand for steel products has come with the month of September, except in wire products, considerable business having been booked in the past week prior to the advance. Plates and sheets are extremely dull and there is only a moderate volume of business in bars and structural shapes.

Pig Iron.—A significant feature of the foundry pig iron market is that consumers who have been buying a carload or two at a time for months are now inquiring for their requirements for last quarter of this year and first quarter of next year. Eastern Pennsylvania furnaces are a unit in declining to quote for next year and one New Jersey furnace has withdrawn all quotations except for September shipment, this being due to the uncertainty as to coke prices. While spot furnace coke is to be had at $3.25, Connellsville, contract coke is not available at this price, some operators naming about $4. As Eastern furnace operators claim to be losing $4 or $5 a ton on iron with present costs, they do not care to accept too much forward business at present prices with the possibility of costs going higher. Sales within the past week have totaled several thousand tons, and there is a fair volume of business pending, mostly in lots of 100 to 800 tons in this district, though eastern Pennsylvania furnaces are quoting on four or five inquiries from the New York and New England districts which aggregate about 20,000 tons. The week's sales included 3000 tons to one melter and 1000 tons to another; also 1000 tons of basic iron to a plate manufacturer, the price being $19.25, delivered. Prices on foundry iron are unchanged, though they are no firmer. No. 2 plain iron is available from at least two furnaces at $19.50, furnace, and No. 2 at $20, furnace. One furnace quotes $20 for No. 2 plain and $20.50 for No. 2X and still another asks $20.50 for No. 2 plain and $21 for No. 2X. With furnaces losing money at present prices, the prospect of other merchant furnaces coming into blast within the near future are not good. One furnace operator was considering putting his stack in operation, but after careful analysis of the situation decided not to do so. Furnace stocks show a slight decrease and much of the iron now on furnace yards is not of standard analysis.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.34 to	$21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	20.84 to	21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to	28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to	29.74
Basic deliv. eastern Pa.		19.25
Gray forge	20.00 to	21.00
Malleable	22.00 to	23.00
Standard low phos. (f.o.b. furnace)		36.50
Copper bearing low phos. (f.o.b. furnace)		35.00

Ferroalloys.—One British agent is reported to have received authorization to quote ferromanganese at $58.35, Atlantic seaboard; others continue to quote $65. The domestic price remains at $70, delivered. Spiegeleisen is quoted at $27 to $28, furnace.

Semi-Finished Steel.—With little or no demand, prices for semi-finished remain unchanged. Open-hearth

rerolling billets are $30, and forging quality $35, Pittsburgh.

Plates.—The plate market continues exceedingly dull. Probably less tonnage is being booked than in any steel product. Prices are weaker, it being easy to buy plates at 1.65c., Pittsburgh, while 1.60c. can be done on desirable lots.

Structural Shapes.—Some Eastern mills are strongly competing for orders for shapes at the expense of prices. Ordinary lots of shapes can be bought at 1.65c. to 1.70c., Pittsburgh, while a fair-sized tonnage would command a price a low as 1.60c., Pittsburgh.

Bars.—The steel bar price on ordinary lots is now 1.65c., Pittsburgh, but 1.60c. has been done on reinforcing bars of standard specification when combined with orders for plates and shapes. An Eastern company is reported to have quoted as low as 1.50c., Pittsburgh, on steel bars, but this is not confirmed here. Bar iron is off $1 a ton, being available at 1.60c. to 1.65c., Pittsburgh. An export order for 5000 tons of iron or steel bars, threaded at one end, is reported to have been placed by a New York export company at 1.76c., Pittsburgh, including the extra for threading.

Sheets.—A company in the Pittsburgh district has quoted prices on sheets about $1 a ton less than the figures named in the announcement recently of the American Sheet & Tin Plate Co. Those prices were 2.25c. on blue annealed, 2.75c. on black and 3.75c. on galvanized, Pittsburgh. A coal company is reported to have placed 300 tons of blue annealed sheets at 2.20c., Pittsburgh.

Track Supplies.—Railroad companies are inquiring more freely for spikes and track bolts. The Pennsylvania Railroad is in the market for 450,000 to 900,000 spikes and a large quantity of heat-treated track bolts. The Philadelphia & Reading and the Philadelphia Rapid Transit Co. have also inquired for track bolts. It is stated that railroad buying of track supplies has increased considerably within the past few weeks.

Warehouse Business.—A fair improvement in sales of steel out of stock is reported. Jobbers are in some instances buying more freely for stock. Prices on black and galvanized sheets and cold-rolled steel have been revised downward. We quote for delivery in Philadelphia as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ in. x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 3.75c.; galvanized sheets, No. 28 gage, 4.75c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4c.; squares and hexagons, cold-rolled steel, 4.50c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Old Material.—The scrap market shows some evidences of a firmer tendency. Fair tonnages of No. 1 railroad wrought have been sold at $15 and $15.50, an advance of 50c. a ton. Heavy axle turnings are 50c. higher. Heavy melting steel is firmer without any actual change in price. We quote for delivery in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.25 to 9.75
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.50
Stove plate (for steel plant use)	12.50 to 13.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Lake Placid Meeting of Electrochemists

The fortieth general meeting, marking the end of the second decade since the organization of the American Electrochemical Society, will take place at the Lake Placid Club, in the Adirondacks, New York, Sept. 29, 30 and Oct. 1. The technical program will be featured by two symposia on non-ferrous metallurgy and electrodeposition. The program follows, in part:

Thursday, Sept. 29

9:00 a. m.—Miscellaneous papers:

Charles Vickers: "Experiences with Alkaline and Alkaline Earth Metals in Connection with Non-Ferrous Alloys."

W. A. Cowan, L. D. Simpkins and G. O. Hiers: "The Electrolytically Produced Calcium-Barium-Lead Alloys Comprising Frary Metal."

Colin G. Fink and Chas. H. Eldridge: "The Electrolytic Corrosion of Lead-Thallium Alloys."

J. Newton Friend: "A New Theory of the Corrosion of Iron."

Haakon Styri: "Rust Prevention by Slushing."

8:00 p. m.—Meeting in the music room of the Forest Clubhouse. Lecture by Prof. Harlow Shapley, of the Harvard University Observatory, on "Chemistry and the Stars."

Friday, Sept. 29

9:00 a. m.—Symposium on non-ferrous metallurgy:

H. M. St. John: "The Influence of the Electric Furnace on the Metallurgy of Non-Ferrous Metals."

E. A. Smith: "Modern Developments in the British Brass Industry."

T. F. Baily: "Resistance Type of Electric Furnace in the Melting of Brass and Other Non-Ferrous Metals."

N. K. B. Patch: "Comparison of Electric Furnace Practice with That of Fuel Fired Furnace Practice."

H. A. DeFries: "Electric Silver Melting."

F. C. Thompson: "Electric Furnace Melting of Nickel-Silver."

H. A. Winne: "Recent Developments in Electric Furnaces of the Muffled Arc Type."

J. G. Thompson: "Electric Furnace Purification of Zirkite."

M. L. Hartmann and W. A. Koehler: "Physical Characteristics of Specialized Refractories. Part IV. Cross Breaking Strength at 20 and 1350 deg. C."

8:00 p. m.—Lecture by Col. T. S. Woolsey, Jr., on "Practice of Forestry on National Forests," to be held in the music room of the Forest Clubhouse.

Saturday, Oct. 1

9:00 a. m.—Symposium on electrodeposition:

F. A. Lidbury and F. A. Stamps: "An Electric Steam-Generator for Low Voltage."

W. E. Hughes: "Researches on the Electrodeposition of Iron."

T. R. Briggs: "Electrolytic Solution and Deposition of Copper."

W. R. Ingalls: "Electrometallurgy of Zinc."

C. J. Wernlund: "Deposition of Zinc from the Zinc Cyanide Solution."

Wm. Blum and H. E. Haring: "The Electrodeposition of Lead-Tin Alloys."

Wm. Blum: "The Structure and Properties of Alternately Electrodeposited Metals."

Directors of the American Iron and Steel Institute have presented to the Butler Art Institute at Youngstown, Ohio, a bronze bust of Joseph G. Butler, Jr., long a member of the board of directors of the Institute. The bust is the personal gift of the directors, for whom Willis L. King, vice-president Jones & Laughlin Steel Co., Pittsburgh, acted in making the presentation. The speech of acceptance was by James A. Campbell, president Youngstown Sheet & Tube Co., and also a director of the American Iron and Steel Institute. The bust is a replica of the representation of Mr. Butler which stands in the McKinley Memorial Building at Niles, Ohio, both being the work of J. Massey Rhind, New York sculptor.

A course in labor and employment management for Thursday evenings, beginning Sept. 22, is announced by New York University by its department of business management, School of Commerce, Accounts and Finance, 32 Waverly Place, New York. The course is to be conducted by J. D. Hackett, who has been identified with industrial establishments and later on his own account as labor consultant.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.70c. to 1.80c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.20 to $2.50
Large boiler rivets.....2.35 to 2.60
Small rivets....65, 10 and 10 to 65, 10, 10 and 5 per cent off list
Machine bolts, small, rolled threads, 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer, 65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads.....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts.....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ¾ in. x 4 in.:
Smaller and shorter.....60, 10 and 5 per cent off list
Larger and longer sizes.....60 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped.....4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $38 to $41; chain rods, $38 to $41; screw stock rods, $43 to $46; rivet and bolt rods and other rods of that character, $38 to $41; high carbon rods, $46 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.40 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.65 to $2.75 base; 5/16-in., $2.65 to $2.75 base. Boat and barge spikes, $2.65 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.60c. to 1.75c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	50½	24	¼ to ⅜	+ 3½	+22½
¼ to ⅜	53½	27	½	36½	18½
½	58½	44	¾	42½	27½
¾	62½	50	1 to 1½	44½	29½
1 to 3	64½	52			

Lap Weld

2	56½	44	2	39½	25½
2½ to 6	60½	48	2½ to 6	42½	29½
7 to 12	57½	44	7 to 12	40½	27½

Butt Weld, extra strong, plain ends

⅛	46½	29	¼ to ⅜	+ 4½	+37½
¼ to ⅜	49½	32	½	35½	23½
½	55½	44	¾	42½	28½
¾	60½	49	1 to 1½	44½	30½
1 to 1½	62½	51			
2 to 3	63½	52			

Lap Weld, extra strong, plain ends

2	54½	43	2	40½	27½
2½ to 4	58½	47	2½ to 4	43½	31½
4½ to 6	57½	46	4½ to 6	42½	30½
7 to 8	53½	40	7 to 8	35½	23½
9 to 12	48½	35	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	21½	1½ in.	List
2 to 2¼ in.	36	1¾ to 1⅞ in.	10
2½ to 3 in.	47	2 to 2¼ in.	20
3¼ to 13 in.	52	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.15	Nos. 11 and 12	2.35
Nos. 9 and 10 (base)	2.25	Nos. 13 and 14	2.45
		Nos. 15 and 16	2.55

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.45	No. 28 (base)	2.75
Nos. 22 to 24	2.50	No. 29	2.80
Nos. 25 and 26	2.65	No. 30	2.95
No. 27	2.70		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75	Nos. 25 and 26	3.45
Nos. 12 to 14	2.85	No. 27	3.60
Nos. 15 and 16	3.00	No. 28 (base)	3.75
Nos. 17 to 21	3.15	No. 29	4.00
Nos. 22 to 24	3.30	No. 30	4.25

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55	No. 28 (base)	2.75
Nos. 17 to 21	2.60	No. 29	2.80
Nos. 22 to 24	2.65	No. 30	2.80
Nos. 25 to 27	2.70	Nos. 30½ and 31	2.85

Non-Ferrous Metals

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Tin	Lead		Zinc	
Sept.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
7	12.00	11.75	27.25	4.50	4.30	4.70	4.20
8	12.00	11.87½	27.00	4.50	4.30	4.70	4.20
9	12.00	11.87½	26.50	4.60	4.40	4.70	4.20
10	12.00	12.00	....	4.60	4.40	4.70	4.20
12	12.25	12.00	26.62½	4.60	4.40	4.70	4.20
13	12.25	12.00	26.75	4.60	4.40	4.70	4.20

New York

NEW YORK, Sept. 13.

The tone of all the markets continues to improve without much increase in buying. Prices for copper have advanced, but buying is not large. The tin market continues quiet, but a little easier. There is a steady demand for lead and prices have again advanced. Buying of zinc has improved only a little, but prices are a shade firmer.

Copper.—There has been a marked improvement in the asking price of sellers not only in the last week, but in the last two or three weeks; the disappointing feature, however, is the absence of domestic buying. Inquiry is fairly good from such sources, but it does not develop into much business. This week a still better feeling is reported and representatives of brass interests state that there has been an improvement in their business. It is also pointed out that the large quantities of scrap brass have been largely consumed so that the outlook for the copper market is better. Electrolytic copper for early delivery is quoted at 12.25c., delivered, or 12c., New York, for early delivery, by some sellers, with others still out of the market. Forward positions are ⅛c. to ¼c. higher. Lake copper is largely nominal at 12.25c., New York. Buying for foreign consumption is and has been good, particularly by Japan and Germany.

Tin.—The week has been dull and uninteresting, and transactions have been very light. For the most part prices here have ruled below parity in London, so that there has been a little buying from that market. On the New York Metal Exchange 50 tons of spot Straits tin has been sold for future shipment at 27c. for July-August shipment and 26.62½c. for December delivery. The London market to-day was about £5 per ton lower than a week ago, with spot standard quoted at £156 12s. 6d. future standard, £158 15s. and spot Straits at £157 7s. 6d. per ton. Spot Straits, New York, to-day was quoted at 26.75c. Arrivals thus far this month have been 2075 tons, with 2085 tons reported afloat.

Lead.—Again last week the American Smelting & Refining Co. advanced its price 10 points, to 4.60c., New York and St. Louis. Quotations in the outside market are 4.60c., New York, or 4.40c., St. Louis. A steady business is reported in both markets, and it is rumored that on this last advance in price heavy buying followed, with the result that the leading interest is not now so keen for business as recently.

Zinc.—Prime Western for early delivery is quoted at 4.20c. to 4.25c., St. Louis, or 4.70c. to 4.75c., New York, for early delivery. While the tone of the market has improved, actual buying has not increased, but the number of sellers at concessions has diminished so that the market can be regarded as firmer.

Antimony.—Wholesale lots for early delivery are quoted at 4.40c., New York, duty paid, with the market quiet.

Aluminum.—Virgin metal, 98 to 99 per cent pure, is obtainable from importers at 19c. to 20c., New York, duty paid, while the same grade from the leading domestic producer is quoted at 24.50c., f.o.b. plant, for wholesale lots for early delivery.

Old Metals.—The market is firm and values are higher. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	4.875
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

Sept. 13.—Copper and lead have advanced, while tin has declined. Copper has stiffened principally because stocks in second hands are gone and producers refuse to sell at concessions. The advance of the leading lead producer has carried this metal upward and has induced some buying. In general, the metals are very quiet. Old metal prices remain unchanged. We quote in carload lots: Lake copper, 12.50c. to 12.75c.; tin, 28c. to 28.50c.; lead, 4.50c.; spelter, 4.30c. to 4.35c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Sept. 13.—The non-ferrous markets continue dull. Lead and zinc are slightly higher. We quote lead at 4.40c., carlots, and zinc at 4.25c. We quote Lake copper at 12.73⅝c. to 12.86⅛c., carlots; tin, 27.36c., and antimony, 5.23½c. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Germans Lowest Bidders on Cars and Pumps

WASHINGTON, Sept. 13.—Based on the value of 70.42c. for the gold peso, quoted yesterday, the German makers bid the equivalent of $2,706, American makers $3,225, Belgian makers $3,521 and British makers $4,154 each on small freight cars for the South American market. On pumps the Germans were also lowest at 400 paper pesos each. The lowest American bid was 830 pesos and the lowest British bid 1,618 pesos. In a cable to the Bureau of Foreign and Domestic Commerce, Commerce Attache Edward F. Feeley, Buenos Aires, cautions American makers against too much emphasis being put on price, because quantity, quality, delivery, terms and credit arrangements are not ignored. In these respects American bidders are on at least an even footing with European competitors, and are making better price terms than any of them, with the exception of those in Germany.

Gain in British Pig Iron and Steel Output in August

(By Cable)

LONDON, ENGLAND, Sept. 13.—The production of pig iron in August was 93,600 gross tons and of steel ingots and castings 432,600 tons.

These figures compare with an output of only 800 tons and 10,200 tons of pig iron in June and July respectively and with 2700 tons and 117,200 tons of steel ingots and castings in the same two months respectively. The August steel output of 432,600 tons compares with 483,500 tons and 493,400 tons in February and January respectively. In steel output the industry is rapidly recovering from the paralyzing effect of the coal strike.

LOWER MILL WAGES

Average Reduction of Sheet and Tin Mill Workers Is 41.25 Per Cent from War Peak

YOUNGSTOWN, OHIO, Sept. 13.—Average price of tin plate shipped during July and August by mid-Western mills subscribing to the wage agreement with the Amalgamated Association of Iron, Steel and Tin Workers, was $5 per base box, as disclosed at the bi-monthly settlement here Sept. 12. The subscribers represent the bulk of the independent capacity of the country, and the average price indicates that there has been considerable difference in sales of the constituent companies. The spread on shipments has been from $4.75 to $5.25 per base box.

Two months before, the average price on tin plate shipments was $5.95. There is a difference, therefore, of 19 points in the average price of tin plate in the periods covered, which involves a reduction of 19 per cent in the tonnage rate to be paid affected workers during the September-October period. Under the new annual agreement, the tonnage rate rises or falls at the rate of 1 per cent for each 5c change in selling price. Under last year's agreement, the change was made at the rate of 1⅛ per cent.

Under the new rate, tin mill workers will still be 30 per cent. above base, though 36 per cent. below the peak rate paid during the war.

The average invoiced price of Nos. 26, 27 and 28 gage black sheets was found to be 3.10c per lb., as compared with 3.85c two months ago, and involves a reduction for affected workers of 15 per cent. Union sheet mill employees will be paid 28½ per cent. above base in September and October, but will be 38.5 per cent. under the peak rates paid during the war.

James H. Nutt, secretary of the Western Sheet & Tin Plate Manufacturers' Association, acted for the employers, while M. F. Tighe, president of the Amalgamated Association, represented the employees.

Under normal conditions, 25,000 workers would be affected by the agreement.

Mr. Nutt has compiled a statement showing the percentage of reduction from the peak rates for the following operations: Puddling, 51 per cent.; heavy scrap rolling, 52 per cent.; muck rolling, 50 per cent.; heating piles on boards, 42 per cent; knobbling, 40 per cent; bar mill heating and roll hands. 48 per cent; guide mill, base sizes, 41 per cent.; guide mill extras, 44 per cent.

The average reduction on the above and for sheet and tin mill workers, is 41.25 per cent., from the war peak rates.

Plant Activities

Several departments of the Eagle Lock Co., Terryville, Conn., which have been operating on short time, have resumed a 54-hr. per week schedule.

The E. D. G. Jones & Sons Co., Pittsfield, Mass., paper making machinery, for the second time this year has reduced wages of its 250 employees 10 per cent.

The Westfield Mfg. Co., Westfield, Mass., bicycles and motorcycles, which has been operating with a curtailed working force and on short time, has resumed production in all departments.

Largely because of the difficulty in securing automobile bodies, the reopening of the Rolls-Royce of America, Inc., Springfield, Mass., plant was postponed from Sept. 6 until Oct. 1.

The 350 piece workers of the L. S. Starrett Co., Athol, Mass., tool manufacturer, have been notified of a reduction of 10 per cent in their rate of pay. The plant is operating 3½ days a week.

The Millers Falls Co., Millers Falls, Mass., maker of small tools, is operating its plant 50 hr. per week instead of 48 hr. as heretofore. It will not be operated Saturdays for the present and only a limited number of employees has been taken on.

The Graton & Knight Mfg. Co., Worcester, Mass., manufacturer of belting, has adjusted wages to equalize rates of pay. Some employees receive as much as heretofore, while others have had a slight reduction in wages. The plant is operating every week-day and employing about 900.

Smith & Wesson, Springfield, Mass., makers of firearms, scheduled to reopen Sept. 6, remain closed. Harold Wesson, president, states that business, although getting back on a sounder basis, does not warrant the plant's resuming operations. It is possible it will reopen within a month.

More than 1000 employees of the Royal Typewriter Co., Hartford, Conn., reported for work last week. Eight departments are working on a 5-day and the rest on a 4-hr. day per week schedule. The management plans to increase the number of working hours within the near future. The plant had been closed three weeks.

Little Change in Refractories Market

PITTSBURGH, Sept. 12.—The refractories market does not change much. In almost all consuming districts demands are purely hand-to-mouth. Blast furnace interests and steel companies are taking on merely such supplies as are actually needed; most of them have stocks and are drawing from them and are purchasing only for replenishment. Since manufacturers are supplying such demands from their own stocks, plant activities are largely on special sizes and shapes not ordinarily carried in stock. It is doubtful if fire clay and silica brick works, taking the country as a whole, are as much as 20 per cent engaged. In all producing districts there are idle plants, while part time operations rule at those which are running. Conditions both as regards demand and plant activities reflect closely those now prevailing in the iron and steel industry. There has been no change in public quotations of the several kinds of brick, which for the most part are nominal. Sizable orders undoubtedly would lead to price concessions.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $40.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 42.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		65.00
Chrome Brick:		
Standard size, per net ton		52.00

Steel Corporation's Orders Decrease

Unfilled orders on the books of the United States Steel Corporation Aug. 31 were 4,531,926 tons, compared with 4,830,324 tons on July 31. This is a decrease of 298,398 tons, and compares with one of 287,544 tons in July, 364,619 tons in June, 362,737 tons in May, 439,541 tons in April, 649,102 tons in March, 639,297 ton sin February, and 574,958 ton sin January, and represents the thirteenth consecutive monthly decrease reported. The unfilled tonnage a year ago was 10,805,038 tons, or 6,273,112 tons more. The table below gives the unfilled tonnage at the close of each month, beginning with January, 1918:

	1921	1920	1919	1918
Jan. 31	7,573,164	9,285,441	6,684,268	9,477,853
Feb. 28	6,933,867	9,502,081	6,010,787	9,288,443
Mar. 31	6,284,765	9,892,075	5,430,572	9,056,404
Apr. 30	5,845,224	10,359,747	4,800,865	8,741,882
May 31	5,482,487	10,940,465	4,282,310	8,337,623
June 30	5,117,868	10,978,817	4,892,855	8,918,866
July 31	4,830,324	11,118,468	5,578,661	8,883,801
Aug. 31	4,531,926	10,805,038	6,109,103	8,759,042
Sept. 30		10,374,804	6,284,638	8,297,905
Oct. 31		9,836,852	6,472,668	8,353,293
Nov. 30		9,021,481	7,128,330	8,124,663
Dec. 31		8,148,122	8,265,366	7,379,172

The largest total of unfilled orders was on April 30, 1917, when it was 12,183,083 tons. The lowest was on Dec. 31, 1910, at 2,605,747 tons.

PERSONAL

Norman Allderdice, formerly in charge of the open-hearth department of the Lorain, Ohio, plant of the National Tube Co., became sales manager for the Pittsburgh and Cleveland districts of Manning, Maxwell & Moore, Inc., on Sept. 1, succeeding Robert A. Bole, vice-president and manager of the Pittsburgh district, who died about four months ago. Under Mr. Allderdice's management the open-hearth department made a splendid record. He carries with him to his new position a knowledge of steel plant machinery and equipment. He is the son of Taylor Allderdice, vice-president National Tube Co. His headquarters will be maintained at 1005 Park Building, Pittsburgh. He is a member of several Pittsburgh clubs, including the Duquesne Club and the Pittsburgh Athletic Club Association. H. J. Hair, who has been office manager of the Pittsburgh office, becomes district sales manager for the Pittsburgh territory and E. W. Winship remains as district sales manager in Cleveland.

F. V. Archer, formerly manager of Naumburg & Co., New York, has assumed the duties of vice-president in charge of finance, cost and expenditures of the Thacher Propeller & Foundry Corporation, Albany, N. Y.

G. A. Thompson and J. R. Hussey announce that their interests in the Thompson Machinery Co. have been purchased by the Brown & Zortman Machinery Co., Second Avenue, Pittsburgh, with which company they will in the future be identified.

E. S. Gregg, formerly of Galveston, Tex., but more recently of New York, has begun work as chief of the transportation division of the Bureau of Foreign and Domestic Commerce. He is a graduate of Austin College, Tex., and he took a graduate course in transportation at the University of Chicago. During the war he was connected with the shipping section of the general staff of the War Department. Since the war he has been associated with the American International Corporation as adviser on shipping conditions.

Commander R. C. Hilliard, construction officer, Charlestown (Boston) Navy Yard, has been assigned as construction officer of the Atlantic fleet and reported for duty at Newport, R. I., Sept. 10.

Frank J. Fahey, vice-president Gillette Safety Razor Co., Boston, has returned from a business trip to Europe. He says business conditions are better than a year ago.

Col. Elmer H. Havens, of the steel jobbing firm of Hunters & Havens, Bridgeport, Conn., has been elected president of the Locomobile Co. of America, Bridgeport. Frank R. Hickman is associated with Colonel Havens as vice-president and treasurer. With this change in the officiary of the company the Locomobile Co. also is wholly divorced from Hares Motors, Inc., which had charge of manufacturing and selling the automobiles made at the Locomobile plant.

Ogden R. Adams, machinery merchant of Rochester, N. Y., has been elected president and general manager of the Seneca Falls Mfg. Co., Seneca Falls, N. Y., manufacturer of Star and Adams Short-Cut lathes. Mr. Adams still remains at the head of, and actively identified with, his Rochester business in machinery and equipment.

Oscar J. Maynard, sales department, Langelier Mfg. Co., Arlington, Cranston, R. I., special machinery and tools, has resigned to engage in business for himself. He is succeeded by William R. Renton.

Vernon Campbell, formerly with the Boston office of the Becker Milling Machine - Whitcomb-Blaisdell Machine Tool - Reed-Prentice companies, has associated with the Boston office of the South Bend Lathe Works.

G. E. Sanford, safety engineer General Electric Co., and president American Society of Safety Engineers, will speak on "Foundry Hazards and Safeguards" at the first fall meeting of the New England Foundrymen's Association, Wednesday, Sept. 14, at the Exchange Club, Boston. N. M. Du Chemin, secretary General Electric Co., Lynn., Mass., works safety committee, will address the association members on "Selling Safety."

E. Howard Green has been made chairman of the Worcester, Mass., executive committee of the American Society of Mechanical Engineers, and Harry M. Latham, secretary and treasurer.

John F. Tinsley, manager Crompton & Knowles Loom Works, Worcester, Mass., has been made permanent chairman of a mayor's committee appointed to cooperate with the Worcester branch, National Safety Council in connection with a safety week in Worcester, Sept. 26 to Oct. 3.

George Washington Brown, vice-president and chairman finance committee, United Shoe Machinery Corporation, Boston and Beverly, Mass., last week celebrated his eightieth birthday. Officers and employees of the corporation filled his office with flowers.

Joseph J. Wilson, gray iron foundry manager for the Saginaw Products Co. division of the General Motors Corporation, Saginaw, Mich., has resigned to enter business in Detroit.

Robert S. Fowler, formerly assistant sales manager of the Northway Motor & Mfg. Co. division of the General Motors Corporation, and prior to that for six years with the Anderson Electric Co., Detroit, has been made district representative of the Wheel Trueing Tool Co., Detroit. He will include in his district the territory in southeastern Michigan and Toledo, Ohio. E. F. Robinson, who has been with the company as sales manager, has resigned to resume the practice of law in Ravenna, Ohio.

James A. Campbell, president Youngstown Sheet & Tube Co., Youngstown, Ohio, celebrated his 67th birthday on Monday. Mr. Campbell was born in Ohltown, Trumbull county, Ohio, Sept. 11, 1854. He received messages of felicitation from a wide group of associates in the steel industry.

George B. Bell, Jamaica, N. Y., has been appointed chief of the agricultural implements and vehicles division of the Bureau of Foreign and Domestic Commerce. He was with B. F. Avery & Sons, Louisville, Ky., engaged in export work for 20 years. He was later director of foreign sales with Bateman & Companies, New Jersey. He has traveled in many sections of the world, building up markets for American agricultural implements, and has had experience in this country in manufacturing, traffic, field demonstration, advertising and sales, etc.

William Knudsen, formerly of the Ford Motor Co., has joined the Ireland & Matthews Mfg. Co., Detroit, machinist and sheet metal goods manufacturer, as general manager.

The Bureau of Foreign and Domestic Commerce has announced the appointment of Dr. Samuel McClintock of Chicago as editorial adviser of the new commodities division, which among other things will be concerned with investigations of importance to the major industries. Dr. McClintock is an editorial writer and political economist. Some years ago he was consul in Latin America. He goes to the bureau in Washington from New York, where he was a consulting editor of the McGraw-Hill Book Co. and a lecturer in applied economics at the College of the City of New York.

George A. Armes, recently resigned as president and general manager of the Moore Shipbuilding Co., San Francisco, and Joseph Moore, vice-president of the company, was chosen as his successor. For the war effort Mr. Armes was loaned to the Shipping Board by the Bethlehem Shipbuilding Co. and later became head of the Moore company.

OBITUARY

CHARLES F. BRAGG, president N. H. Bragg & Sons, Bangor, Me., iron and hardware, died at his home in that city Sept. 11 in his seventy-first year. Since its inception, Mr. Bragg was actively associated with the New England Iron and Hardware Association, and probably was one of the most widely known New England iron and steel merchants. He was born in Dixmount, Me., but resided most of his life in Bangor. He served that city as mayor for three terms. Mr. Bragg was one of the promoters of the Bangor & Aroostook Railroad Co., was president of the Orono Pulp & Paper Co., and was interested in various other business enterprises.

RAYMOND SEARING BALDWIN, formerly of J. H. Williams & Co., makers of drop forgings, died at his summer home near Westerly, R. I., from heart disease, Sept. 3, after an illness of several months. He retired from active work last spring, being at the time controller and assistant treasurer of the company. As assistant to the president he had charge of the design and erection of the company's Buffalo plant. He was graduated from Stevens Institute in 1903 and for some time was connected with the Carbon Steel Co., Pittsburgh, as an engineer.

MATTHEW M. SWEENEY, general manager and secretary Fairmount Foundry & Engineering Works, Woonsocket, R. I., died Sept. 7 at his home there following a long illness. He was graduated from Brown University in 1906, and was a member of the American Society of Mechanical Engineers and other societies. He was born in Woonsocket 43 years ago.

MORRIS S. WRIGHT, president and general manager M. S. Wright Co., Worcester, Mass., maker of vacuum cleaners, died Sept. 5 of peritonitis. He was born in Janesville, Wis., June 11, 1859.

CHARLES W. DAVIS, vice-president Standard Underground Cable Co., Pittsburgh, died Sept. 11, in Memorial Hospital, New York, where he had gone for special medical treatment. He was born in Pittsburgh 48 years ago. He received his early education in the Pittsburgh public schools and was graduated from the Western University of Pennsylvania, now the University of Pittsburgh, later taking special courses at the Massachusetts Institute of Technology. He made his home in Sewickley, Pa.

CHARLES WILLIAM ELDREDGE, for several years associated with the Chapman Valve Mfg. Co., Springfield, Mass., and recently in charge of the H. W. Johns-Manville Co., Montreal, branch, died Sept. 9 at his home in East Longmeadow, Mass.

HENRY ELIOT, JR., president Eliot Frog & Switch Co., East St. Louis, Ill., died Sept. 9 at his home in St. Louis, from the effects of a cerebral hemorrhage sustained five months ago. He was born 67 years ago in Cincinnati, where he was educated in the public schools, and went to St. Louis in 1881. He was at one time engaged in the manufacture of railroad supplies, and about 15 years ago became president of the frog and switch company, in which he was active until he was stricken. He was a member of the Masonic fraternity. He is survived by two daughters, Mrs. Edward Mallinckrodt, Jr., and Miss Georgia Eliot. The funeral took place on Sept. 12.

RICHARD B. CARRAN, president R. B. Carran & Sons Co., brass manufacturer, Ludlow Ky., died at his home in that city recently. He was also president of the Ludlow Savings Bank, and a director of the Covington Bank & Trust Co. He was born on the Isle of Man, 63 years ago and came to America at the age of 14. He was employed by the Southern Railway in Cincinnati for 25 years.

WILLIAM HENRY WARRINGTON, president of the Vulcan Iron Works, Chicago, died Aug. 11.

WILLIAM BAXTER MYERS, treasurer Bethlehem Fabricators, Inc., Bethlehem, Pa., died Friday, Sept. 2.

Gain in August Steel Ingot Output

The steel ingot statistics of the American Iron and Steel Institute show that 30 companies, which in 1920 produced 84.20 per cent of the total, had an output in August of 1,138,071 gross tons as compared with 803,376 tons in July, and with 1,003,406 tons in June. The increase, which is the first since last October, was 334,695 tons or 41.6 per cent. Estimating the production of other companies on the basis of those reporting, the total output of ingots in August was 1,351,628 tons, or 50,060 tons per operating day, counting 27 working days in August, against an estimated total of 954,128 tons or 38,126 tons per day for the 25 operating days in July. This is an increase of 397,500 tons or 11,934 tons per day, representing 31.3 per cent increase in the rate of production. In the table below the output of Bessemer and open-hearth works is separated and the figures for 1920 by months are included:

Monthly Production of Steel Ingots by 30 Companies Which Produced About 84.20 Per Cent of Total in 1920—Gross Tons

	Open Hearth	Bessemer	All Other	Total
January, 1920..	2,242,758	714,657	10,687	2,968,102
February	2,152,106	700,151	12,867	2,865,124
March	2,487,245	795,164	16,640	3,299,049
April	2,056,336	568,952	13,017	2,638,305
May	2,251,544	615,932	15,688	2,883,164
June	2,287,273	675,954	17,463	2,980,690
July	2,135,633	653,888	13,297	2,802,818
August	2,299,645	695,003	5,784	3,000,432
September	2,300,417	693,586	5,548	2,999,551
October	2,335,863	676,634	3,485	3,015,982
November	1,961,861	673,215	3,594	2,638,670
December	1,687,162	649,617	3,586	2,340,365
Total, 1920...	26,197,843	8,112,753	121,656	34,432,252
January, 1921...	1,591,281	608,276	3,629	2,203,186
February	1,295,863	450,818	2,796	1,749,477
March	1,175,591	392,983	2,404	1,570,978
April	1,000,053	211,755	2,150	1,213,958
May	1,047,810	216,497	1,543	1,265,850
June	808,286	193,644	1,476	1,003,406
July	689,489	113,312	575	803,376
August	915,334	221,116	1,621	1,138,071

The August ingot production was at the yearly rate of 15,568,660 tons, counting 311 operating days to the year. This compares with a rate in July of 11,857,186 tons, in June of 14,824,437 tons, in May of 17,980,465 tons, in April of 17,242,773 tons and in March of 21,258,405 tons.

The increase of 397,500 tons in the estimated ingot output of all companies in August from that in July compares with an increase of 89,638 tons in the August pig iron output over that of July.

Sligo Furnace to Be Abandoned

The Sligo Furnace Co., St. Louis, Mo., recently blew out its charcoal furnace at Sligo, Dent County, Mo., and it is announced that the furnace will be abandoned. The shut-down is due to the exhaustion of the timber on which the company had depended for its charcoal supply. The uncut timber remaining in the district is too far distant to be transported advantageously. A hamlet of 400 persons has been built up about the furnace and now that the sole industry of the place has stopped most of the inhabitants will go to other districts. The buildings of the town are owned by the Sligo Furnace Co., including a school and a church. The Sligo furnace was built in 1880 by W. F. Crawford and others and was rebuilt in 1891. Its last relining was in 1919. The product was warm blast charcoal pig iron and the annual capacity was 20,000 tons. A considerable part of the output was taken by the American Car & Foundry Co.

The Society of Visual Education of Chicago is making a comprehensive series of motion pictures of milling machine operations in the plant of the Kempsmith Mfg. Co., Milwaukee. The films are being prepared for Governmental purposes for use in vocational education at rehabilitation and industrial schools.

An increase of 13,273 freight cars loaded with revenue freight during the week ended Aug. 27, as compared with the previous week, is shown by reports to the American Railway Association. The total for the week was 829,709 cars, the largest week's loading since Dec. 11, 1920, but 171,599 less cars than were loaded in the same week of August last year.

FAR EAST ACTIVE

British Colonies Interested in Railroad Material—Spanish Ore at $4.50 Per Ton Atlantic Port

NEW YORK, Sept. 13.—Export activity is still confined to Japan and other Far Eastern markets. Japanese purchases of cathode copper are still fairly large and there is an active interest in tin plate, black and galvanized sheets, wire and bars in small quantities. From the British colonies there is a continued brisk demand for railroad material and rolling stock. Several inquiries have recently appeared in the market for small tonnages of rail equipment and locomotives from these sources. Mining interests in South Africa, Australia and Mexico have recently shown an interest in light railroad equipment, locomotives and cars.

There have been some fairly large transactions in electric equipment to be used in the electrification of the Japanese railroads. Sheet buying, however, continues to lead in the Japanese purchases. One inquiry, being handled by a New York branch of a London export house, calls for a total of 1200 tons of black sheets and blue annealed ranging from No. 18 to No. 31 gage. Considerable difficulty has been encountered by this exporter in obtaining quotations from mills on the portion, totaling about 100 tons, of No. 30½ or No. 31 gage sheets 36 x 72 in., packed 13 to the bundle. Inquiry will probably be made in about six weeks by the purchasing agent of the George A. Fuller Co. of the Orient, New York, for a small tonnage of reinforcing bars for a $500,000 reinforced concrete building, which that company is erecting in Kobe, Japan.

Two new iron works are reported recently organized in Japan, the Niniwa Iron Works and the Tanaka Iron Works, both in Osaka, to manufacture machinery and boilers. The latter company is capitalized at 100,000 yen. The Aki Shoji Co., with a capital of 200,000 yen, has been organized in Osaka to deal in pig iron and steel. In view of the large stocks of pig iron in Japan, the stock of the Government iron works alone totaling 196,225 tons, it is reported by the *Far Eastern Review* that no more iron will be imported during the current year.

Chinese Locomotive Purchases

According to reports, the recent public opening of the tenders on 41 locomotives and 300 cars for the Chinese railroads, purchased by the Railway Car Loan Chinese Banking Group, was the first time that a government letting had been opened in public. Only two Mikado type locomotives were awarded to an American builder. These went to the American Locomotive Co. at $52,000 each. Thirty Prairie type locomotives were awarded to the Societe Belge pour L'exportation Industrielle, which represents the Forges Usines et Fonderies de Haine-St. Pierre, the Ateliers Metallurgiques Tubize and the Societe Franco-Belge a la Croyere in Belgium. The six English type locomotives were also placed with this company. The cars were awarded to Fearon, Daniel & Co., representing the Compagnie Centrale de Construction a Haine-St. Pierre.

European prices continue low. An exporter who submitted a bid on 1500 tons of steel bars for Japan based on 1.50c. per lb. Pittsburgh, lost the order. One exporter in New York reports recent sales of black sheets totaling about 350 tons to the Philippines and China.

In line with recent reports that foreign iron ore can be imported profitably, an exporter and importer in New York is now prepared to offer Garrucha ore from Garrucha, Spain, at about $4.50 per gross ton, f.o.b. cars New York. The analysis given is: Fe, 54.3; Mn, 1.77; S, 0.09; and P, 0.021.

Despite recent reductions of prices in Sweden, which have brought Swedish iron bars down to a price of about 6c. per lb. or less c.i.f. New York, carriers of stocks of this material in the United States see slight prospect of any but the most meager sales, as the demand is exceedingly light since the war period when it was impossible to obtain Swedish iron and consumers were forced to resort to substitutes.

British Iron and Steel Market

Continental Prices Still Stiffening—British Position Improves, But Orders Badly Needed

(*By Cable*)

LONDON, ENGLAND, Sept. 13.

Pig iron buyers are awaiting lower prices. There is a better demand for hematite, and more export inquiry, but the price has been reduced, owing to German competition.

Foreign ore is stagnant. Bilbao Rubio is nominally 28s. ($5.21) c.i.f. Tees.

British steelmakers are slightly better placed, but are still badly in need of orders. Continental prices are stiffening. German works are believed to have oversold, and trouble is expected in obtaining deliveries. German merchant bars are quoted up to £9 (1.49c. per lb.) f.o.b. for extended delivery. French merchant bars have sold at £8 2½s. (1.33c. per lb.) f.o.b., but £8 5s. (1.37c. per lb.) is now asked. Sellers of Belgian merchant bars ask up to £9 (1.49c. per lb.) f.o.b. Belgian joists (beams) are now sold at £8 5s. (1.37c. per lb.) f.o.b.

Inquiries are again coming from the Far East for important tonnages of steel wire, and German makers are full until January. Second-hands are being sold at £18 5s. (3.03c. per lb.) cost and freight to Japan, on basis of No. 8 gage, for December and January shipment.

Tin plates are easier, and there is little buying except by the Far East, which continues to make steady purchases. The Welsh output is from 25 to 30 per cent of capacity. Galvanized sheets are now sold by merchants to India at £19 15s. (3.28c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.72 per £1 as follows:

Durham coke, delivered	£1 15	$6.51
Cleveland basic	7 7½ & £7 10*	27.45 & $27.90
Cleveland No. 1 foundry	7 0	26.04
Cleveland No. 3 foundry	6 15	25.11
Cleveland No. 4 foundry	5 19	22.13
Cleveland No. 4 forge	5 17½	21.85
Hematite	7 0*	26.04
East Coast mixed	7 0 & 6 15*	26.04 & 25.11
Ferromanganese	18 0 & 14 10*	66.96 & 53.94
Rails, 60 lb. and up	10 0 to 14 0	37.20 to 52.08
Billets	7 10 to 8 0	27.90 to 29.76
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.76 to 31.62
Tin plate base box	1 1½ to 1 3	4.00 to 4.28
		C. per Lb.
Ship plates	13 0 to 14 0	2.16 to 2.32
Boiler plates	18 0 to 19 0	2.99 to 3.16
Tees	13 0 to 14 10	2.16 to 2.41
Channels	12 5 to 13 15	2.03 to 2.28
Beams	12 0 to 13 10	1.99 to 2.24
Round bars, ¾ to 3 in.	12 0 to 12 10	1.99 to 2.08
Galvanized sheets, 24 g.	20 0 to 20 10	3.32 to 3.40
Black sheets	16 0	2.66
Steel hoops	14 5 & 14 0*	2.37 & 2.32
Cold rolled steel strip, 20 g.	26 10	4.40

*Export price.

In the editorial on "The Inventor's Opportunity," in our issue of Sept. 8, the last sentence in the last paragraph but one, page 612, should have read: "Few inventions have a real commercial value until they have been put through a costly developing and refining process, and for that the buyer [of the patent] must pay."

The Chapman Valve Mfg. Co., Springfield, Mass., has put into effect a flat wage reduction of 10 per cent for office force as well as other employees. The company employs approximately 700 and has operated on full time without any reduction in its working force.

IRON AND INDUSTRIAL STOCKS

Substantial Recovery in Valuations Since Latter Part of August

That a more general feeling exists of business having reached the turning point is substantiated by the action of prices during the past week for iron and industrial stocks. In the more active securities, recoveries from quotations established in the latter part of August range from $5 to $20 a share. The rebound in inactive stocks naturally has been less. The fact remains, however, securities of practically every industry in the country are tending upward. To-day a small but real investment demand for securities exists, whereas a fortnight ago real liquidation was the keynote in the market for securities. The improvement in stock valuations apparently is largely based on the ability of industry to weather federal tax payments without disturbing the money market enough to influence the pending sale of Government securities; to the improved demand for iron and steel products; to the adjustment of labor to a basis where manufacturing costs, coupled with proposed protective tariffs, place our industries in a more favorable position as regards competition with foreign merchandise; to the recovery in the cotton market, which has revived business to some extent in the South; to Government financial aid to our farmers; and to the Government's efforts to place the railroads in a position to buy much needed equipment—all constructive business straws.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	32½- 33¾	Lackawanna Stl.	39 - 41⅞
Am. Can com....	26¾- 28⅛	Midvale Stl.....	24 - 25
Am. Can pf.....	80½- 80¾	Nat.-Acme	14 - 14½
Am. C. & F. com.	126½-133	Nat. E. & S. com..	33⅛- 34¾
Am. C. & F. pf..	108⅞-109	N. Y. Air Brake.	50 - 54⅞
Am. Loco com...	87⅜- 93½	Nova Scotia Stl..	23¾- 25½
Am. Loco. pf....	... -104	Pressed Stl. com.	54 - 60
Am. Stl. Fd. com.	23⅞- 25	Pressed Stl. pf...	... - 83
Am. Stl. Fd. pf..	... - 80¾	Ry. Stl. Spg. com.	79¾- 84¾
Bald. Loco. com..	79⅞- 89½	Replogle Stl.....	22¾- 26½
Beth. Stl. com...	50 - 51	Republic com....	47½- 50½
Beth. Stl. Cl. B..	51 - 55	Republic pf.....	82 - 84¼
Beth. Stl. 8% pf.	98½- 99	Sloss com.....	35 - 37
Chi. Pneu. Tool..	50 - 52¼	Superior Stl.	29½- 30⅜
Colo. Fuel	24½- 25	U. S. Pipe com..	13½- 15¾
Cru. Stl. com....	57¾- 61¾	U. S. Pipe pf....	41¾- 43
Gen. Electric....	121½-126¾	U. S. Steel com..	75⅞- 79
Gt. No. Ore Cert.	28 - 28¾	U. S. Steel pf....	108⅞-109¼
Gulf States Stl..	34¾- 40	Vanadium Steel..	30⅜- 35⅝
Int. Har. com....	77 - 81	Va. I. C. & Coke.	65 - 66
Int. Har. pf.....	... -101	Westingh'se Elec.	43⅝- 45¼

Industrial Finance

The Manufacturers Foundry Co., Waterbury, Conn., has issued $98,625 additional stock, increasing the outstanding capitalization to $295,875.

Stockholders of the Baush Machine Tool Co., Springfield, Mass., have voted to exchange the 12,500 outstanding common shares, par $100, for an equal number of shares of no par value, and to increase the common stock capitalization 87,500 shares, making the total authorized capitalization 50,000 shares of common stock, no par value, and 6100 preferred, par $100. Of the new common shares, 22,500 will be issued for all assets, except cash, of the Huron Metals Co.

The J. R. Stone Tool & Supply Co., 5009 Woodward Avenue, Detroit, has been adjudicated a bankrupt in the United States district court at Detroit. The first meeting of creditors will be held at 10 a. m., Sept. 13, at the office of the referees in bankruptcy in Detroit.

John F. Gerdis, trustee of the John Obenberger Forge Co., Milwaukee, bankrupt, who has been operating the plant by permission of the referee in bankruptcy for three months ending Sept. 12, has secured an extension of the permit to Oct. 31. His request was for a permit to operate until Jan. 12.

The A. P. Swoyer Co., merchandise stock, at 17 North Seventh Street, Philadelphia, has been purchased and the premises leased to the U. T. Hungerford Brass & Copper Co., 510 Arch Street, Philadelphia. Possession was taken by the Hungerford company Sept. 1.

The Motor Wheel Corporation, Lansing, Mich., has organized a steel wheel division, of which Roy F. Irvin has been made sales manager.

Office and Trade Changes

The Concord foundry, Elkhart, Ind., which has been owned by the Chicago Hardware Foundry Co. since Oct., 1919, will be known hereafter as Branch No. 6 of the Chicago Hardware Foundry Co.

The Worcester Brush & Scraper Co., Worcester, Mass., for many years located at 26 Southbridge Street, has removed to a new plant at 456 Park Avenue. Edward F. Fletcher is president.

The Connecticut Iron & Metal Co., Bridgeport, Conn., has filed a preliminary certificate of dissolution. Claims should be sent to Harry Danberg, 86 Savoy Street, that city.

Houghton & Richards, 145 Oliver Street, Boston, dealers in steel, have incorporated under Massachusetts laws as Houghton & Richards, Inc., with a capital of $200,000. Bryan R. Houghton, Stoneham, is president, and George A. Mahoney, 33 Egremont Road, Brookline, treasurer.

Blake, Long & Co., 77 Hurley Street, Cambridge, Mass., sheet metal workers, has been taken over by the Blake-Long Corporation, capitalized for $70,000, which has been granted a charter to manufacture and deal in heating apparatus, ventilation equipment, blower systems, dust collectors and to do a general sheet metal and machine shop business. John J. Shamrock, 26 Taft Avenue, Point Shirley, Mass., is president, and James A. Blake, 132 Baldwin Street, Cambridge, is treasurer.

The National Chain Co. has moved from College Point, L. I., to Terry and Cortland streets, Belleville, N. J. The floor space occupied in the new location is 30,000 sq. ft., with room for expansion immediately available.

The Universal Equalizer Co., Cincinnati, has moved from 132 Opera Place to 8 East Pearl Street.

The Springfield Motor Specialties Co., Inc., Springfield, Mass., has been taken over by the Springfield Motor Specialties Co., a Massachusetts corporation capitalized for $100,000. Charles P. Whitall, 1446 Longmeadow Road, Longmeadow, is president, and John G. Waddell, 497 Belmont Avenue, Springfield, treasurer.

The Garlock-Walker Machinery Co., Ltd., wood working and metal working machinery, Montreal, is now located at No. 356 Hingston Avenue.

The Betts Machine Co., Inc., Rochester, N. Y., has opened a Pittsburgh district sales office at 1915 Oliver Building, where direct factory representatives will supply sales and engineering service to the trade. Betts heavy duty machine tools were manufactured at Wilmington, Del., from 1861 until 1918, when the business and organization was moved to its present plant at Rochester.

The New York office of Joseph T. Ryerson & Son, 30 Church Street, has been removed to the Jersey City warehouse, Westside Avenue and Carbon Place, Jersey City. Hereafter, only a small office will be maintained at the former address, in charge of H. R. Heneage, general manager. The telephone number will remain unchanged, all calls for the New York office hereafter going directly to the Jersey City warehouse, with which the New York branch is connected by private wires.

The Texas Supply Co., dealer in oil well supplies, boilers, engines, pumps, tanks, etc., has moved its plant to Houston, Tex., at Lorain and Semmes streets. The company has been in the business of buying and selling oil well machinery for about twenty years at Beaumont, Tex.

J. E. Haetten & Co., dealers in machine tools, contractors' machinery, etc., have absorbed the Engineering Equipment & Supply Co., and have moved from 299 Broadway to new offices at 30 Church Street, New York. Officers of the consolidated company are J. E. Haetten, president; F. C. Young, formerly president of the Engineering Equipment & Supply Co., vice-president; Herbert Wilson, secretary and treasurer, and C. A. Bergmann, chief engineer.

The Reliance Machine & Specialty Co., Boston, has completed arrangements for combining with the Union Machine Co., Fitchburg, Mass. The Reliance Company's Jamica Plain plant will be moved at once to Fitchburg, and combined with the plant of the Union Machine Co., where self-lubricating bushings and bearings will continue to be made. Hereafter, all communications should be addressed to the Reliance Machine & Specialty Co., in care of the Union Machine Co., Fitchburg, Mass.

The name of the Grover Bros. & Wood, manufacturers of the Grover pneumatic tube carriers, has been changed to the Grover Co. The change will in no way affect the status of the company or its personnel. The offices will remain at 428 East Jefferson Avenue, Detroit.

Manning, Maxwell & Moore, Inc., machine tool dealers, 27 North Jefferson Street, Chicago, are adding a line of machinist's supplies to their stocks in that city.

Machinery Markets and News of the Works

PROSPECTS IMPROVING

Machine-Tool Trade Sees More Signs of Activity

Buying Is Limited, but There Are More Inquiries and Sentiment Is More Cheerful

Sentiment is steadily improving and the machine-tool trade is confident that the worst of the depression is past. While purchasers of machine tools are still in very small volume, there is in most centers an increasing number of live inquiries, on which action is expected soon if the improvement in the business situation which has manifested itself becomes more widespread.

The New York and Chicago markets have been very dull the past week, but improvement appears in other sections. The Ansted Engineering Co., Connersville, Ind., bought 10 tools at Cincinnati, the Detroit, Toledo & Ironton, the Ford road, has purchased several tools and the American Steel & Wire Co. at Cleveland has revived a list of eight large tools, mostly lathes.

The International Bed Corporation, New York, has inquired for several new or used tools. The Driver-Harris Co., Harrison, N. J., has asked for prices on a few machines, but may not buy immediately. The Brooklyn schools are considering the purchase of 60 or 70 lathes and bids will be asked for as soon as the appropriation is granted. The New York school board opened bids on Monday for some 400 items, mostly machine shop supplies, but including a number of machine tools.

In New England, prospects are improving. Inquiries are small, but come from diversified industries, indicating possiby a fairly general resumption of fall activity.

A noteworthy feature is the larger inquiry for cranes, particularly for locomotive cranes. Electrical equipment is also showing some activity. One company has booked 100 special electric motors for United States Navy submarines.

Railroad inquiry is not prominent, but the Big Four is expected to close shortly on several tools. A list from the Sewell Valley Railroad covering several tools is still pending at Pittsburgh.

Some makers of shapers have reduced prices about 10 per cent. A Cincinnati manufacturer of portable electric drills has reduced prices on some types 10 per cent. A New York State manufacturer of measuring blocks and gages has made reductions of 10 to 15 per cent. A St. Louis manufacturer of grinding and polishing machines has put reductions of 10 per cent into effect.

New York

NEW YORK, Sept. 13.

A few more prospects for machine tools are appearing, but generally they are rather indefinite, buyers being in no mood as yet to hasten purchases. The trade believes that the worst of the depression has passed and that a gradual improvement in demand may be expected shortly. The Driver-Harris Co., Harrison, N. J., which is installing new rolling mill equipment, has sought prices on a number of machine tools, but purchasing may be deferred. The International Bed Corporation, 50 East Forty-second Street, New York, has inquired for a drill press, shaper, engine lathe and several single-spindle drills, either new or used. The Brooklyn school board is considering the purchase of 60 or 70 lathes, but the appropriation has not yet been made and it is not known how soon bids will be asked for. The New York City school board took bids up to Monday, Sept. 12, on some 400 items, mostly machine shop supplies, but including a number of machine tools. Prices on shapers have been reduced about 10 per cent by some makers.

While the crane market in this district continues dull with the exception of the cranes for the Stapleton, S. I., piers closing Oct. 4, other districts report greater activity, largely confined to locomotive cranes, derricks and hoists. A large manufacturer of electric hoists has booked an order for 40 electric hoists for a Japanese shipyard. An inquiry has been issued by Asano Bussan Co., 165 Broadway, New York, exporter, for a floating grab transporter for handling coal from lighters with a capacity of 100 to 150 tons. A steam shovel is also included in the inquiry, which is for shipment to Japan for harbor use. The Betts Supply Co., Syracuse, N. Y., has requested quotations on a 15 to 20-ton locomotive crane, new or second hand. The Porcupine Co., Bridgeport, Conn., is reported to be on the point of closing its inquiry for cranes. The Mayer Coating Machine Co., Rochester, N. Y., has purchased a 3-ton, 16-ft. span, hand power crane from an unnamed builder and the Phoenix Utilities Co., 71 Broadway, New York, has purchased a 4-ton electric hoist from the Roeper Crane & Hoist Works.

Among recent sales are: Industrial Works, a 15-ton, 40-ft. boom locomotive crane to Dwight P. Robinson, Inc., New York, for export to Brazil; a 100-ton wrecking crane to the Sewell Valley Railroad, Rainelle, W. Va., and a 40-ton locomotive crane to the Western Maryland Railroad, Baltimore, Md.; Roeper Crane & Hoist Works, a 4-ton electric hoist to the Phoenix Utility Co., 71 Broadway, New York.

V. Lowener, 114 Liberty Street, New York, desires quotations on looms for weaving fence wire.

The Air Reduction Co., 120 Broadway, New York, is having plans prepared by Francisco & Jacobus, 511 Fifth Avenue, architects, for its new plant on property recently acquired on Ridge Avenue, Pittsburgh, for the manufacture of commercial oxygen, etc. It will be one and two-stories, 80 x 140 ft., and is estimated to cost about $250,000 with machinery.

The Westchester Buckle Mfg. Co., Mt. Vernon, N. Y., has been incorporated with a capital of $30,000 by K. Dauber, H. Brindberg and Horace London, 302 Broadway, New York, to manufacture buckles and other metal specialties.

The United Electric Light & Power Co., 130 East Fifteenth Street, New York, will build two one-story coaling towers, 67 x 187 ft. high, at its new generating plant on Walnut Avenue, 133rd to 134th Street, estimated to cost about $200,000 with machinery. A one-story meter house will also be erected.

M. Hulbert, Commissioner of Docks, foot of Battery Place, North River, New York, will receive bids until Oct. 4 for furnishing and installing cranes, elevators and electric power transmission equipment at piers 12 and 13, Stapleton, S. I. The work will include new boiler plants.

The Royal Metal Furniture Co., 125 Eighth Street, Brooklyn, has plans in preparation for a new one-story factory at Eighth Street and Third Avenue. William Higginson, 18 East Forty-first Street, New York, is architect.

The Flynn Specialties Corporation, New York, has been incorporated with a capital of $200,000 by J. F. and A. L. Flynn, and S. M. Platt, 908 Brook Avenue, to manufacture spark plugs, ignition equipment, etc.

A. L. Cadle, Superintendent of Public Works, Capitol Building, Albany, N. Y., will receive bids until Sept. 28 for one three-ton electric burtoning crane, to be installed on the Barge Canal, Mott Haven, New York.

The Dexter Folder Co., 28 West Twenty-third Street, New York, manufacturer of printing machinery and parts, has awarded contract to the H. K. Ferguson Co., 25 West Forty-third Street, for its plant addition at Pearl River, N. Y., estimated to cost about $100,000.

The Quid Mfg. Corporation, Bay Shore, L. I., has been incorporated with a capital of $1,000,000 by W. S. Johnson and M. J. Bunce, to manufacture engines, motors and kindred products. It is represented by A. F. Wells, Bay Shore.

The Rice Foundation, 12 East Eighty-seventh Street, New York, in co-operation with the city of New York, will build a new one-story power house, 73 x 73 ft. at Pelham Bay

Park, estimated to cost about $25,000. Plans have been completed.

The Robert Bosch Magneto Co., New York, has been incorporated with a capital of $250,000, to manufacture magnetos, spark plugs, starting and lighting systems. It is headed by the former officers of the Bosch Magneto Co., and has established offices at 123 West Sixty-fourth Street. Plans are under way for the early establishment of works in the vicinity of New York, and if possible an existing building will be acquired. Otto Heins is president; Guenther Jahn, treasurer, and Harvey T. Andrews, secretary. The last noted will also act as attorney for the company and maintains offices at 115 Broadway.

R. M. Mansfield, Inc., Babylon, L. I., has been incorporated with a capital of $30,000 by C. P. and S. A. Daly, and W. R. Cleary, Babylon, to manufacture electrical equipment, mechanical products, etc. It is represented by J. T. Cuff, 2 Wall Street, New York.

The Austin Estate, 2406 First Avenue, New York, has filed plans for a one-story forge shop, 50 x 100 ft., at 405 East 123rd Street.

The Ball Compass Co., New York, has been incorporated under Delaware laws with capital of $300,000 to manufacture marine and aeromarine instruments and other precision equipment. It is represented by the United States Corporation Co., 65 Cedar Street.

The Greenpoint Metal Covered Door Co., 13 McKibben Street, Brooklyn, has removed its plant to the factory at 538-44 Porter Street for increased operations.

Simon Gasner & Sons, 1870 Pitkin Avenue, Brooklyn, pipe, plumbing fixtures, etc., have awarded contract to the Turner Construction Co., 242 Madison Avenue, New York, for a new two-story and basement building, 105 x 260 ft., in the vicinity of their present works.

F. C. Schwab, New York, care of Simpson, Thacher & Bartlett, 62 Cedar Street, has leased for 21 years the United States Engineering Corps terminal property at Kearny, N. J., comprising about 30 acres with buildings totaling about 30,000 sq. ft. of space. The new owner is organizing a company to establish an industrial terminal at this location, with a portion of the property devoted to the manufacture of automobiles and automotive equipment. Other industrial plants will also be established.

The Star Machine & Novelty Co., Bloomfield, N. J., has been incorporated with a capital of $100,000 by John Brach, John Clonek and Anthony E. Zaga, 77 Mill Street, to manufacture electric motors and parts, and other machinery.

The Titan Miniature Lamp Co., Orange, N. J., has been incorporated with a capital of $100,000 by George Anderson, Dexter G. Dittell and Alfred J. Grosso, 308 Main Street, to manufacture electric lamps and other electrical products.

The White Metal Mfg. Co., Grand Street, Hoboken, N. J., has completed plans for a new one-story factory on Grand Avenue. Joseph C. Schaeffler & Co., 11 East Fifty-sixth Street, New York, are architects.

The M. W. Kellogg Co., 117 Westside Avenue, Jersey City, N. J., manufacturer of piping, power plant equipment, etc., has filed plans for a one-story addition on Hackensack Avenue, estimated to cost about $11,600.

The Christopher Marine Chain Propeller Corporation, Rahway, N. J., has been incorporated under Delaware laws with capital of $350,000 by Edwin S. and Charles F. Gale, Port Richmond, N. Y., and William B. Christopher, Rahway, to manufacture chains and other equipment for marine service.

The Borough Council, Sea Girt, N. J., will build a new one-story automobile service and machine repair works for municipal automobiles. Plans have been prepared.

A one-story power house, 75 x 80 ft., will be built by the Clark Thread Co., Clark Street, Newark, at its new bleaching works on Broad Street, Bloomfield, N. J.

The New Jersey Die Casting Co., Newark, has been incorporated with a capital of $310,000 by Gunnar Anderson, A. Roy Myers and James Beakbame, 16 Washington Avenue, Irvington, N. J., to manufacture die-castings, dies and other mechanical products.

The J. K. Osborne Mfg. Co., First Street, Harrison, N. J., manufacturer of metal products, has leased a new one-story factory at 14-20 Runyon Street, Newark, for the establishment of a new plant.

The Benjamin Products Corporation, Jersey City, N. J., has been incorporated with a capital of $1,000,000 under Delaware laws to manufacture rubber goods. It is represented by the Registrar & Transfer Co., 900 Market Street, Wilmington, Del.

The Board of Freeholders, Court House, Newark, has directed County Purchasing Agent George C. Bergen to advertise for bids for the construction of a new ash conveyor system and ash storage works at the County Isolation Hospital, Soho; and for the construction of a coal conveyor system and coal storage equipment at the Overbrook Hospital, near Verona, N. J.

The Reliable Japanning Co., Newark, has been incorporated with a capital of $25,000 by Frank Principe, Peter and Walter F. Lynch, 14 Ferdon Street, to manufacture japanned metal products, and electro-plated ware.

The Newark Spring Bed Co., 161 Prince Street, Newark, manufacturer of metal bedsteads, etc., has been directed by the city Zoning Commission to remove its works to another location. A period of 3 months has been granted in which to make the change.

The Gasifier Co., Newark, has been organized by Paul F. and George L. Reichella, 410 Trumbull Street, to manufacture gas machinery and other equipment.

The Auto Sales & Service Co., Newark, N. J., has filed plans for a one and two-story automobile service and machine works at 221-35 Frelinghuysen Avenue, 200 x 397 ft., estimated to cost about $208,000, including equipment.

A machine and repair shop will be installed in the building, 100 x 125 ft., now being erected by the Dorsey Motor Co., Perth Amboy, N. J., estimated to cost about $40,000.

The O'Connor Metal Barrel Co., Elizabeth, N. J., has been incorporated with a capital of $500,000 by H. A. Mullen, Frank J. Kelaber and William R. O'Connor, 11 Elmwood Place, to manufacture steel barrels and other metal containers.

Philadelphia

PHILADELPHIA, Sept. 12.

The Westinghouse Air Spring Co., 1428 Vine Street, Philadelphia, has leased property at 2336-38 Fairmount Avenue for new works. The building on the site will be demolished and a new structure erected.

I. Morris Hall, Inc., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture iron and steel products. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Quaker City Iron Works, Tioga and Edgemont streets, Philadelphia, has completed plans for a one-story boiler shop addition. Work will commence at an early date.

The Pneumatic Conveyor Co., Philadelphia, has been incorporated under Delaware laws with capital of $1,000,000 to manufacture pneumatic conveying equipment and other apparatus. It is represented by F. R. Hansell, Land Title Building.

The H. Brinton Co., 213 Race Street, Philadelphia, manufacturer of textile machinery and parts, is completing plans for a new four-story factory at Kensington Avenue and M Street, estimated to cost about $200,000, including machinery.

Paul Beyer, Philadelphia, operating a coppersmithing and other metal-working shop at 834 North Fourth Street, has filed plans for a new one-story works at 312-14 Fairmount Street.

Samuel W. Green, Philadelphia, has acquired the property of the Modern Machine Works Co., 2855-65 Ruth Street, Philadelphia, for $27,000, for the operation of a machine and metal-working plant.

The Montgomery Iron & Steel Co., Ninth Street and Montgomery Avenue, Philadelphia, will build a new crane runway at its plant.

The Electro Self-Winding Phonograph Co., Philadelphia, has been incorporated under Delaware laws with capital of $100,000 to manufacture talking machines and parts. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Bureau of Water, City Hall, Philadelphia, will install an electric traveling crane at the Shawmut pumping station. Machinery will also be installed at the repair shops of the bureau.

The Kuhn & Jacob Machine & Tool Co., Trenton, N. J., has been chartered under State laws to manufacture machinery and tools. The incorporators are Eugene and Walter Jacob, and George Kuhn, Prospect Street and the Pennsylvania Railroad.

The Trent Rubber Co., Trenton, N. J., has been incorporated with a capital of 10,000 shares of stock, no par value, by William V. Lee, I. M. Martino and Frank H. Thropp, Enterprise Avenue. It will take over and operate the plant of the Trenton Rubber Co., which has been under a receivership for about a year.

A new one-story power house will be erected by S. W. Evans & Son, 4623 Paul Street, Philadelphia, manufacturer of metal products, in connection with the construction of an addition, estimated to cost about $125,000.

The Hurley Motor Co., Broad and Race Streets, Phila-

delphia, is demolishing the building at 219-25 North Broad Street, preparatory to the erection of a new 10-story and basement plant on the site, 80x100 ft., estimated to cost about $350,000. John S. Hurley is president.

A new one-story power house will be erected by the Clifton Yarn Mills, Clifton Heights, Pa., 25 x 52 ft., in connection with other extensions.

The Hydro United Tire Co., Pottstown, Pa., will build an addition to its plant, estimated to cost about $250,000 with machinery.

The Keystone Supply & Mfg. Co., 427 North Ninth Street, Philadelphia, manufacturer of steam equipment, plumbing hardware and fixtures, etc., has completed plans for new works at Bethlehem, Pa., estimated to cost about $175,000.

The Floyd-Wells Co., Royersford, Pa., manufacturer of stoves, ranges, etc., is having revised plans prepared for its two-story addition, 32 x 120 ft. A. S. Kepner, 121 Hanover Street, Pottstown, Pa., is architect.

The Wat-R-Oil Burner Corporation, Harrisburg, Pa., has been incorporated under Delaware laws to manufacture oil-burners, heating equipment, etc., with capital of $2,000,000. It has perfected arrangements with the Harrisburg Corporation for the manufacture of its products until a new plant can be constructed.

The State Board of Public Grounds and Buildings, Harrisburg, Pa., has taken bids for a new one-story automobile service and repair works for State automobiles and trucks, estimated to cost about $130,000. A second unit, to cost approximately a like amount, will be constructed later. T. W. Templeton is superintendent of the department.

The Lower Paxton Township School Board, Lower Paxton Township, Pa., has had plans prepared for the erection of a one-story vocational school at Linglestown, to cost about $50,000. It will include machine shop, metal-working department, electric department, wood-working, etc. Frank F. Fahnstock, Jr., Patriot Building, Harrisburg Pa., is architect.

The Blue Ridge Corporation, Roaring Creek, Pa., will build a one-story machine and repair shop in connection with a new food canning plant.

The Pneumatic Conveyer Co., Philadelphia, has been incorporated under Delaware laws with capital of $1,000,000 to manufacture mechanical conveyor systems, etc. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Argo Paper Mills Co., Gloucester City, N. J., has been organized to operate a plant at the Argo mills, for the manufacture of news-print paper. The company is formed under Delaware laws, and is headed by Frank J. Hummell, owner of the property. It is proposed to have the mills equipped and ready for operation by the close of the year.

New England

BOSTON, Sept. 12.

With few exceptions local dealers are working on prospects that apparently have considerable promise and in a number of instances it is believed actual transactions will be consummated within the next fortnight. Degrees of activity in this respect vary from one or two prospects to several. Inquiries concern new as well as used machinery and come from diversified industries, with piston ring and other automobile parts manufacturers and electrical contractors the most numerous.

As far as can be learned no change in prices has been made, but a maker of boring mills intimates a revision to be announced in the near future. The General Electric Co., West Lynn, Mass., has purchased some gear testing machinery and three additional sets of Pratt & Whitney precision blocks. Two New England railroads are negotiating on several pieces of shop equipment; the Watertown Arsenal, Watertown, Mass., wants three gear cutters, and the city of Boston is inquiring for a gear driven universal milling machine. One dealer reports sales of two 16-in. x 8-ft. gap lathes to a Brockton company and a 13-in. x 5-ft. engine lathe to a Rutland, Vt., manufacturer. School jobs are developing more slowly than anticipated. One of the largest projects of this nature has been postponed for four or five months and one of the largest textile machinery makers has put off purchases of a few needed tools. The Hartford fire board has asked for an appropriation to purchase a small crane, lathes and other equipment for its machine shop.

The auction sale of the National Products Mfg. Co., Inc., 153-155 Washington Street North, Boston, on Sept. 8 was well attended. There is a shortage of used presses in this market and bidding for those at the sale was active and good prices resulted. Milling machines, lathes and the like went slowly at prices considerably less than 50 per cent of the replacement value. The outstanding feature was the sale of two Waterbury Farrel Foundry & Machine Co. No. 106 practically new six plunger automatic eyelet machines, having a replacement value of $2,360 each, which were sold for $1,012.50 each, and a similar machine, but not in as good conditions, sold for $812.50. Bidding for these three machines was especially keen.

Builders of motors report good sales and prospects in the textile and shoemaking industries.

The American Steel Ladder Co., Sanford, Me., steel ladders, etc., is to erect a two-story plant.

A permit has been issued the Ramsdell Specialty Co., 667 West Boylston Street, Worcester, Mass., to rebuild a two-story factory, 50 x 60 ft.

The Reliance Machine & Specialty Co., 101-103 Green Street, Boston, oilless bushings and bearings, etc., has completed arrangements for combining with the Union Machine Co., Fitchburg, Mass.

A Massachusetts charter has been granted the Safe Auto Lock Co., Boston, capitalized for $150,000. Stanley B. Andrews 44A Linden Park Street, Roxbury, Boston, is president, and Charles F. A. Smith, 181 Beach Street, Wollaston, Quincy, Mass., treasurer.

Isaie Laplante, 586 Mount Hope Avenue, Fall River, Mass., is president, and Louis A. Cadoret, 156 Broad Street, Pawtucket, R. I., treasurer of the Universal Shuttle Spring Co., Fall River and Pawtucket, a $99,000 corporation recently granted a Massachusetts charter.

Plans are on foot to move the Philadelphia plant of the Standard Steel & Bearings Corporation to Plainville, Conn., as soon as business conditions warrant. Ball bearing machinery installed in the New Haven plant is being moved to Plainville.

The Grip Tool & Machine Co., Worcester, has been granted a Massachusetts charter to carry on a general manufacturing and machine shop business. Carl G. Grip, 17 Paine Street, is president, and John F. Hjort, 1 Mars Street, treasurer. The company is capitalized for $50,000.

The Sachem Mfg. Co., Inc., Brockton, toys, is occupying a new plant on Pearl Street having 7646 sq. ft. of floor space. Ola F. Smith, 794 Pearl Street, is president; Ralph H. Waite, 7 Greenwood Road, vice-president, and B. E. Holmberg, 25 Riverview Street, treasurer. The company recently incorporated under Massachusetts laws with a capital of $40,000.

The Aircraft Construction-Transportation Corporation, New Haven, Conn., recently organized under Delaware laws, has taken over the Connecticut Aircraft Co., and local plant. It will specialize in the construction of airplanes, concentrating production on those of rigid character. S. C. Morehouse is president; Ralph H. Clark, treasurer, and Paul Webb, secretary.

The Excellight Co., Bristol, Conn., has been incorporated with a capital of $25,000 by Rudolph Stern, F. N. Manross and Hjalmar Geruldsen, 28 Merriman Street, to manufacture electric lamps and kindred products.

New coal-handling and conveying equipment, and other mechanical apparatus will be installed at the plant of the City Fuel Co., Quincy, Mass., in connection with rebuilding the works at an estimated cost of $100,000.

A two-story power house addition, 95 x 105 ft., estimated to cost about $75,000, will be constructed by A. F. Robinson, Cambridge, Mass., at his plant at Binney and Second streets.

The Marcy Tool Works, Putnam, Conn., has been organized with a paid-in capital of $31,000 to manufacture tools and other mechanical specialties. A. W. Marcy is president and treasurer.

The Kescot Mfg. Co., 67 Clifford Street, Providence, R. I., manufacturer of metal products, has acquired property at Clifford and Page Streets for extensions.

The Connecticut Light & Power Co., New Britain, Conn., has commenced an expansion and improvement program to cost about $250,000. It will include the installation of new equipment at the Black Rock power plant and a new power distributing plant at New Britain.

Dragat & Troubman, 340 Windsor Avenue, Hartford, Conn., have had plans prepared for a new three-story automobile service and repair works, 95 x 100 ft., on Windsor Avenue, to cost about $100,000.

The American Electric Service & Maintenance Co., 51-57 Taylor Street, Springfield, Mass., operating a plant for machine and electrical repair work, parts manufacture, etc., is arranging for the removal of its plant to a new building on Liberty Street, to provide about double the amount of floor space now occupied. Additional equipment will be installed.

The W. J. Hyland Mfg. Co., 151 Dwight Street, New London, Conn., manufacturer of pipe, plumbing fixtures, heat-

ing apparatus, etc., has plans under way for the erection of a new three-story building, 47 x 85 ft., on Liberty Street.

The Utilities Mfg. Corporation, New Haven, Conn., has been incorporated with a capital of $50,000 by T. F. Cooney, Cheshire, Conn.; J. D. Beecher and W. B. Turley, 865 Chapel Street, New Haven, to manufacture metal specialties, including can-openers, metal button hooks, etc.

The B. F. Zimmerman Mfg. Co., Inc., New Haven, Conn., has been incorporated with a capital of $150,000 by Harry A. Waldron and B. F. Zimmerman, 2088 Chapel Street, to manufacture tools, automobile equipment, etc.

Buffalo

BUFFALO, Sept. 12.

The Ojax Battery Co., Canaseraga, N. Y., has plans under way for the erection of the second unit of its plant for the manufacture of electric storage batteries. The initial unit is nearing completion and machinery will be installed at an early date.

Fire Sept. 7 destroyed a portion of the oil manufacturing plant of the Frontier Mfg. Co., Erie Avenue, Tonawanda, N. Y., with loss estimated at about $30,000.

The Park Metal Ware Co., Orchard Park, N. Y., has been incorporated with a capital of $50,000 by J. and A. Zilliox and J. Petrie. Orchard Park, to manufacture metal goods, automobile parts, etc. It is represented by A. L. Steatemeier, Hamburg, N. Y.

The Cady Products Co., Canastota, N. Y., has been chartered under State laws to manufacture automobile and machine parts, etc. The incorporators are G. B. Cady, A. Case and L. D. Williams. It is represented by D. F. Wallace, Canastota.

The Depew & Lancaster Light, Power & Conduit Co., Lancaster, N. Y., is planning the erection of a new electric plant to replace the present power house at East Aurora, N. Y., formerly operated by the East Aurora Electric Light Co., and recently acquired. Other improvements and extensions will also be made in this section.

Henry Landsheft, 1202 Jefferson Street, Buffalo, manufacturer of automobile bodies, will take bids at once for a one-story addition, adjoining the present works, 35 x 100 ft., estimated to cost approximately $25,000.

G. P. Marton, Harrisburg, Pa., and Levi S. Chapman, 321 Westcott Street, Syracuse, N. Y., are negotiating for the purchase of the plant of the Dunkirk Axle Co., Dunkirk, N. Y., which has been closed for several months. The new interests propose to organize a company and operate the works for the manufacture of axles and kindred products.

The Fedders Mfg. Co., 57 Tonawanda Street, Buffalo, has arranged for the operation of a department for rebuilding and repairing automobile radiators, etc.

The Cortland Grinding Wheel Corporation, Cortland, N. Y., has filed notice of dissolution under State laws.

Cleveland

CLEVELAND, Sept. 12.

Some machine-tool dealers are working on a few more live inquiries than they have had for some time and an improved feeling is noted in the trade. Sales are generally confined to the smaller sizes of machines with most of the orders coming from other industrial centers, the local market being almost lifeless. The American Steel & Wire Co. has revived an inquiry for eight large machines, mostly lathes, on which it is asking new quotations. This inquiry was first put out in July last year. The Detroit, Toledo & Ironton Railroad, now owned by Henry Ford, has purchased a few tools recently and is expected to be in the market shortly for additional equipment.

The management of one local machine tool plant, which was scheduled to resume operations Sept. 12, has decided to remain closed for an indefinite period. Another plant which has been shut down for some time has resumed operations, but may again stop production. The most encouraging feature of the market locally is an improvement in the demand for machine shop supplies.

The only price change reported is a reduction of approximately 10 per cent by a St. Louis manufacturer of grinding and polishing machinery.

The Minerva Engine Co., 1916 East Sixty-first Street, Cleveland, manufacturer of truck and tractor engines, has purchased a 10-acre site on Dunham Road and the Pennsylvania Railroad on which is a factory providing 20,000 sq. ft. of floor space. The building is being equipped for the manufacture of the company's line of engines and additional units will be erected later. C. S. Goby is president and R. J. Long, secretary.

The S. H. Vehicle Co., 3291 East Sixty-fifth Street, Cleveland, has had plans prepared for a one-story factory, 40 x 90 ft., to manufacture parts for wagons.

The Rundle Mfg. Co., which for the past six years has been manufacturing children's vehicles in Columbus, Ohio, is planning to move to Fremont, Ohio, where enlarged capacity will be provided. George W. Rundle is head of the company.

The Williamson Hydraulic Clutch Co., Mt. Vernon, Ohio, has appointed an executive committee of which Edgar Thomas is chairman, to have charge of the management of the company's business. It plans to place a new type of clutch on the market shortly.

The Unitile Co., Uhrichsville, Ohio, has been reorganized as the Donahey Power & Products Co., with a capital stock of $2,000,000 in preferred stock and $2,000,000 common stock, and plans to move to a new location and to erect works for the manufacture of sewer pipe, brick and other products. A. V. Donahey, New Philadelphia, Ohio, is president, and W. E. Knight, Cleveland, secretary. The general offices will be in the Hanna Building, Cleveland.

The Sterling Brass Co., 4610-12 St. Clair Avenue, Cleveland, will hold in abeyance the erection of its new two-story foundry and machine shop, 145 x 200 ft., at St. Catherine and Ninety-third streets, estimated to cost $60,000.

Chicago

CHICAGO, Sept. 12.

Machine-tool inquiries have decreased almost to the vanishing point and store calls are infrequent. Such sales as there are cover used equipment more largely than new. No action has been taken on the pending Santa Fe and Rock Island lists, and no other railroad business is in sight. Auction sales of equipment belonging to industrial concerns in financial difficulties continue to be held without stirring up undue interest among either dealers or users. In some cases bids have been so few that machines have been sold at unusual prices. At a recent sale of the assets of the Security Tool Works, Chicago, a practically new six-spindle drill press, listed by the maker at over $1,000, f.o.b. factory, brought only $210. On the other hand, a number of other machines went at fairly high prices.

A Cincinnati manufacturer of portable electric drills and grinders has reduced prices on some types about 10 per cent. A New York State maker of measuring blocks and gages has announced a reduction of from 10 to 15 per cent.

The crane market is showing some activity after several months of quiet. The Marquette Electric Engineering Co., Chicago, has placed an order for a 20-ton electric overhead traveling crane, and the Chicago, Burlington & Quincy Railroad has bought a 10-ton crane. Negotiations are active on a number of cranes wanted by the Atchison, Topeka & Santa Fe Railroad for its Albuquerque, N. M., shops.

The Ralco Mfg. Co., manufacturer of electrical railroad supplies, 849 West Washington Boulevard, Chicago, has purchased a one-story factory, 100 x 180 ft., at the corner of Lake Street and Albany Avenue, and plans to occupy the premises Oct. 15.

Holmquist & Co., manufacturers of ladders and household woodenware, 82 West Washington Boulevard, Chicago, have purchased a two-story factory, 50 x 125 ft., at 2556-62 Armitage Avenue.

The Warmick Type-O-Phone Mfg. Co., 3501 Wabash Avenue, Chicago, has been incorporated with $40,000 capital stock by William M. Houston, William L. Ford and Henry W. Warmick to manufacture dictation machines.

The Du-Al Co., 1810 Belle Plaine Avenue, Chicago, has been incorporated with $100,000 capital stock by A. K. Hansen, E. H. Lowell and Karl Mockenhaupt to manufacture safety razor blade sharpeners. It has started operations.

The Safstrom Mfg. Co., 6706 South Chicago Avenue, Chicago, has been incorporated with $30,000 capital stock to manufacture timers for Ford cars and other automotive parts and accessories, and has commenced production. The incorporators include John B. Bleco, G. A. Safstrom and E. V. Safstrom.

The Ellison Engineering & Furnace Co., 810 South Second Street, Maywood, Ill., has been incorporated by Earl J. Ellison, W. Scott Hodges and Robert F. Bradburn to manufacture heating, ventilating and drying systems. For a time its manufacturing operations will be confined to assembling parts made under contract in other plants.

The Illinois Penitentiary, Joliet, Ill, will take bids through Zimmerman, Saxe & Zimmerman, 64 East Van Buren Street, Chicago, until Sept. 30, on a one-story power house, 70 x 80 ft., to cost $45,000.

The city of Des Moines, Iowa, will build a two-story high school, 240 x 360 ft., including boiler plant and manual training department, at South West Ninth Street and Loomis Street. G. L. Garton, secretary of the school board, is receiving bids on the structure, the estimated cost of which is $700,000.

The J. Ryan Foundry Co., 506 Forty-first Street, Rock Island, Ill., will erect a two-story plant, to cost $50,000.

The Missouri, Kansas & Texas Railway will receive bids until Sept. 15, on a two-story machine shop, 50 x 150 ft., at Parsons, Kan., to cost $50,000.

The Sheridan-Wilson Garage Co., 64 West Randolph Street, Chicago, is taking bids for a new three-story service and repair works, 75 x 200 ft., at 4616-32 Winthrop Avenue, estimated to cost about $200,000, with equipment. W. G. Uffendell, 39 South State Street, is architect.

The Cross Mfg. Co., Woodstock, Ill., has been incorporated with a capital of $100,000 by Harry Cross, George L. Murphy and Emil Wittenberg, Woodstock, to manufacture automobile parts and equipment, and other products.

The Davenport Ice Co., First and Myrtle streets, Davenport, Iowa, is planning the erection of a new two-story ice-manufacturing plant, estimated to cost about $75,000.

The Common Council, Hecla, S. D., has completed plans for a new municipal electric power house. W. H. Higby is city clerk.

The Chicago, Rock Island & Pacific Railroad Co., 139 West Van Buren Street, Chicago, has awarded a contract to Joseph E. Nelson, 3240 South Michigan Avenue, for a new one-story engine house and repair shop at Amarilla, Tex.

Cincinnati

CINCINNATI, Sept. 12.

Sentiment in the machinery market is steadily improving, and most manufacturers and dealers are confident that the worst of the depression has been passed. A number of orders have been placed the past week, the largest being 10 machines by the Ansted Engineering Co., Connersville, Ind. Included in the list were seven gear hobbers, two drilling machines and one milling machine. Other orders were mostly for single tools. Some business is being done on a trading basis, the customer taking a new machine and giving in part payment used equipment. The Big Four Railroad has not yet taken action on its list for the Beech Grove shops, though negotiations were resumed last week. It is said that buyers are not meeting with much success in securing lower quotations than have already been made against inquiries, manufacturers insisting that prices have been cut to the lowest possible point. Several shops are putting on a few additional men, and while stocks in some instances are large, they are not well assorted, and for this reason operations will be resumed on a part time scale.

The Cincinnati Traction Co., Cincinnati, has awarded to the Hazen-Jones Co. the general contract for an electric transformer house on Walnut Street of concrete and steel. A number of other stations will also be built.

To take care of increasing business, the Enterprise Brass & Plating Co., Cincinnati, has increased its capital stock from $25,000 to $100,000. No extensive additions to the plant are contemplated at present.

The Elcon Engineering Co., Franklin Building, Columbus, Ohio, has been awarded contracts covering the design and installation of a coal-crushing and handling plant for the new power house at Ohio State University.

The Universal Equalizer Co., Cincinnati, has been incorporated with a capitalization of $25,000 by W. J. McCauley, Sam Schwartz, Oscar Schwartz, Joseph F. Pflum and William Thompson to take over as a going concern the business of the same name at 8 East Pearl Street.

The Dayton, Toledo & Chicago Railroad Co., Dayton, Ohio, is erecting a round house at Celina, Ohio, 80 x 100 ft. A repair shop will also be built.

The Allsteel Ridewell Tire & Rubber Co., 513 Lindsay Building, Dayton, Ohio, has completed plans and proposes to commence construction during the fall for its new automobile tire manufacturing plant on South Dayton Street, three stories and basement, 125 x 300 ft., and estimated to cost close to $500,000 with machinery. A. Huetter is president and general manager.

The Columbus Forge & Iron Co., West First Street, Columbus, Ohio, has taken bids for a new one-story and basement addition, 70 x 200 ft., and will award contract at an early date.

The Globe Metallic Works, 1126 Gact Street, Cincinnati, has awarded a contract to F. Mersch & Sons, 1037 Wade Avenue, for a new one-story plant at 917-19 State Avenue, estimated to cost about $15,000.

Detroit

DETROIT, Sept. 12.

The H. M. Reynold Asphalt Shingle Co., Grand Rapids, whose plant was recently destroyed by fire, will start the immediate erection of a new factory.

Work on the new municipal electric light and power plant for Lansing, Mich., will begin within the next 30 days.

The Atlas Crucible Steel Co., Dunkirk, N. Y., will open a warehouse at Marysville, Mich., and install high speed and carbon steel. It is contemplating the erection of a plant there as soon as conditions warrant.

The Ireland & Matthews Mfg. Co., Detroit, will soon increase its capitalization by issuing $700,000 additional stock to be used in plant and equipment extensions.

John Doran, Detroit, care of I. M. Lewis, 503 Congress Building, architect, has plans under way for a new one-story machine shop at Epworth Boulevard and Tireman Avenue, estimated to cost about $20,000.

The McRae Steel Co., Detroit, has been incorporated with a capital of $30,000 by Herbert C. Shotwell, D. Shepard Shine, Jr., and Kenneth C. McRae, 2714 Pingree Avenue, to manufacture iron and steel products.

R. J. Teetor, Muskegon, Mich., has plans under way for a one-story foundry at Cadillac, Mich., to manufacture iron and steel castings, estimated to cost about $50,000. Frank D. Chase, Inc., 645 North Michigan Avenue, Chicago, is engineer.

The Marcellus Corporation, Marcellus, Mich., has been incorporated with a capital of $150,000 by Frank Patch and B. C. Pittman, Marcellus, to manufacture gas and oil-burning engines, pumping machinery, etc.

The Department of Motor Transportation, City Hall, Detroit, has preliminary plans under way for a three-story automobile service and repair plant for municipal automobiles, 200 x 350 ft., estimated to cost about $400,000 with equipment. W. Helmboldt is superintendent in charge.

The Van Atlas Corporation, Detroit, has been chartered under State laws to manufacture automobile parts and accessories. The incorporators are Oscar E. Rasch, James H. White, and George F. Balk, 622 West Foreshaw Avenue.

Pittsburgh

PITTSBURGH, Sept. 12.

Inquiries for cranes are more numerous than in several weeks, even though actual sales still are conspicuous by their absence. The Truscon Steel Co., Youngstown, Ohio, has a request out for bids on a 5-ton low head room crane, with 37-ft. 9-in. span; the National Radiator Co. has inquired for a 5-ton, 3-motor, 37½-ft. span overhead for its New Castle, Pa., works, and the National Tube Co. is seeking a 10-ton or 15-ton, 71-ft. 4-in. span, and a 7½-ton stationary jib crane for its Christy Park works, McKeesport, Pa. It is expected that the Bessemer Gas Engine Co., Grove City, Pa., will soon close for a 5-ton crane for which it inquired a few weeks ago.

The machine tool market still is limited as to sales and inquiries, except for individual tools, are not numerous. So far as can be learned the Sewell Valley Railroad, Ranelle, W. Va., has not yet closed against a list issued about two weeks ago calling for a 1200-lb. steam hammer; a 20-in. engine lathe, with power cross feed and taper attachment to swing 8-ft. between centers, or the same of turret type with turret on carriage, belt driven; one No. 2 or No. 3 universal milling machine, belt driven; a 24-in. high-speed upright drilling machine, back geared, belt driven; a 58-in. or 68-in. 250-ton wheel press, inclinable type, belt driven, and a 60-in. belt driven lathe to turn straight connectors; also two Shay type drivers.

Some activity is noted in electrical equipment, the Ridgway Dynamo & Engine Co., Ridgway, Pa., having recently taken 100 special electric motors for installation in United States submarines, while the General Electric Co. recently was awarded by the Aluminum Co. of America, for installation at Baden, N. C., a 7000-kw. generator, it being the purpose of the Aluminum Co. to develop power for use in its own plant and to sell the surplus to the Southern Power Co.

The Conewango Car Co., Warren, Pa., recently organized under Delaware laws with capital of $550,000, to manufacture freight cars, tank cars, etc., taking over the plant of the Allegheny Steel Car Co. at this location, will break ground at once for a new one-story car repair shop, estimated to cost about $25,000. It will replace a structure recently destroyed by fire.

The Senior Mfg. Co., Pittsburgh, is being organized by J. C. and C. C. Kohne, and D. L. Taylor to manufacture hardware, grinding and sharpening devices, and other special-

ties. It is represented by George Y. Meyer, 1302 Berger Building. Application for a State charter will be made Sept. 26.

The Pittsburgh Engineering, Foundry & Construction Co., Pittsburgh, is being organized by N. J. Wallace, F. C. McCutcheon and J. B. Orr, to manufacture castings and other engineering specialties. Application for a State charter will be made Sept. 27. J. B. Orr, Farmers' Bank Building, represents the company.

The Safety Appliance Corporation, Pittsburgh, has been incorporated under Delaware laws with capital of $200,000, to manufacture drop forgings, hardware products, appliances, etc. The company is represented by the Capital Trust Co., Dover, Del.

The Union Ice Co., Pittsburgh, has completed plans for a new two-story plant, 70 x 160 ft., on Beaver Avenue, estimated to cost about $100,000.

Thomas Holden, Bradford, Pa., has plans under way for a one-story forge shop.

The Tech Food Products Co., Thirty-sixth and Butler streets, Pittsburgh, is planning for enlargements in its cold storage and refrigerating plant to increase the capacity from 700,000 cu. ft. to 2,200,000 cu. ft. Three new electrically operated ice machines will be installed, with auxiliary power equipment.

The P. V. & K. Coal Co., 242 Main Street, Monongahela, Pa., E. H. Robinson, treasurer and general manager, is planning for the installation of new electrical machinery and mechanical equipment at its coal properties at Arnettsville, W. Va.

The Safety Appliance Co., Huntington, W. Va., has been organized to manufacture safety equipment. W. K. Cowden and H. C. Duncan, Jr., Huntington, head the company.

The Hackett Coal Co., Cedar Grove, W. Va., has completed plans for the construction of a new tipple at its property. Other mechanical and electrical equipment will be installed.

The Miller Glass Feeder Co., Wheeling, W. Va., has been chartered under State laws to manufacture feeders for glass machinery and similar glass-making equipment. The incorporators are George A. Blackford, Wheeling, and A. Tegarden, Martins Ferry, Ohio.

Baltimore

BALTIMORE, Sept. 12.

A new power plant will be erected by the Board of Directors, St. Charles College, Catonsville, near Baltimore, in connection with other buildings, estimated to cost about $180,000.

The Universal Products Co., Inc., 1621 Cathedral Street, Baltimore, has been incorporated with a capital of $50,000 by L. Sterling Wagner, Edward L. Quirk and Harry L. Price, to manufacture automobile equipment, bodies, etc.

Fire, Aug. 24, destroyed the main building at the plant of the Thomasville Chair Co., Thomasville, N. C., with loss estimated at about $30,000, including equipment.

The Anheuser Busch Co., Norfolk, Va., with headquarters at St. Louis, has plans under way for an addition to its local ice and cold storage plant, estimated to cost about $250,000 with equipment. Ophuls, Hill & McCreery, Inc., 112 West Forty-second Street, New York, is engineer.

The Winchester Cooperage Co., Winchester, Va., is planning to rebuild the portion of its plant destroyed by fire, Sept. 1, with loss of about $60,000, including equipment. W. A. Higgs heads the company.

The Forbes Aluminum Products Co., Wilmington, Del., has been incorporated with a capital of $4,500,000 to manufacture cooking utensils, screens, etc. The Corporation Trust Co, duPont Building, represents the company.

The Edward Tin Splitting Machine Co., Wilmington, Del., has been incorporated with a capital of $300,000 to manufacture machinery. It is represented by the Capital Trust Co., Dover, Del.

The Raven Red Ash Coal Co., Richlands, Va., is planning for the construction of a new coal tipple at its properties. Construction will commence at an early date.

The Hughes Engineering & Construction Co., Baltimore, has leased property at 316 West Redwood Street, for the establishment of a new plant.

The Columbus Sewer Pipe Co., Columbus, Ga., is planning to rebuild its plant, recently destroyed by fire, with loss estimated at about $75,000. Judson C. Buchanan is manager.

The North State Power Co., Raleigh, N. C., has been incorporated with a capital of $250,000 to operate a local power plant in this section. The incorporators are L. H. Crouch, Raleigh; J. B. Johnson, Cardenas, N. C.; and A. J. Blabock, Willow Spring, N. C.

Electric plant improvements and extensions to cost about $300,000 will be made by the city of Kinston, N. C.

The Midway Foundry Co., Burlington, N. C., has been organized with $25,000 capital stock and is arranging for the establishment of a plant. J. G. King is manager.

The Safety-First Patch Co., 1520 Fidelity Building, Baltimore, has been incorporated with a capital of $100,000 by George E. Thrall, Hugh T. Aldrich and Harvey R. Baker, to manufacture rubber specialties.

The Automatic Clothes-Brushing Machine Co., Harrisonburg, Va., has been incorporated with a capital of $50,000 to manufacture special machines and parts. Julius Wise, Harrisonburg, is president, and W. D. Mitchell, secretary.

The National Bean & Pea Picker Corporation, Atlanta, Ga., has been incorporated with a capital of $250,000 by E. E. Davis and W. A. Sims, Atlanta, and C. W. Rice, Hartwell, Ga., to manufacture harvesting machinery.

Milwaukee

MILWAUKEE, Sept. 12.

The demand for machine tools continues spasmodic and from scattered sources, but is assuming volume. Inquiry likewise is increasing, the past week having developed a moderate number of requests. The experience of sellers has been that considerable inquiry is made merely to obtain some tangible basis for figuring requirements, with no prospect of immediate buying. Nevertheless, the quantity of business growing out of current inquiry is regarded as a healthy sign of the improvement believed to be in the foreground. Local automotive parts makers have been buying some new tools, placing orders generally in single machines or lots of two or three. Tool production in this territory is fluctuating considerably, some shops have enlarged operations since Sept. 1, while others have reduced forces. The Gisholt Machine Co., Madison, Wis., closed Sept. 1 after running on a three-day-a-week schedule for some time past, but expected to reopen this week with the previous force of about 500 men.

The Victor Krefl Mfg. Co., Two Rivers, Wis., manufacturer of automotive accessories and equipment, has decided to transfer its operation to Eagle River, Wis., where local capital has absorbed a requisite interest to insure the relocation. The Krefl company has been in business about a year and recently was obliged to relinquish its leased quarters in Two Rivers. A new factory costing about $30,000 will be erected at once in Eagle River. The present equipment will be about doubled with purchases of new and used tools. Victor Krefl is president and general manager.

The Cadillac Washing Machine Co., Chicago, manufacturer of manual and power-driven washing machines, is negotiating for the lease or purchase of the former plant of the Clinton Creamery Supply Co. at Clinton, Wis., with a view of relocating its plant and headquarters in that city. The Cadillac company recently absorbed the business of the Oden Washing Machine Co., and is incorporated in Illinois with $500,000 capital. E. A. Reinman is president, and H. D. Payne, secretary.

The Oneida Motor Truck Co., Green Bay, Wis., manufacturer of motor trucks and axles, has issued $1,000,000 of 8 per cent serial gold bonds for financing operations. During the spring it made considerable additions to its plant and purchased some new equipment. Lafayette Markle is general manager.

The J. J. Jones Hardware Co., 1017-1019 Third Street, Milwaukee, will build a four-story brick and concrete store and factory, 40 x 120 ft. and will equip two floors as a sheet metal shop and for making hardware specialties. It is also a wholesale and retail dealer in general hardware. The building and equipment will cost about $38,000.

The Neenah Brass Works, Neenah, Wis., has acquired a half interest from John B. Ranz, local, in his invention of a refuse incinerator for dwellings, etc., and is planning to engage in quantity production. The device is built in three sizes.

The Board of Education, Eagle River, Wis., has engaged Parkinson & Dockendorff, architects, La Crosse, Wis., to design a new high school with manual training department, to cost not more than $100,000. It is expected that bids will be taken about Oct. 1 or 15. H. E. Marshall is president of the board.

The Wisconsin Ice & Coal Co., 214-216 West Water Street, Milwaukee, has postponed the construction of an artificial ice producer plant estimated to cost $100,000, at Cambridge Avenue and Thomas Street. Bids taken by C. F. Ringer & Son, architects, were considered too high. New bids will be taken in 30 or 60 days. John H. Kopmeier is president.

The Peerless Electric Co., 2028 Fond du Lac Avenue, Milwaukee, has let the general contract to Byrne Brothers, 3100 Burleigh Street, for a new factory and service building, 45 x 120 ft., part two stories, at Eighteenth Street and North Avenue.

Indiana

INDIANAPOLIS, Sept. 12.

The Vincennes Foundry & Machine Co., First and Perry streets, Vincennes, Ind., has preliminary plans under way for a new plant at Nicholas and Fourteenth streets. J. E. Hartegan is president.

Fire, Sept. 1, destroyed a portion of the coal washery at the plant of the American Coal Co., Bicknell, Ind., with loss reported at about $12,000. It will be rebuilt.

The Indiana Public Service Co., Pearl and West Main streets, Fort Wayne, Ind., will break ground at once for a new power house at 301 Militia Street.

The Bureau of Yards and Docks, Washington, Navy Department, has completed plans for an addition to its power house at Annapolis, Ind., and will take bids at once.

The O. K. Battery Co., 515 Broadway, Gary, Ind., has plans under way for rebuilding the portion of its electric storage battery plant, recently destroyed by fire with loss of about $30,000. The new structure will be one-story, 100 x 200 ft., estimated to cost the amount of fire loss.

The Board of Trustees, Indiana University, Bloomington, Ind., will commence work at once for extensions and improvements in the power house at the institution, estimated to cost about $40,000.

The Central South

ST. LOUIS, Sept. 12.

The St. Louis office of Manning, Maxwell & Moore sold a Warner & Swasey turret lathe to the Guston-Bacon Mfg. Co., Kansas City.

The Standard Stamping Co., 2000 North Broadway, St. Louis, has awarded contract to the A. H. Haessler Contracting Co., Wainwright Building, for a new one-story plant, 107 x 132 ft., at Broadway and Madison Street, for the manufacture of enameled metal products.

The Joplin Center Cord Tire & Rubber Co., 815 Main Street, Joplin, Mo., manufacturer of automobile tires, will build an addition to cost about $25,000. J. L. Courvoiser is treasurer.

The Williams Radiator Co., St. Louis, has leased a local building, totaling about 20,000 sq. ft. of space, for the establishment of a new works.

The Chicago, Rock Island & Pacific Railroad Co., 137 West Van Buren Street, Chicago, has arranged for the immediate erection of its proposed new car repair shop at Trenton, Mo., one-story, 87 x 400 ft., estimated to cost about $80,000.

The Rainbow Oil Co., Greenville, Miss., recently organized with a capital of $500,000, is considering the erection of a new oil refinery. E. L. Wortham, El Dorado, Ark., heads the company.

The Norton Iron Works, Ashland, Ky., will proceed at once with the construction of a two-story addition, 150 x 200 ft., for the manufacture of wire-fencing, wire-cloth and similar products. T. M. Adams is president and general manager.

The City Ice Co., Twenty-first and Campbell streets, Kansas City, Mo., is completing plans for the erection of two new cold storage plants, each about 42 x 80 ft. F. D. Whiting is general manager.

The Ruckel Engineering Co., Hutchinson, Kan., has plans under way for municipal electric power and light plants at Quinter and McCracken, Kan., each estimated to cost about $45,000.

The Cinderella Aluminum Heel Co., 107 South Seventh Street, St. Louis, has leased a local building for the establishment of a new plant to manufacture aluminum heels and other metal products. Robert Tabor is general manager.

The General Woodwork Mfg. Co., 3201 North Broadway, St. Louis, has acquired a local plant, including adjoining property, for the establishment of a branch works to manufacture automobile and truck bodies. It is proposed to install machinery and commence operations at an early date. C. W. Redecker is vice-president and general manager.

The Tennessee Grain Softener Co., Chattanooga, Tenn., recently organized to manufacture metal equipment for grain softening service, is planning the erection of a factory. It is headed by L. E. Glass and B. B. Newman, Chattanooga.

Conveying machinery, loaders, transmission and other mechanical and electrical equipment will be installed in the new grain elevator to be constructed at St. Joseph, Mo., by the Chicago, Burlington & Quincy Railroad, 547 West Jackson Street, Chicago, estimated to cost about $200,000. The Burrell Engineering & Construction Co., 327 South La Salle Street, Chicago, is engineer and will soon call for bids.

The Board of Education, Lawrence, Kan., is arranging a list of machine tools and other equipment for installation in the manual training department at the proposed new high school.

The Progress Pressed Brick Co., Louisville, is planning the erection of an addition to increase the daily capacity from 25,000 to 45,000 brick. A. P. Hildebrand is president.

The Common Council, Crescent, Okla., is perfecting plans for a new municipal electric power plant to cost about $40,000.

The Missouri-Pacific Railroad Co., St. Louis, has had plans prepared for a new one-story car repair shop at Poplar Bluff, Mo. Bids will be asked at once. E. A. Hadley is chief engineer.

Fire, Aug. 25, destroyed the service and repair works of the Ferguson Motor Car Co., Pawhuska, Okla., with loss estimated at about $100,000. It will be rebuilt.

J. H. Schmidt, Muskogee, Okla., and associates, have awarded a contract to Dickman & Nelson, Muskogee, for a new one-story plant to manufacture electric storage batteries and kindred equipment, estimated to cost about $60,000.

The Gulf States

BIRMINGHAM, Sept. 12.

The Eggleston Oil Corporation, Somerset, Tex., is planning the erection of a new refinery to cost about $55,000.

Fire, Aug. 28, destroyed the repair shops of the Ford Motor Co., Tyler, Tex., with loss estimated at about $40,000.

The Van Zandt Cotton Oil Co., Willis Point, Tex., recently organized with a capital of $600,000, is planning for the erection of new works estimated to cost in excess of $100,000. W. P. Allen heads the company.

The Artesian Ice Co., Carbon Hill, Ala., recently organized, is planning the erection of a new ice-manufacturing plant, with machinery installation estimated to cost approximately $15,000. James Nichol, Jr, is president, and I. E. Cooper, secretary-treasurer and general manager.

The Southern Electrolyte Battery Co., New Orleans, has acquired a local building for the establishment of a new works to manufacture electric storage batteries of special type. The structure will be remodeled and equipment installed at an early date.

The Texas Imperial Co., Fort Worth, Tex., is planning the erection of a new refinery with initial output of about 100 bbl. per day.

The Jahncke Dry Dock & Ship Repair Co., New Orleans, has acquired the plants of the Crescent City Machine & Mfg. Co. and the Stearn Foundry Co. for extensions to its works. It is also negotiating for a portion of the Government property known as the Jackson Barracks, and proposes to construct a new works. The expansion program is estimated to cost close to $1,000,000.

The Rule-Jayton Cotton Oil Co., Stamford, Tex., recently organized with a capital of $200,000, is planning the erection of a cotton oil mill estimated to cost close to $100,000. C. M. Francis heads the company.

Harry K. Johnson, 1003 Hibernia Building, New Orleans, and associates have plans under way for a new electric power plant with generating capacity of about 1000-hp., estimated to cost about $200,000 with machinery.

The Baton Rouge Ice Co., Baton Rouge, La., is planning for the installation of new machinery to double the present capacity.

Hopkins & Duffy, Waco, Tex., have awarded a contract to J. M. Bush, Waco, for a new two-story plant, 100 x 125 ft., for the manufacture of automobile bodies, tops and other automotive equipment.

The Louisiana & Arkansas Railroad Co., Stamps, Ark., is completing plans for a new one-story locomotive repair shop. E. F. Salisbury is chief engineer.

The Auto Truck Co., Tallahassee, Fla., has been incorporated with a capital of $50,000 by L. R. Moore and G. E. Mabry, Tallahassee, to manufacture truck parts and other automobile equipment.

The Common Council, Gainesville, Fla., is planning for extensions and improvements in its municipal electric power plant to cost about $30,000.

The Transcontinental Petroleum Co., Tampico, Mex., is completing plans for a new one-story works for the manufacture of oil drums, cans, etc. It is estimated to cost about $450,000.

The new plant of the Tidewater Glass Co., Jacksonville, Fla., will comprise two manufacturing units, each to cost

about $150,000. The installation will include annealing ovens, tanks, glass furnaces, with mold shop, power house, and other departments. Later a number of additions will be constructed. The company is headed by C. H. Dankworth and F. W. Stewart. It is represented locally by the Chamber of Commerce, B. R. Kessler, secretary, which is interested in the project.

The Putnam Fluid Lift Co., Breckenridge, Tex., has been incorporated with a capital of $25,000 by F. M. Gill, C. O. Lund and S. C. Barton, Breckenridge, to manufacture mechanical equipment for oil well and other service.

California

LOS ANGELES, Sept. 6.

The City Council, Sacramento, Cal., is considering a bond issue of $8,000,000 for the construction and operation of a municipal electric power plant.

The Pacific Coast Tire & Rubber Mfg. Co., Los Angeles, has been incorporated with a capital of $2,000,000 by William B. Wightman, J. B. Treadwell and O. C. Emery, to manufacture automobile tires and other rubber products. It is represented by Owen C. Emery, 106A East Broadway, Glendale, Cal.

The Los Angeles & Salt Lake Railroad Co., Los Angeles, has awarded a contract to V. P. Gilbert, 431 Citizens' National Bank Building, for a new one-story works, 100 x 250 ft., at 2204 East Sixth Street.

The Pacific Tank Gage Co., Eddy Street, San Francisco, manufacturer of gasoline and other tank gages, has removed its plant to 167 Jessie Street for increased production.

The Alma Electric & Supply Co., Los Angeles, has been incorporated with a capital of $75,000 by A. E. Westphal, Iver J. McAllister and Joseph O. Poole, to manufacture electrical products. It is represented by Arthur J. Michell, Alhambra, Cal.

The Precision Mfg. Co., Los Angeles, has filed notice of organization to manufacture precision mechanical equipment. It is headed by Iver L. Shogran, 2861 San Marino Street.

The Washington Union High School District, Easton, Fresno County, Cal., will equip a machine shop in a new school building to be constructed. J. A. Poytress is clerk.

D. E. Culbertson, 1222 Ninety-third Avenue, Oakland, Cal., has filed plans for a one-story machine shop at 50 South Eighty-first Street.

E. C. Leach, 40 College Avenue, San Francisco, has filed plans for a new one-story foundry for the production of iron and other metal castings.

The De Corse Mfg. Co., 43 Mesquit Street, Los Angeles, has been organized to manufacture mechanical products and operate a general machine works. M. D. Fraser, 1339 West Twelfth Street, heads the company.

The Power Bureau, Los Angeles, E. F. Scattergood, chief engineer, has plans under way for a new power plant for the municipal power system, estimated to cost close to $100,000.

The Southern California Telephone Co., Los Angeles, has plans under way for a one-story automobile service and machine shop, for company cars and trucks, estimated to cost about $140,000, including equipment.

The San Joaquin Light & Power Corporation, Fresno, Cal., has been granted permission to erect two hydro-electric generating plants on the Kern River. One will have a capacity of about 16,800-hp. and is estimated to cost close to $1,000,000; the other will have a rating of 7700-hp. and will cost approximately $880,000.

The Kansas City Boiler & Welding Co., 1779 North Main Street, Los Angeles, has filed notice of organization to manufacture boilers, tanks, etc. Conrad A. Byloff, 324 West Thirty-third Street, heads the company.

Canada

TORONTO, Sept. 10.

The Canadian National Exhibition has helped to stimulate machine-tool buying a little and some companies having exhibits have received a few small orders, but no large buying is yet manifest. Small tools are still backward, users purchasing only for immediate needs. Some dealers are shading price to secure business, but no reductions have been made in quotations recently.

Arrangements have been concluded for the financing of a $10,000,000 power development at Great Falls, Man., on the Winnipeg River, according to A. W. McLimont, vice-president Winnipeg Electric Railway Co. The plant will have a capacity of 168,000-hp., and is expected to be completed and in operation in 1927. Construction has started and about 200 men are now employed. Later from 1000 to 2500 men will be at work. The project will be carried out by the Manitoba Power Co., Ltd., which is taking over the plant and assets of the Winnipeg River Power Co., Ltd. Sir Angus Nanton is president of the new company and A. W. McLimont, vice-president, will have control of the construction and operation of the plant.

Arrangements have been approved whereby the plant of the Preston Car & Coach Co., Preston, Ont., will be taken over by the Canadian Brill Co., Ltd, a subsidiary of the J. G. Brill Co., Philadelphia, Pa. The new owner will start operations immediately and has a substantial volume of orders on hand. The president of the Canadian company is Samuel M. Curwen, Philadelphia, president of the Brill company and all subsidiaries; first vice-president, H. K. Hauck; second vice-president, A. N. W. Clair, Preston; H. D. Scully is general manager.

The plant and building of the W. C. Hunt Brass Mfg. Co., 30 Holly Avenue, Toronto, was damaged by fire Sept. 6, with a loss of $30,000. It will probably be rebuilt immediately. This makes the third fire in the past two months.

Joseph Langevin, Coteau du Lac, Que., will receive bids until Sept. 30 for electric light and power plants to cost $30,000.

H. W. Hill, Box 164, Preston, Ont., is in the market for 2-ton chain blocks, and a 1½-ton block.

Armstrong Whitworth of Canada, Ltd., 298 James Street, Montreal, whose plant at Longueuil, Que., was closed some time ago, will dispose of the following equipment: Seven automatic screw machines; two boring mills; one centering machine; three jib cranes; four drills; electrical equipment, including one 3 and one 6-ton Heroult electric furnaces, generators, etc.; steam engines; drill fluting machines; grinders; steam hammers; lathes; milling machines; presses; relieving lathes; rolling mills; shears; tanks; metal testing machines; pumps; boiler and steam plant equipment; time clocks; foundry ladles; cranes; also miscellaneous tools, high-speed and carbon steels, motors, etc.

The Wallace Barnes Co., Bristol, Conn., has taken over the plant formerly occupied by the National Machinery & Supply Co., Hamilton, Ont., and will manufacture its regular line of screw machine products, cold rolled spring steel, wire, washers, stampings, springs, etc.

Plans of New Companies

The Pennsylvania Foundry Supply Co., Philadelphia, was organized to meet the special requirements of foundries from the standpoint of quality, price and service. The company is acting as manufacturer, dealer and agent for all kinds of supplies and equipment needed by foundries making ferrous and non-ferrous castings. It is the Eastern distributor of the Mac Co., Inc., Milwaukee, of its parting, high temperature furnace cement, brass cleaner and core compound. It has warehouse facilities in Philadelphia. H. E. Mandel, formerly of the Lindsay Chaplet & Mfg. Co., is general manager.

A new corporation, the Marlin Firearms Corporation, has purchased the former Marlin firearms plant at New Haven, Conn., and has acquired all of the machinery, tools, fixtures, gages, patterns, good-will, inventory, etc., of the business, which has heretofore been conducted by the Marlin Firearms Co. and the Marlin-Rockwell Corporation. The new corporation will manufacture the full Marlin line of repeating rifles and repeating shotguns; also single shot rifles, single guns, double barrel guns and revolvers. The factory organization includes all of the important men of the old Marlin firearms organization—practical gun makers with from 15 to 20 or more years of experience in the manufacture of high-grade firearms. The officers of the company are John F. Moran, president; LeRoy Sargent, vice-president; Reuben Hill, secretary and treasurer. The directors are these officers with Howard E. Adt and Thomas M. Steele.

The Pure Aluminum Co. of America, 180 Centre Street, New York, will manufacture aluminum cooking utensils to be marketed under the name of "Nobolo Ware." The company contemplates the erection of its own rolling mills and has completed arrangements with the Bush Terminal sales representatives to handle part of the distribution of its products. F. E. Grabo, who controls the E. O. Grabo Machine Works, New York, is vice-president, in charge of production. Burnett L. Shaw is president.

The Lumen Bearing Co., Buffalo, and Youngstown, Ohio, manufacturer of machinebronze, brass and bronze castings and bearings, solders and babbitts, has established in Chicago a branch office to handle business west of and including Michigan, with the exception of Detroit, and west of a line from Toledo to Columbus to Cincinnati; Kentucky, Tennessee and Georgia. H. S. Huncke is the Western sales manager, with Henry Waters as associate salesman. The office is located at 15 North Jefferson Street, Chicago.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers or shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c.
No. 12	3.33c.
No. 14	3.38c.
No. 16	3.48c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.90c. to 4.10c.
No. 16	4.05c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—48	—32	¾ in. Butt...	—30	—13
¾ in. Butt...	—54	—39	1-1½ in. Butt.	—32	—16
1-3 in. Butt..	—56	—42	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—51	—37	2½-6 in. Lap.	—30	—16
7-12 in. Lap..	—43	—27	7-12 in. Lap...	—23	— 7

Steel Wire

BASED PRICE* ON No. 9 GAGE AND COARSER	Per Lb.
Bright basic	3.75c. to 4.00c.
Annealed soft	3.75c. to 4.00c.
Galvanized annealed	4.50c. to 4.75c.
Coppered basic	4.25c. to 4.50c.
Tinned soft Bessemer	5.75c. to 6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¼c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	19½c. to 21¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80	$6.55
		90 lb...	6.90	6.65
		100 lb...	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	28c.
Bar	34c. to 35c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5c. to 5½c.
Bar lead	6¼c. to 6¾c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb. 29c. to 31c.

Old Metals

The market is stronger and prices are a little higher. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	9.75
Copper, heavy and wire	9.00
Copper, light and bottoms	7.75
Brass, heavy	4.50
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.25
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

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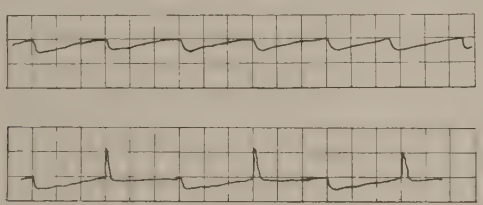
ESTABLISHED 1855 VOL. 108: No. 12

Open-Hearth Furnace Design

Reversing Valves and Their Effect on Efficiency—Chimney Areas and Heights

BY A. D. WILLIAMS*

REVERSING valves for regeneratively fired furnaces have been a source of much trouble. Many different valves have been designed and placed upon the market, and a number of different flue ar-



Figs. 1 and 2—Pyrometer Diagrams of Stack Temperatures. Abnormal conditions showing sudden upward kick in Fig. 2 are due probably to air leakage and the combustion of checker gases passing along the flue toward the stack

rangements have been devised, to eliminate the reversing valve and accomplish the reversal with a multipicity of mushroom valves and dampers. The simple Siemens butterfly valve was the first four-way valve used on these furnaces. In use, however, exposed to the hot gases on one side, and the cool gas or air passing to the regenerators, it soon warps and becomes leaky. These leaks permit air to pass direct to the stack and cool down the waste gases, or if used for gas there is continual leakage of gas, which either burns in the valve or in the stack flue.

While many reversing valves are water sealed, most of these, during the operation of the valve, in common with the butterfly valve, open a direct connection, practically the full area of the valve from gas main or air to the stack. A few valves have been designed which cut the furnace, gas and air entirely off from each other and the stack, but these valves have not come into extended use.

Water sealed valves are used extensively. As long as the seal holds they are tight, but there are usually structural limitations to the depth of the seal. When exposed to gas pressure on one side and the stack depression upon the other the seal is unbalanced, and may readily be broken by surges or explosions. In some cases a considerable water area is exposed to the entering gas or air as well as to the waste gases.

Producer gas and stack gases, being several hundred degrees hotter than boiling water, will absorb a

*Consulting engineer, Newark, N. J. Copyrighted by A. D. Williams.

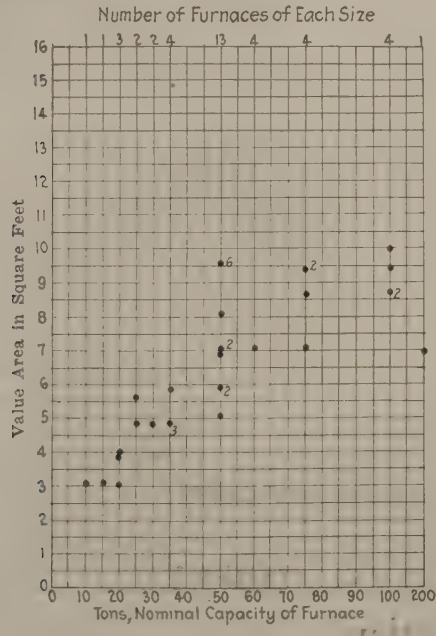


Fig. 3—Gas Valve Areas Spotted

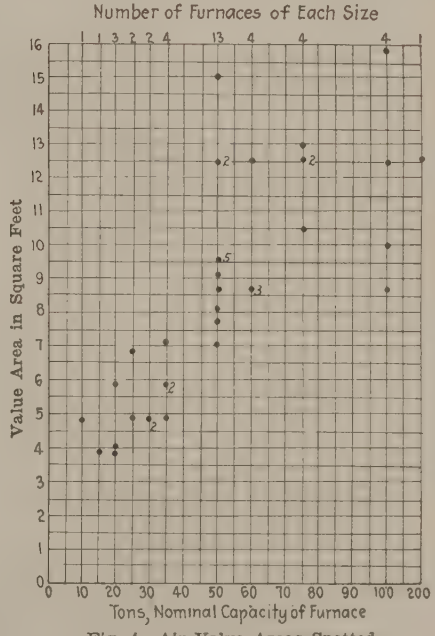


Fig. 4—Air Valve Areas Spotted

considerable amount of moisture from a very small area of water surface. With all of these valves the sealing lip must be raised, to clear the water surface and the port rims, whenever the valve is operated. From the time the seal is broken until it is re-established the full suction of the stack acts to pull air or gas, and in some cases both, into the stack.

TABLE 1
Reversing Valves

Nominal Diameter Valve In.	Ft.	Mm.	Nominal Area of Valve Sq. In.	Sq. Ft.	Sq. Meters
18	1.50	450	254	1.77	0.164
21	1.75	525	346	2.40	0.223
24	2.00	610	452	3.14	0.292
27	2.25	685	572	3.98	0.369
30	2.50	760	706	4.91	0.456
33	2.75	840	855	5.93	0.554
36	3.00	915	1017	7.07	0.657
40	3.33	1000	1256	8.73	0.808
42	3.50	1070	1385	9.62	0.894
48	4.00	1220	1809	12.57	1.168
54	4.50	1370	2290	15.90	1.477
60	5.00	1525	2827	19.63	1.823
66	5.50	1675	3421	23.76	2.210
72	6.00	1830	4071	28.27	2.630

With some valves the furnace itself is directly connected to the stack through both regenerators at reversal, so that a portion of the stack pull tends to draw air in at the doors. This may or may not be seriously objectionable, according to the distance between the valve and the furnace, and the rapidity with which the valve may be operated.

Effect of Absorbed Moisture

Moisture absorbed from water seals is a direct loss of the amount of heat required to evaporate it and superheat it to the temperature at which it passes out

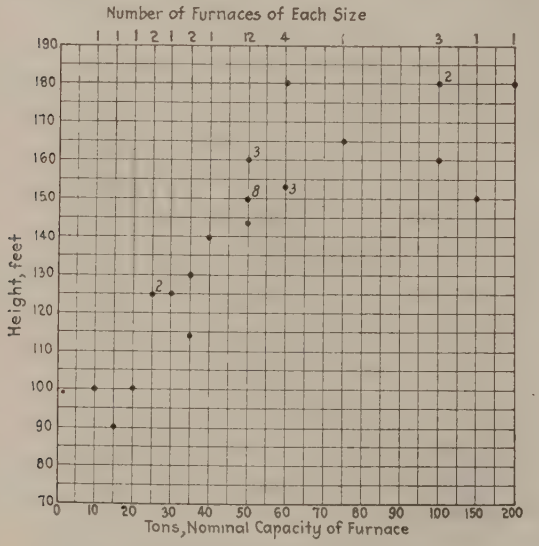


Fig. 5—Stack Heights Spotted

of the regenerator to the stack. In addition, its dissociation probably occurs in the checkers, which may release some oxygen to combine with other combustibles at this point. The reactions here are complex, as certain hydrocarbons dissociate in the checkers, as well as CO_2. A further increment of moisture occurs in certain elements of the charge, and an open-hearth furnace is not particularly efficient as a dryer. At the same time, moisture is carried in by the air supply.

All of this water leaves the regenerator for the stack as highly superheated steam, and its amount is considerable, particularly with large furnaces. In "The Heat Balance of the Open-Hearth" by Sidney Cornell, (*Chemical and Metallurgical Engineering*, May, 1913,) the weight of moisture passing in the flue gases was about 26 per cent of the weight of ingots produced. The water seals in the valves increased the amount of moisture in the producer gas 1 per cent.

As the water seal depends upon its water supply, a very slight stoppage breaks the seal. Frozen water

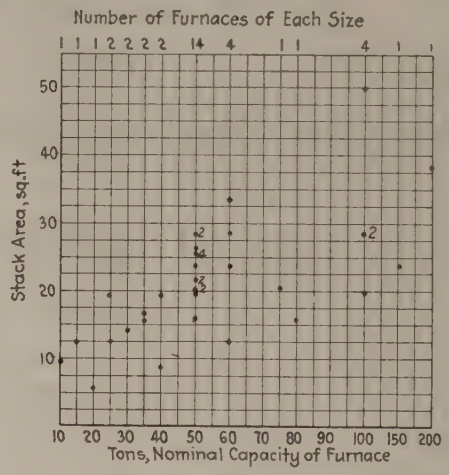


Fig. 6—Stack Areas Spotted

lines in winter frequently cause the superintendent to consign the plant to the tropical regions, particularly when they occur on a cold Sunday morning.

TABLE 2
Reversing Valves and Chimneys in Practice

Nominal Furnace Capacity, Tons	Valve Area Gas, Sq. Ft.	Air, Sq. Ft.	Sq. Ft. per Ton Gas	Air	Chimney Height, Ft.	Area of Bore, Sq. Ft.	Sq. Ft. per Ton
10—1	3.12	4.87	0.312	0.487	100	9.62	0.962
15	3.12	3.12	0.208	0.208	90	12.56	0.837
20—A	3.90	3.90	0.195	0.195	100	....	....
20—3	3.07	4.00	0.154	0.200	...	....	....
20—D	3.90	5.90	0.195	0.295	...	....	....
20—4	...	...	....	....	...	5.85	0.293
25—4	4.90	4.90	0.196	0.196	125	12.56	0.502
25—3	5.65	6.90	0.226	0.276	125	19.64	0.786
30—5	4.90	4.90	0.163	0.163	125	14.2	0.473
30—4	4.90	4.90	0.163	0.163	125	14.2	0.473
35—2	5.90	5.90	0.169	0.169	...	.....	....
35—A	4.90	5.90	0.140	0.169	114	17.0	0.487
35—1	4.90	4.90	0.140	0.140	130	15.9	0.474
35—D	4.90	7.10	0.140	0.203	...	....	....
40—7	...	...	....	....	...	9.0	0.225
40—4	...	...	....	....	140	19.64	0.491
50—4	7.06	7.06	0.141	0.141	150	23.7	0.474
50—10	7.06	15.00	0.141	0.300	...	21.5	0.430
50—11	5.94	9.18	0.119	0.184	150	26.27	0.525
50—8	9.60	12.50	0.192	0.250	150	28.27	0.565
50—13-15	9.60	9.60	0.192	0.192	150	25.8	0.516
50—16	9.60	12.50	0.192	0.250	160	20.0	0.400
50—X	5.22	7.75	0.104	0.155	...	....	....
50—4	8.13	8.13	0.163	0.163	...	....	....
50—19	9.60	9.60	0.192	0.192	150	20.0	0.400
50—5	7.00	9.52	0.140	0.190	...	....	....
50—D	5.90	8.70	0.118	0.174	...	....	....
60—13	7.06	12.58	0.118	0.210	180	33.18	0.553
60—3-5	7.06	8.72	0.118	0.145	153	28.27	0.471
75—1	9.42	13.00	0.126	0.173	...	....	....
75—A	9.42	12.56	0.126	0.167	...	....	....
75—3	8.70	12.56	0.116	0.167	...	....	.....
75—D	7.10	10.50	0.095	0.140	...	.....	.....
75—2	...	...	.....	....	165	20.36	0.271
80—1	...	...	....	....	...	15.8	0.198
100—3	...	...	....	....	...	19.6	0.196
100—H	10.00	10.00	0.100	0.100	180	28.25	0.283
100—E	8.75	8.75	0.088	0.088	180	50.0	0.500
100—4	9.42	15.90	0.094	0.159	160	28.25	0.283
100—D	8.70	12.60	0.087	0.126	...	....	....
150—1	...	...	....	....	150	23.7	0.158
200—4	7.00	12.56	0.035	0.063	180	38.50	0.193

Water vapor absorbed by the flue gases reduces not only their temperature, but also the stack draft and the amount of heat available for the waste-heat boiler to convert into steam.

As to the valve area required for a furnace, there is as much diversity in practice, as there is with the other proportions of the furnace. Figure 3 is a graphical comparison of reversing valve practice, while Table 2 shows the same data in tabular form. The reference numbers in the table correspond with those given in

preceding articles, which have appeared in *Révue de Métallurgie* in 1919 and THE IRON AGE in 1920.*

Some of these valves are so heavy as to require electric motors or some other form of power for their operation. In these cases the control is located on a pulpit at a central location on the charging floor in the rear of the furnace. Smaller and lighter valves are operated by cables or levers led into the pulpit. Heavy valves have considerable inertia, and for this reason cannot be operated as rapidly, even by power, as the smaller valves which have lighter moving parts.

Furnaces fired by pulverized coal, natural gas, oil, coke oven gas or tar require reversing valves for the air only, the fuel being reversed by shutting off the jet at one end of the furnace and turning on the jet at the opposite end. Some of these furnaces are supplied with one checker chamber at each end, while others are so constructed, with two chambers at each end, that they may be converted with little difficulty to producer gas firing.

Those furnaces in which the air only is preheated have a slight advantage over those in which both the gas and air are preheated, in that no unburnt gas has to be wasted up the stack at reversal. The amount of fuel lost in this manner depends upon the gas-filled volume between the reversing valve and the port, and the frequency of reversal. When the gas is preheated this loss cannot be avoided.

This gas likewise creates an explosion hazard When the conditions are right this gas burns and passes up the stack as a puff of flame. Again, if it becomes mixed with air, the mixture being below the ignition temperature, and a portion of this mixture is suddenly ignited, an explosion of more or less violence occurs. These explosions damage the walls of regenerative chambers, flues and waste-heat boilers, opening up cracks, so that large amounts of air are drawn into the system, reducing the stack draft and the output of the boiler, by reason of the lowering of the temperature of the waste gases.

Velocity of Gases Through Valves

One factor in regard to valve area that meets with little consideration is the velocity of the gases passing through the valve. In addition, most valves involve a change in direction of flow, totaling 360 deg., 180 deg. in the valve and two 90-deg. changes in the flues. When a stream of flowing gases goes through a passage involving changes in area, velocity changes are involved. The velocity of flow in the normal section of the flue may be represented by $V_{min.}$, and in the contracted area of the valve by $V_{max.}$ The corresponding velocity heads will be $h_{min.}$ and $h_{max.}$ That is, a velocity head $= h_{max.} - h_{min.}$ will be required to produce the increase in velocity. The pressure in inches of water required to produce the increase in velocity will be:

$$p = 0.192\ (h_{max} - h_{min})\ d_t$$

in which d_t = weight in lb. per cu. ft. of the gas in motion at the temperature t deg.

The coefficient of contraction varies from unity, when the areas of the two passages are same, to 0.83 when the area of the smaller passage is 0.01 of the area of the larger passage. This slightly increases the pressure required, but ordinarily a large margin is available to cover this. The loss of pressure due to changes of direction may be expressed by the formula:

$$p = 0.192r\ d_t\ \frac{v^2}{2g}$$

in which:

p = pressure in inches of water column;
v = velocity in ft. per sec. of the stream of gas;
g = gravitational constant = 32.2;
d_t = weight in lb. per cu. ft. of the gas in motion at the temperature t deg.;
r = a function of the angle through which the stream is deflected.

The following values are given by Weisbach for short bends in pipes:

Angular change	a =	20 deg.	40 deg.	45 deg.	60 deg.	80 deg.	90 deg.
Coefficient	r =	0.046	0.139	0.188	0.364	0.740	0.984

This last loss, due to directional change in passing through the valve, amounts to 180 deg. in the valve itself and 90 deg. in the flues each side of the valve. For this reason changes of diameter of valve of 6 in. or so are of comparatively small effect upon operation. These losses vary with the square of the velocity in the valve and the flues. Many furnaces are, undoubtedly, choked by the small area of the valves used, and much operating trouble is doubtless due to lack of consideration of these details.

A valve small enough to choke the furnace is an expensive luxury, as it exacts its toll every minute the furnace is working. Added chimney height or forced draft must be provided to overcome its resistance. There is very little doubt that the erratic working of some furnaces with different weather conditions is largely due to the close balance, between draft and resistance, being disturbed by barometric and temperature conditions. These various losses will be gone into in more detail in the design computations.

Figs. 5 and 6 give a graphical comparison of chimney areas and heights, which are tabulated in Table 2. Open-hearth practice in the United States tends to steel self-supporting chimneys lined with fire brick. Even with waste-heat boilers and induced draft the straight chimney is used, while abroad many of the venturi cone (Prat type) chimneys are used. The chimney is required to carry the waste gases to a sufficient height to prevent their becoming a nuisance, not only in the works, but to its neighbors.

Another factor which must be considered in connection with the draft required to operate the furnace is that the gases must be pulled out of the furnace through the ports, down through the checkers and through the valves and flues. That is, the waste gas end of the furnace is below atmospheric pressure, and there is a constant tendency for cold air to be pulled into the system. When the brickwork is new and tight the leakage of air into the system may be slight, but after a few explosions have shaken things up, this brickwork is liable to leak like a sieve. For this reason, gas samples taken at the base of the stack are liable to show a condition of affairs quite foreign to that which actually exists in the gases leaving the heating chamber or the regenerators.

Many tests and considerable investigation of open-hearth furnaces have been made from time to time at different plants. Tests of this kind cannot be permitted to interfere with furnace operation. They must be carried on night and day over several melts. When it is decided to run such a test, the question of cost must be considered, not only in apparatus but in personnel. A large number of observations and chemical analyses must be recorded and analyzed.

Very slight details are liable to vitiate the value of such tests, and it is extremely difficult to impress upon the assistants available the factors that are really essential. Frequently, in fact, the busy executive is unable to devote to the test scheme the preliminary attention he desires, and as a result only a portion of the data required are obtained. Comparatively few of these test results are made known, hence there is much repetition of the work of others.

Inquiries now before structural steel mills call for 280 tons of steel to be used for the initial unit of the factory-warehouse building to be erected at Youngstown, Ohio, by the Paul J. Kalman Co., a Chicago fabricating interest. The plant will manufacture reinforcing steel and when completed will have an annual consumptive capacity of 70,000 tons of bars.

The American Rolling Mill Co., Middletown, Ohio, has made another cut of 10 per cent in salaries and wages. The new schedule was effective Sept 16. The base rate for common labor is now 27c. per hour. The announcement was made that this will be the last reduction in wages to be made this year, regardless of the price of steel.

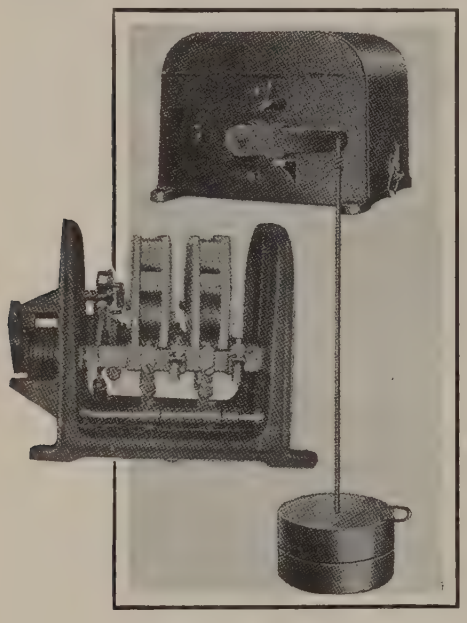
Molders of the American Steel Products Co., Macomb, Ill., recently struck as a protest against a reduced rate on piece work put into effect by the company. The molders had been earning from $8 to $9 a day and in order to meet competition the company found it necessary to reduce this amount to $6.

*Jan. 1, page 35; Jan. 8, page 119; Jan. 29, page 317; Feb. 12, page 475; March 18, page 805; April 29, page 1225; May 27, page 1510; Aug. 5, page 319.

Electric Crane Safety Switch

A new crane safety limit switch, designated as type L C, intended to prevent overtravel of the hoist brake and the consequent damage, has been brought out by the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. The safety limit guards the equipment irrespective of the kind of control or of the position of the controller handle or brakes. In addition to its safety feature time is saved within the normal operating range of the hoist, as the switch obviates the necessity of approaching the limit of travel slowly and cautiously.

Under normal operating conditions, the limit switch is held in the operating position by the counterweight as shown in the illustration, which overpowers the torsion operating springs, also shown. In case of overtravel the counterweight is raised by the hoisting hook or other moving part, which permits the torsion spring to operate the switch. This disconnects the motor from the line and establishes a closed dynamic braking cir-



In Case of Overtravel, the Counterweight Is Raised by the Hoisting Hook, Permitting the Torsion Spring to Operate the Switch

cuit through the motor armature, motor series field and resistor, which stops the motor, irrespective of the position or type of the controller or brake. The operation of the switch also releases the series magnetic brake which holds the load until the controller handle is moved to the lowering position. As soon as the hook has been lowered beyond the limit the switch is again ready to function as before, as it re-sets itself automatically. The quick-make and quick-break feature of the switch throws it rapidly from the normal to the braking position when approaching the limit and back to the normal operating position when backing out. It will not remain in a partially open or partially closed position and destroy the contacts or fail to function.

The safety limits may be used also on metal mixers, bridges and other applications employing series motors, where it is desired to limit the travel in one direction by applying dynamic braking.

Industrial training, by co-operation between school and shop, has been inaugurated by Pennsylvania State College. A supervisor in each shop gives individual aid to the students working there, on the points where they show weakness. All papers are corrected at the college, and all lessons are sent from there direct to the students. Special text books have been prepared for students in textiles, automobile parts, electrical equipment, iron and steel, machines and tools and other subjects.

Industrial Cost Association

At a meeting of the board of directors of the Industrial Cost Association, held on Sept. 8, the resignation of J. W. Stannard as president and director was accepted and Horace S. Peck, comptroller, S. K. F. Industries, Inc., 165 Broadway, New York, was elected to fill the vacancy. Christopher Haigh, General Electric Co., West Lynn, Mass.; Joseph P. McLean, Pittsburgh Forge & Iron Co., Pittsburgh, and Ernest J. Wesson, W. T. Raleigh Co., Freeport, Ill., were elected directors of the association.

It was decided to hold the fall conference at Pittsburgh, Nov. 2, 3 and 4. The association now has 224 members. The organization has no salaried officers. The board of directors at one time passed a resolution to the effect that at such time as the receipts of the association exceeded disbursements, the secretary-treasurer was to be placed on a salary basis but at no time has this condition existed for a long enough period to justify such action, and it was therefore impossible for this officer to continue to devote his entire time to the association.

In a letter to the membership President Peck explained that for a number of months A. A. Alles, Jr., the secretary-treasurer, through the courtesy of the Fawcus Machine Co. and the Schaffer Engineering Co., devoted his entire time and attention to the affairs of the association and that he still continues to devote as much of his time as possible to this work.

New Plans to Study Drill Steel Breakages

WASHINGTON, Sept. 20.—Plans have been made by the Bureau of Standards and the Bureau of Mines to intensify further study of breakage and heat treatment of drill steel and invitations have been issued to outside experts on the subject, who, it is hoped, will cooperate with the bureaus and act as a consulting committee. Those asked to serve in this capacity are President J. A. Mathews of the Crucible Steel Co. of America; Dr. Van H. Manning of the American Petroleum Institute; B. F. Tillson of the New Jersey Zinc Co.; W. L. Saunders, chairman Ingersoll-Rand Co., and F. W. Benton of the Copper Range Co.

The Bureau of Mines has been conducting research on drill steel at its experimental stations in Rolla, Mo., and Minneapolis, and, having a lack of appropriations to continue them as extensively as necessary is seeking aid through experts in the trade and in the mining industry.

The Bureau of Standards also has been conducting a research with the Bureau of Mines. It is stated that improvements in drill steel have not as yet come up to the standard of those made in the drill themselves and that there has been considerable breakage, causing a cessation in operations in drilling at mines and resulting in heavy costs.

Gain in Employment at Youngstown

August wage distribution by Youngstown, Ohio, industries of $3,349,974 compares with $3,323,982 disbursed in July. This is the first gain in payroll at Youngstown in several months. According to a statement issued by the United States Department of Labor, Youngstown leads other cities in the increase in number of persons employed in industry in August as compared with July. Youngstown's gain is 27.7 per cent, whereas the average increase in 65 principal industrial centers is 1.08 per cent. The Department of Labor bases its figures on reports from 1428 firms in the various cities which usually employ 500 or more persons.

During August the Ford Motor Co. made 109,173 passenger cars and trucks in the United States, breaking its former record for a month's output by 211. Total production of Fords in this country since the beginning of this year is 645,192, an average of 80,650 a month for each of the eight months. The average output for each of the 27 working days of August was approximately 4050.

Electric Furnace Progress in 1921

Discussion of the Merits of Dual Voltages for Melting the Steel and for Refining —Heat Losses and Electrodes Considered

BY E. T. MOORE*

MUCH of the work outlined as a program for research work of necessity involves continuity of operation, a condition which has not been possible to obtain. On this account it has been impossible to complete the work, which anticipated extensive research and the recording of a mass of secured data. However, it is hoped much discussion will result from the suggestions outlined herein, and a much broader scope given to the subject. The plans called for the following lines:

1. A thorough study of the heat losses from electric furnaces.
2. Presentation of operating data on furnace electrodes, according to the electrode specifications drawn up by this committee and presented in a paper before the last convention.
3. An investigation of the merits of dual voltages, and the deleterious effect on the metal, if any, of a relatively high voltage, for melting.
4. Investigation of electric furnace phemonena.

Heat Losses From Electric Furnaces

Considerable attention has been given to the study of heat losses through walls, roof, electrodes, cooling water, and escaping gases. (A bibliography of the literature on the subject is given in the report.)

Messrs. Wolfe and Wysocki in "Heat Losses Through Electrodes of a 6-ton Heroult Furnace" give data for heat losses through the cooling water, but obviously tests of this kind are not complete, since a large amount of heat is lost at the electrodes which is not carried away by cooling water. The figure of 18.7 per cent given for power loss of the electrodes did not represent the complete loss at this point. This is especially true in those furnaces where there is considerable clearance between the roof and the electrodes, which permits the escape of gases in large volume, carrying a tremendous amount of heat with them. The economizer referred to in our last report will prevent the escape of a large amount of heat, and lengthen the life of the electrodes as well.

In the Stobie furnace, which was developed in England and used quite extensively there, the makers claim a device which greatly reduces the heat losses at the opening between roof and electrodes. This device consists of a series of telescoping tubes placed around the electrodes above the roof, and quite effectively seals the opening against escaping gases and heat. The maintenance of tight joints between adjacent sections is a matter which should be investigated.

A considerable amount of heat loss occurs through furnace doors, which should be designed to give as effectual a seal as possible.

Electrode Specifications

An initial specification on any material generally cannot be complete, and the committee has realized that its first attempt to draw up an electrode specification, such as the one presented at our last convention, would be far from satisfactory.

It was hoped, after a year's use of the suggested specification, to send out another questionnaire to manufacturers, and record the results of such use in this paper. The industrial depression has caused the shutting down of most electric furnaces, and operating data under the new electrode specifications are therefore not available. It is hoped the specifications will be criticized and eventually corrected and elaborated.

In the committee report before the last convention reference was made to "a well defined belief that the high rate of melting, obtained by high voltages, is detrimental to the quality of the product, especially to tool steel." A considerable amount of discussion by correspondence has taken place as to the relative merits of dual voltages, the matter dividing itself into three features: Effect of relatively high voltage during melting, on the quality of steel. Effect of relatively high voltage during melting, on the refractories within the furnace. Effect of relatively low voltage during refining, on the refractories within the furnace.

High Voltages During Melting

There seems to be a general opinion that equal results as to metal quality can be secured by either single or dual voltages. Some users feel that there is practically no change in the quality of steel when melted and refined at one voltage anywhere between 100 and 140 volts, such as is used in the Heroult, Greaves-Etchells, Ludlum, and similar types of furnaces. However, there seems to be a decided antipathy for voltages, say 160 to 250, as the extremely long arc with such voltages is detrimental to the metal, particularly high grade tool steels, and also very severe upon the refractories, especially during refining.

On the other hand, while it appears reasonable that detrimental effects to the metal are produced during a high voltage melting period, yet these effects can largely be eliminated by a relatively longer refining period. It is also evident that better steel is made by preventing contamination of the metal, than by allowing contamination and then attempting to eliminate the injurious elements. In other words, we return to the old adage "an ounce of prevention is better than a pound of cure," and whether or not this is worth considering, from the standpoint of commercial steel production, is more or less debatable.

As to just how the steel is affected no one at present, it would seem, can answer, for this brings in such obscure phenomena as the effect of oxygen and nitrogen on molten steel at high temperatures. In a mass of solid steel scrap, having a source of intense heat at its center, with considerable space for gases to play between the fragments of material, we have an ideal condition for the thorough mixing of oxygen and nitrogen with solid, molten, and even vaporized steel.

That such conditions permit of the most active chemical action between the gases and the steel needs no comment. The more intense the action is, the longer must be the period when these gases, oxides, nitrides and other combinations must be eliminated from the final product. This action is present in a greater or less degree in every arc furnace, or open-hearth furnace for that matter, and it might be pointed out now that this may be one of the reasons why the induction furnace is said to produce a higher quality of steel.

Effect of a Long Arc

Assuming, however, that nitrogen is injurious to steel, it would appear that nitrogen fixation would increase when a relatively longer arc with high voltage was used, than with a short arc when lower voltages are used. In other words, the principle of a steel melting furnace with such a long arc is very similar to the Berkelund and Eyde or Schonherr nitrogen fixation furnaces. The fact that the arc is long gives a much greater path of air for the arc to pass through, and it is reasonable to assume as a hypothesis that the greater air gap the arc traverses the greater will be

*Electrical engineer, Halcomb Steel Co., Syracuse, N. Y.] The article is the report, substantially complete, submitted by Mr. Moore's committee to the Association of Iron and Steel Electrical Engineers, at the Chicago convention.

the quantity of nitrogen or nitrous oxide produced.

You will readily recall experiments made in the laboratory with an ordinary static machine, and how the length of the arc was varied by increasing the air gap. You also probably noticed that the longer the arc the more perceptible the presence of ozone became, indicating a greater conversion of oxygen to ozone.

While ozone is an allotropic form of oxygen, one and one-half times as dense—a much more powerful oxidizer than oxygen gas, and nitrogen a very inert gas combining only at high temperatures, and then only with a limited number of elements, it would appear consistent to expect similar results with both as expressed in our hypothesis. The fact that nitrogen combines only at high temperatures is a fair indication of its presence in steel, particularly when a long arc is used, as with higher voltages.

As a result of this supposition, it was thought desirable by the committee to investigate thoroughly the phenomena within an arc furnace, by taking photographs of the arcs with a multi-exposure high-speed camera, and simultaneously recording the phenomena of the circuit with an oscillograph. Also a close analysis of the steel, both physical and chemical, was to be made with particular reference to the occurrence of nitrogen in more or less degree, as the value of the melting voltage and consequently the length of the arms were increased.

Microscopic examination of steel has revealed a fine irregular needle structure, which has generally been accepted to be typical of iron nitride. This structure has been studied by a number of investigators, as outlined in the report. In an article in THE IRON AGE, *volume* 108* on "An Occurrence of Nitrogen in Steel," A. A. Blue presents data showing evidences of direct combination of ordinary inert atmospheric nitrogen with iron at moderate heating temperatures.

Presence of Nitrogen at High Temperature

If evidence of nitrogen is found in iron at moderate heating temperatures (not over 1800 deg. Fahr.), it is reasonable to assume that at temperatures several times these amounts, such as exist in the electric furnace, a much greater combination will result. To our knowledge this type of investigation has never been made, although J. Kelleher, in his paper "Some Phenomena Observed in Electric Furnace Arcs," before the American Electrochemical Society, projected images upon a screen through an aperture in the walls of a small single arc dc experimental furnace, from which sketches of the arc could be made.

These sketches showed that the flame of the arc apparently flowed from the electrode to the slag, depressing the slag and flaring out at all sides when the electrode was the negative pole. An arc length of 3 in. was easily maintained, and under these conditions the arc was silent. With the electrode as the positive pole the arc was very unstable, starting below the surface of the slag, the flame moving away from the slag surface and projecting particles of slag into space with considerable force. The arc could barely be maintained, at a greater length than 1 in., and was loud and spluttering.

These observations were of course made in an experimental furnace using direct current, and may have no bearing in a commercial furnace. However, the obscure information obtained certainly warrants further extended investigation and discussion.

In carrying out this work, it was proposed to use a new type of portable oscillograph to record the wave form, building up of current, instantaneous current and voltage wave distortion, high frequency, harmonics and other phenomena. As a number of phenomena in an electric furnace circuit are over in 0.001 second, the ordinary moving picture camera, capable of from 15 to 35 exposures per second, is hopelessly slow, and it was proposed to use a polar multi-exposure high-speed camera capable of taking pictures at the rate of 3000 per second, thus being comparable to the oscillograph in recording the details of transient electrical phenomena.

For some purposes, of course, such speed is not necessary, but for many of the extremely rapid changes in the configuration of visible forms the finely defined, well distinguished, high-speed pictures are necessary if data of any value and utilization are to be secured. The stereoscopic exposures obtainable, when properly mounted, give, with unusual vividness, a view of what is occurring in the arc, as the flame or object appears to stand out in space, disclosing the shape in three dimensions.

The oscillograph and high-speed camera are synchronized so that, by pressure of a single button, the mechanism of both is operated so as to give simultaneous records.

Effect on the Refractories

Irrespective of the merits or demerits of high voltage during melting on the quality of steel, the effect upon the refractories within the furnace is about the same in each case, for the reason that the charge is cold, and most of the heat generated goes into the cold metal. Also, at this stage of operation, there is no blanket of slag to reflect the heat of the arcs in such manner as to cause damage to the refractories.

Unquestionably the use of a relatively lower voltage for refining is desirable, since the amount of power input can be much reduced. With a lower voltage and reduced power input a much shorter arc can be maintained, and this alone will give a prolonged life to the refractories of the roof, and to the walls as well. With a single voltage available, this must be high enough—usually around 100 volts—to give suitable power input to the furnace for reasonably rapid melting, and yet for refining purposes this is too high, because excessive heat radiation from the longer arcs will greatly curtail the life of the roof.

On the other hand, a voltage of 100 for melting, while entirely satisfactory, can reasonably be increased to at least 120 volts without injuring the refractories a bit more than with 100 volts, and in addition more rapid melting is secured, better regulation from the regulators, and the kwh. per ton input reduced. In some instances, a value of even 140 volts would be advantageous, although above this point joint trouble is liable to develop in the electrodes. The values given above are based on 3-phase 6-ton Heroult furnaces.

For refining, a voltage low enough to give sufficient power input into the furnace to maintain heat balance is desirable, and yet not low enough to allow the electrodes to dip into the bath, or the metal and slag to be splashed against the electrodes, by the action of the arcs, as contamination of the metal will result. A value of 60 volts on a 3-phase 6-ton Heroult furnace installation, with 1500 kva. connected capacity, was found ideal from a power input, refractory, and electrical efficiency standpoint, but undesirable because the electrodes would occasionally drop momentarily into the bath, and thus increase the carbon content of the steel. A voltage of 65 was likewise found undesirable.

At 70 volts, however, the arc length is greater, and the vertical distance from electrodes to bath level sufficient to give nearly as good electrical and refractory performance as at 60 volts, but with much greater safety from contamination due to dipping electrodes. Values of 75 and 80 volts are also desirable, but with a slightly decreasing electrical efficiency and refractory life, but greater safety from contamination. Individual installations will require separate consideration, with the selection of a value between 70 and 80 volts, which will best meet the specific case.

General Conclusions

To recapitulate, it would appear that as good steel could be made using dual voltage as with one voltage, provided the melting voltage is not too high; and, in addition, better economy may be secured electrically and from refractories. This economy amounts to quite an amount, so that the use of dual voltages is well justified and, we believe, will pay handsome dividends.

On Jan. 1, 1921, the total number of electric steel furnaces in this country was 356, and we believe this number has not been increased during the first six months of this year. There has been very little activity in the non-ferrous industry, although there has been a small increase in the number of brass furnaces.

*July 7, 1921, page 1.

Three Types of Alloy Sheet Steel—III

Electric and Acetylene Welding Details and Their Effect on Physical Properties —Chrome-Vanadium Steel Adopted

BY HORACE C. KNERR*

ELECTRIC spot welds, although not used to transmit heavy stresses, play an important part in the manufacture of sheet steel fittings, often being used to hold parts in place for brazing and, in some cases, to replace rivets. Tests were therefore made to determine the comparative value of the three alloys in spot welding.

Specimens of ⅛-in. sheet were sheared into strips about ½ in. wide and 4 in. long. A pair of strips was overlapped about ½ in. and a single spot weld applied to join them as in Fig. 1. One set of 5 specimens of each alloy was welded as received and another set was pickled before welding, to remove scale.

Electric Spot Welds

After spot welding, the specimens were heat treated identically with the corresponding tensile specimens and then tested in tension, the breaking load in pounds being determined. The results are given in Table 6. Tests of spot welded specimens show that:

All three steels spot welded satisfactorily.

Removal of scale by pickling greatly improved the strength and uniformity of joints in each case, and the welds were made much more rapidly.

When pickled, the greatest average breaking strength was obtained from the 3.50 per cent nickel steel. Unpickled, chromium-vanadium steel gave best results. The unpickled 3.50 per cent nickel steel showed the greatest variation in strength.

All but two specimens, marked "X," Table No. 6, failed by shearing through the spot weld. These two failed by breaking the specimen in tension, tangent to the spot, and were the two highest in tensile strength.

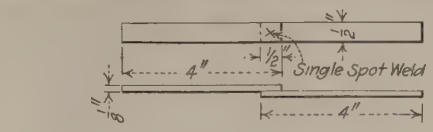
The spot welds varied from 3/16 to ⅜ in. in diameter.

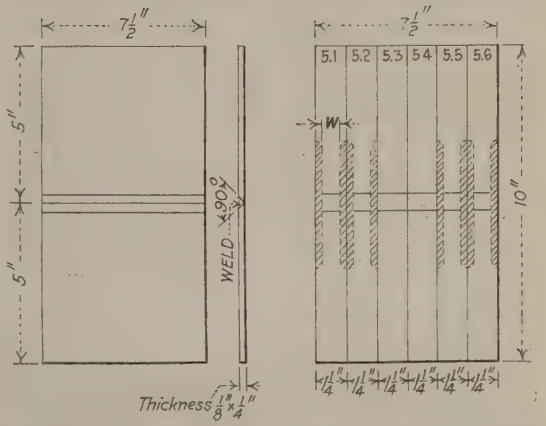
The nickel-chromium specimens showed a tendency to porousness in the weld.

Acetylene Welding

Two sheets, 7½ in. wide by 10 in. long, were taken from each grade and thickness of steel. These sheets were cut in half and the cut edges milled to a 45 deg. bevel, so as to give a 90 deg. V when joined (Fig. 2), the joint being a continuous weld 7½ in. in length.

One set of sheets was welded with copper-plated Norway iron welding rod. The other set was welded with the parent metal, strips about 1/16 to ⅛ in. wide being sheared from the ⅛-in. sheet of each grade for welding rod. No flux was used in either case. The specimens were supported so as to allow free expansion during welding. The sheets were laid on firebrick and preheated with the oxyacetylene torch to a dull red heat for about one inch back from the joint. The ends of the joint were first "tacked." The ⅛-in. sheets were welded in one run; the ¼-in. specimens





Figs. 1 and 2 (Upper and Left) Show Method of Welding Used. Fig. 3 (Right Lower) Size and Appearance of Tensile and Bend Specimens Cast from Original Sheets

*Metallurgist Naval Aircraft Factory, Philadelphia. The first and second installments appeared in THE IRON AGE, Sept. 8 and 15

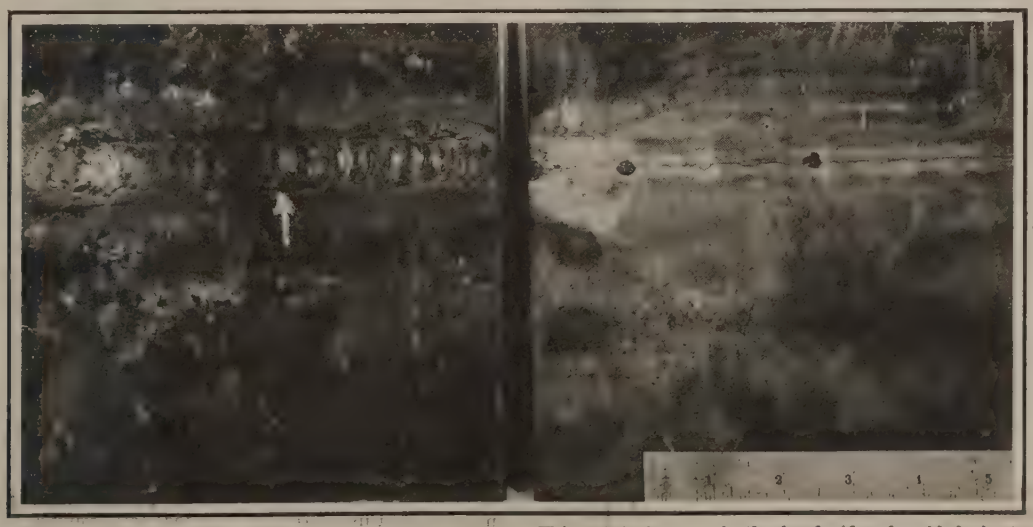


Fig. 4—A Front and Back View of the Welded Sheets. This particular one is the bead side of welded sheet No. 12, nickel-chromium, ¼-in. thick, parent metal melt bar, which developed a shrinkage crack (arrow)

required a second run to fill the joint. The weld was little, if any, thicker than the sheet. All sheets warped slightly in welding. For uniformity, all the work was done by one welder, the most skillful operator in the shop. Fig. 4, shows the "bead" side of welded sheet No. 12, nickel-chromium, ¼-in. thick, parent metal melt bar, which developed a shrinkage crack (arrow). The corresponding ⅛-in. sheet (No. 10) also developed

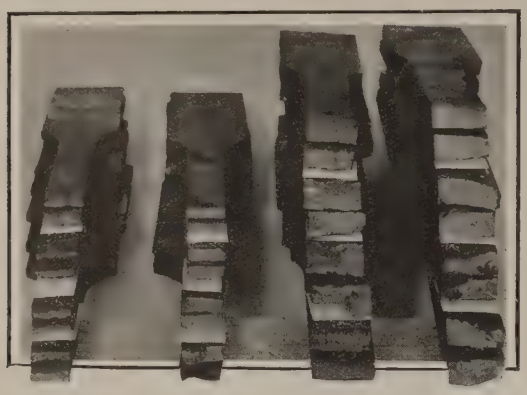


Fig. 5—Welded Tensile Specimens After Rupture, Chrome-Vanadium Steel Sheet

small cracks in the weld. The reverse side of sheet No. 15, 3.50 per cent nickel, ¼ in. is shown. No cracks were found in any of the nickel or chromium-vanadium welds.

After welding, the sheets were cut into tensile and bend specimens as shown in Fig. 3. These specimens were heat treated identically with the corresponding standard tensile specimens before testing. The joint was not "dressed" or ground off, but was tested in the condition as welded.

Average maximum and minimum tensile values for

Fig. 6—Welded Tensile Specimens After Rupture, Nickel-Chromium Steel Sheet

⅛ and ¼-in. specimens of each type appear in Table No. 7. A comparison of the results obtained in the three steels, using parent metal and Norway iron melt bars is given in Table No. 8, with a final comparison of parent metal vs. Norway iron for all steels, in Table No. 9. Photographs of welded tensile speciments after rupture are given in Figs. 5, 6 and 7. The following points are noteworthy:

All three steels can be welded either with Norway iron or with parent metal welding rod. Although the latter gives a higher maximum tensile strength, the minimum strength may be as low or lower than the minimum obtained with Norway iron rod. The latter is easier to manipulate, shows less tendency to burn and to develop shrinkage cracks, and is therefore preferable.

When welded with Norway iron, chromium-vanadium steel and nickel-chromium steel gave about the same tensile strength, per cent elongation and variation from minimum to maximum of these properties, chromium-vanadium being slightly superior. Nickel steel 3.50 per cent gave slightly higher average tensile strength and lower elongation with greater uniformity (less variation).

When welded with parent metal the 3.50 per cent nickel steel is distinctly the best in all respects, having a higher tensile strength, greater ductility and greater uniformity of these qualities than the other alloys. The nickel-chromium steel is next in order and the chromium-vanadium lowest.

The welder found the nickel-chromium welding strip somewhat more difficult to manipulate than the others, as it had a tendency to become spongy and "burn."

The difference in strength of welds made with Norway iron and parent metal is much less than the difference between the physical properties of these materials, heat treatment being understood in both cases. See Tables Nos. 8 and 9.

It is noteworthy that the minimum strength values for parent metal welds were less than those for Norway iron welds in the chromium-vanadium and nickel-chromium steels. This was no doubt due to the better quality of welds made with the Norway iron and indicates that the latter is the more reliable medium, at least under the conditions of the present test.

Bend Tests

A few bend tests on welded (heat treated) joints were made. Results are given in Table No. 10. The welds were not dressed, but tested in their natural condition as with the welded tensile specimens.

Note: The operator who performed these bend

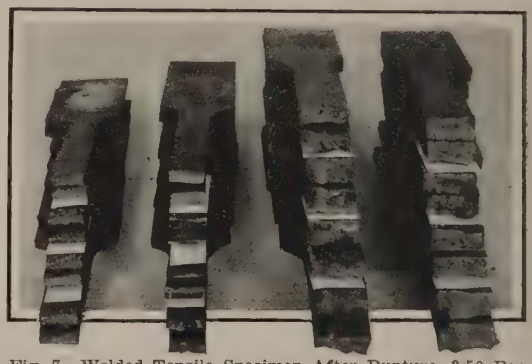


Fig. 7—Welded Tensile Specimen After Rupture, 3.50 Per Cent Nickel Steel

tests recorded which was the convex (tension) side in bending, but failed to arrange this variable in a systematic manner, placing the "bead" or built-up side sometimes up and sometimes down, so that the results are not always strictly comparable.

The 3.50 per cent nickel steel specimens showed distinctly the best bending qualities, with the chromium-vanadium second and the nickel-chromium last, which corresponds to the order of merit in the welded tensile specimens.

The angle of bend withstood by the parent metal

Table No. 6—Electric Spot Welds, Tested in Tension
(Values Give Breaking Load in Pounds)

Spec. No.	Chromium-Vanadium		Nickel-Chromium		3.50 Per Cent Nickel	
	Pickled	Not Pickled	Pickled	Not Pickled	Pickled	Not Pickled
1	4,650	2,745	3,940	2,055	3,585	1,935
2	3,755	2,080	3,740	2,455	4,750	2,890
3	3,715	4,855x	3,160	2,510	4,385	2,980
4	4,770	2,445	3,130	2,490	5,675x	3,235
5	4,105	3,860	2,280	2,095	3,560	1,060
Aver.	4,199	3,197	3,250	2,321	4,391	2,418

Heat Treatment: Spot welded specimens were given the same heat treatment as tensile specimens, aimed to give 150,000 lb. pr sq. in. in the steel. (See Table 3.) Results checked by Brinell hardness readings.

Remarks: Superiority of the specimens of all types from which scale has been removed by pickling is noteworthy.

The chromium-vanadium steel gives the most satisfactory results, considering strength and uniformity.

Specimens marked "x" broke in tension, tangent to spot weld. All others failed by shearing through the weld.

welds was practically the same as that of the Norway iron welds for each given alloy and thickness.

The results obtained from these few tensile and bend tests show great irregularity, due chiefly to sponginess and defective contact in the weld, but it is believed that a careful welder could obtain more consistent results with practice. Too much dependence should not be placed on welded joints in any case, how-

Table No. 7—Oxy-Acetylene Welds, Tension Tests
Chromium-Vanadium Steel

Sheet No.	Melt Bar	Thick, In.	Ultimate, Lb. Per Sq. In. Ave.	Ultimate, Lb. Per Sq. In. Min.-Max.	Elong., Per Cent in 2 In. Ave.	Elong., Per Cent in 2 In. Min.-Max.	Elong., Per Cent in 4 In. Ave.	Elong., Per Cent in 4 In. Min.-Max.	Rating Per Cent of 150,000 Average
5	Norway	⅛	83,200	75,400 94,700	2.6	1.0 3.5	1.3	1.0 1.7	55.5
6	Parent	⅛	47,700	25,800 85,500	0.5	0.0 1.5	0.2	0.0 0.7	31.7
7	Norway	¼	59,000	49,000 66,300	6.0	4.0 7.0	3.0	2.0 3.5	39.2
8	Parent	¼	101,300	90,300 115,200	3.2	1.0 7.0	1.9	1.0 3.5	67.4
				Nickel-Chromium Steel					
9	Norway	⅛	74,400	50,200 90,500	2.0	2.0 2.0	1.0	1.0 1.0	49.5
10	Parent	⅛	83,500	40,700 129,600	0.2	0.0 1.0	0.1	0.0 0.5	55.6
11	Norway	¼	58,800	46,100 68,500	6.3	6.0 7.0	3.5	3.0 4.0	39.2
12	Parent	¼	102,200	66,100 135,500	2.5	2.0 3.0	1.2	1.0 1.5	68.0
				Nickel Steel, 3.50 Per Cent					
13	Norway	⅛	87,250	80,100 97,100	2.5	2.0 3.0	1.2	1.0 1.5	58.1
14	Parent	⅛	132,200	120,400 136,800	2.5	2.5 2.5	1.2	1.2 1.2	88.2
15	Norway	¼	69,050	50,800 95,800	4.6	3.5 6.0	2.3	1.7 3.0	46.0
16	Parent	¼	105,050	72,700 137,400	3.8	3.0 4.5	1.3	1.5 2.2	69.7

NOTE.—All breaks occurred at weld. Each average value represents four tests.

ever, and they should not be required to transmit high stresses. A breaking strength of 25,000 lb. per sq. in. would seem to be a safe allowance for welded joints, heat treated. In special cases, this might be increased to 40,000 lb. per sq. in.

Since starting this investigation a considerable amount of chromium-vanadium steel of similar composition has been welded in the shop in the manufacture of fittings, with satisfactory results, Norway iron welding wire being used. No high stresses are transmitted through welds.

Brazing and Machining

Any of the steels may be brazed by the ordinary methods. The heat of brazing would, of course, remove the effects of previous heat treatment, and the latter must therefore follow brazing. Brazing material of 80 per cent copper, 20 per cent zinc composition has a melting point between 1650 and 1750 deg. Fahr., and will withstand the temperature of heat treatment of even chromium-vanadium steel. Although in the latter case, the margin of safety is rather small, satisfactory results have been obtained for a considerable time in production with brazed chromium-vanadium fittings which require quenching at 1625 deg. Fahr. Heat treatment tends to strengthen the brazed joint. Parts are often held together by electric spot welding before being brazed. This also prevents letting go in case the brazing material softens in heat treatment. Brazed joints develop a tensile strength of about 40,000 lb. per sq. in. and are remarkably uniform. There is less tendency to damage the steel by overheating in brazing than in welding.

All the steels were found more difficult to machine than low carbon steel sheet, but could be sheared, milled, drilled, etc., with ordinary tools in the annealed state with reasonable facility. Tests made at another time on steels of similar analysis, heat treated for 125,000 to 150,000 lb. per sq. in. showed that they could be drilled and machined on milling cutter or lathe with ordinary drills or high-speed cutters, although with some difficulty.

Impact and fatigue tests, at least of a comparative nature, on these three steels would be interesting and valuable, but lack of time has prevented including them in this investigation.

Chrominum-Vanadium Steel Adopted

As the other two types of steel failed to meet the bend test and would therefore not be suitable for the fabrication of fittings of the type intended, and as chromium-vanadium steel showed excellent qualities in bending, and was also satisfactory under all the other tests applied, this steel was adopted. As stated elsewhere in this report, chromium-vanadium steel has now been used in the fabrication of aircraft fittings for about one year. Gages run from 0.035 in. to ¼ in. This material is hot rolled, and is furnished in sheets most of which are 18 in. by 72 in., straight rolled. The manufacturer believed that a carbon content of 0.30

Table No. 8—Comparison of Alloys
Welded with Norway Iron and Parent Metal
(Average of ⅛ and ¼-in. Specimens, Each Alloy)
(Data from Table 7)
Chromium-Vanadium Steel

Sheet No.	Melt Bar	Ultimate, Lb. Per Sq. In. Ave.	Ultimate, Lb. Per Sq. In. Min.-Max.	Elong., Per Cent in 2 In. Ave.	Elong., Per Cent in 2 In. Min.-Max.	Elong., Per Cent in 4 In. Ave.	Elong., Per Cent in 4 In. Min.-Max.	Rating Per Cent of 150,000
5 & 7	Norway	71,100	49,000 94,700	4.3	2.0 7.0	2.1	1.0 3.5	47.3
6 & 8	Parent	74,500	25,800 115,200	1.8	0.0 7.0	1.0	0.0 3.5	49.5
			Nickel-Chromium Steel					
9 & 11	Norway	66,600	46,100 90,500	4.1	2.0 7.0	2.2	1.0 4.0	44.3
10 & 12	Parent	94,880	40,700 135,500	1.3	0.0 3.0	0.6	0.0 1.5	61.8
			Nickel Steel, 3.50 Per Cent					
13 & 15	Norway	78,150	50,800 97,100	3.5	2.0 6.0	1.7	1.0 3.0	52.0
14 & 16	Parent	118,620	72,700 127,400	3.1	2.5 4.5	1.2	1.2 2.2	78.9

All specimens heat treated for 150,000 lb. per sq. in., as in Table No. 3.
Specimens not dressed, weld in "natural" condition.
Breaking stress figured from area of gage length adjacent to weld, therefore, represents stress in sheet at maximum load.
Approximate maximum thickness of weld given for comparison, exceeds thickness of sheets 20 to 50 per cent. Widths identical. All breaks occurred in the weld.
Practically all elongation was confined to the welds, failure having occurred below the elastic limit of the steel.

to 0.40 per cent would more easily meet the specification than the 0.25 per cent to 0.35 per cent originally called for, and at his request the higher content was allowed. This analysis (No. 6135) also met the bend test and physical tests and had the advantage of a lower critical range, which widened the margin of safety in heat treatment after brazing. It has proved satisfactory in manufacture and in service except for a few sheets which failed to harden properly in heat treatment. These were found upon examination to have a non-uniform carbon content which ran as low as 0.20 per cent and showed "ghost line" structure under the microscope. These sheets may have come from a single defective ingot, or they may have been decarburized in rolling heats or annealing.

It is understood from the manufacturer that of the three alloys discussed, the chromium-vanadium steel presents the least difficulties in manufacture, especially with regard to facility of rolling, freedom from scale and tendency to segregation in the ingot.

Prior to the adoption of chromium-vanadium steel a quantity of 3.50 per cent nickel steel and also of plain carbon-vanadium steel, both of 0.30 to 0.40 per cent carbon were tried for the fabrication of fittings. Each of these showed a tendency to split longitudinally when bent, and were therefore unsatisfactory for any but flat work, or where the bend could be made transversely to the length of the sheet or "grain." Neither cross rolling nor special annealing eliminated this tendency to split. The same difficulty has been found with plain low carbon sheet steel, cold rolled and annealed.

In another test, the two longitudinal and two transverse bend specimens, each of ¼ and ⅛-in. sheet, from this lot of chromium-vanadium steel, were heat treated to give about 175,000 lb. per sq. in. (Brinell hardness 340 to 375) and were bent through 180 deg. over a radius equal to three times their thickness. The four ¼-in. specimens showed no cracks, but one of the four ⅛-in. specimens failed on a longitudinal bend.

Similar bend tests were made on sheets of chromium-vanadium steel of 0.35 per cent carbon content, from a different manufacturer, and heat treated to develop 150,000 lb. per sq. in. These withstood a transverse bend, but failed when bent longitudinally.

Molybdenum Steel Suggested

It has been suggested that chrome-molybdenum steel might have superior qualities for the manufacture of high strength sheet steel fittings. Samples of this steel of about 1.00 per cent chromium, 0.35 per cent molybdenum and 0.30 per cent carbon have been obtained from the same manufacturer and will be given tests similar to those outlined above.

Table No. 9—Norway Iron Versus Parent Metal Weld Average—All Alloys

Melt Bar	Spems. Tested	Ultimate, Lb. Per Sq. In. Aver.	Ultimate, Lb. Per Sq. In. Min.-Max.	Elong., Per Cent in 2 In. Ave.	Elong., Per Cent in 2 In. Min.-Max.	Elong., Per Cent in 4 In. Ave.	Elong., Per Cent in 4 In. Min.	Rating Per Cent of 150,000
Norway iron	24	71,950	46,100 97,100	4.0	2.0 7.0	2.1	1.0 4.0	47.9
Parent metal	24	95,300	25,800 137,400	2.1	0.0 7.0	0.2	0.0 3.5	63.4

Ericsson and DeLamater to Be Honored

On the sixtieth anniversary of the battle of the Monitor and the Merrimac at Hampton Roads, Va., tribute will be paid in fitting ceremonies to the memories of Cornelius H. DeLamater and Capt. John Ericsson, pioneers in the development of the naval, marine and industrial interests of the nation, particularly during the Civil War. Bronze tablets will be erected on four sites of buildings in New York, with which these men were identified. The first is the Phoenix Foundry, 260 West Street, where the first iron boats in this country were built; the second, the DeLamater Iron Works, foot of West Thirteenth Street, where were built the first self-propelled torpedo, the first submarine boat and the engines for the original Monitor; third, the Continental Iron Works, Greenpoint, Brooklyn, where the hull of the Monitor was built; fourth, No. 36 Beach Street, where Captain Ericsson lived, worked and died.

The tablets will be unveiled on March 9, 1922, a dinner being held that evening. About 20 societies are behind the movement. The Government has appropriated $35,000, private individuals have subscribed a larger sum for a memorial to Captain Ericsson in Washington, and $5,000 is being raised for the tablets to be placed in New York. Affairs are in charge of the DeLamater-Ericsson Tablet Committee, 29 West Thirty-ninth Street, New York.

Table No. 10—Welded Specimens—Bend Test

(Specimens Heat Treated, Same as Tensile Specimens, Table No. 7)
(Specimens Not Dressed)

Chromium-Vanadium Steel

Thickness	⅛ In.				¼ In.			
Melt bar	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Specm. marks	5.3	5.4	6.3	6.4	7.3	7.4	8.3	8.4
Convex side	Flat	Flat	Bead	Bead	Bead	Flat	Bead	Bead
Angle to break	26.5	12	26	19.5	2.5	13.5	17	25
Condition of weld	Good	Fair	Good	Good	Fair	Seam (Flat)	Pits (Flat)	Fair

Nickel-Chromium Steel

Thickness	⅛ In.				¼ In.			
Melt bar	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Specm. marks	9 3	9.4	10.3	10.4	11.3	11.4	12.3	12.4
Convex side	Flat	Bead	Flat	Flat	Flat	Flat	Flat	Bead
Angle to break	19	30	15	32.5	8.5	5.5	12.5	6.5
Condition of weld	Seam (Flat)	Fair	Seam (Flat)	Crack (Bead)	Fair	Seam (Flat)	Crack (Bead)	Cracks

Nickel Steel, 3.50 Per Cent

Thickness	⅛ In.				¼ In.			
Melt bar	Norway Iron		Parent Metal		Norway Iron		Parent Metal	
Specm. marks	13.3	13.4	14.3	14.4	15.3	15.4	16.3	16.4
Convex side	Bead	Flat	Flat	Bead	Bead	Flat	Bead	Bead
Angle to break	51	31.5	28	51	18	21	21.5	18.5
Condition of weld	Seam (Flat)	Fair	Good	Good	Fair	Good	Seam (Flat)	Good

NOTE.—Bends made in V-block, under compression head.
"Condition of Weld"—determined by inspection of visible flaws before bending.
"Seam"—indicates defective contact in weld.
"Pits"—indicate blowholes or sponginess.
"Cracks"—indicate cracks in weld, as by local contraction.
"Angle to break"—indicates amount of bending in degrees, from flat, to produce distinct cracking.

New Line of Horizontal Boring, Drilling and Milling Machines

The Pawling & Harnischfeger Co., Milwaukee, has developed a new line of horizontal boring, drilling and milling machines, of which the 4-F machine shown in the accompanying illustration is the smallest size. It is designed for very heavy milling and large boring operations.

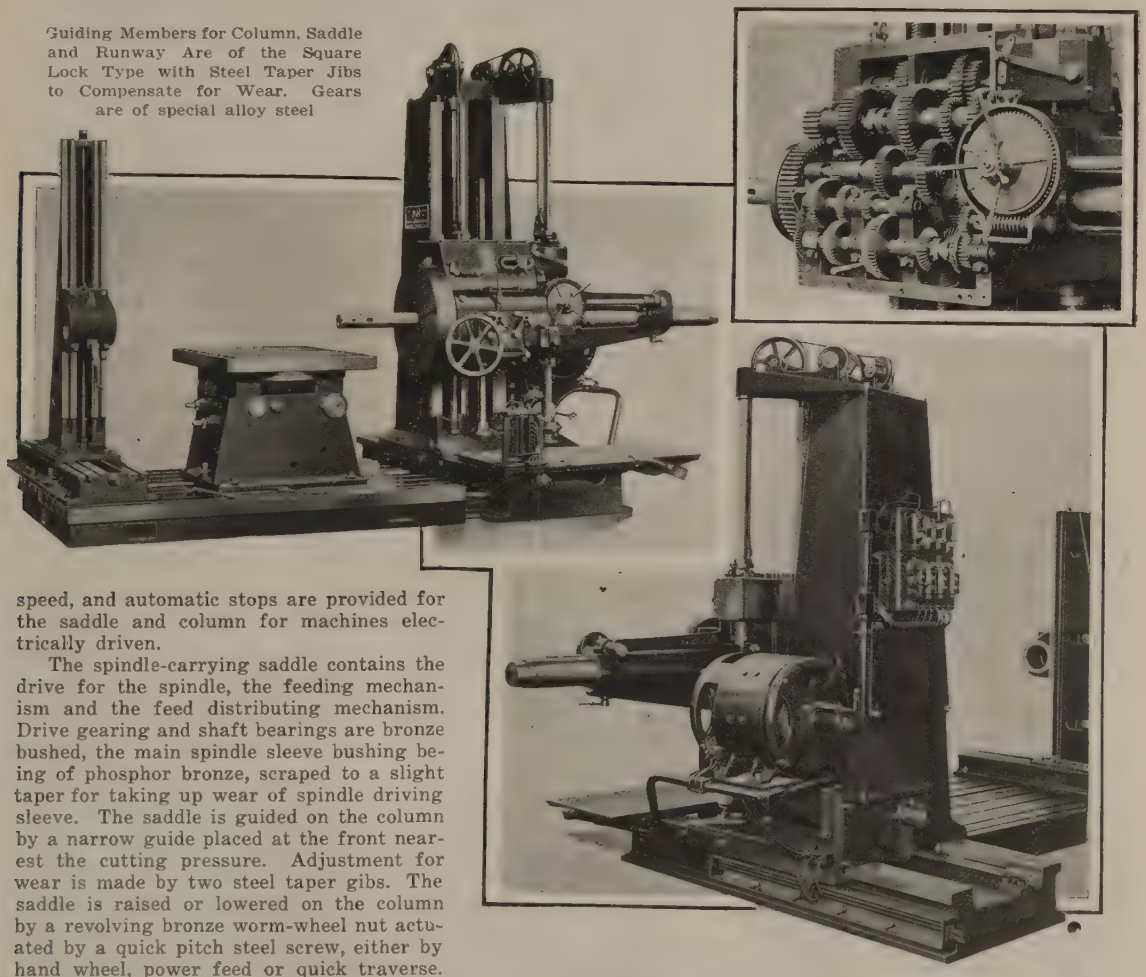
Among the features may be mentioned narrow guiding surfaces; feed screws in tension; sliding parts with take-up for wear; saddle counterbalanced with counterweight inside the column; and centralized control. Milling feeds are actuated through quick pitch worm and bronze worm wheels, revolving on quick pitch screws in tension. Externally- and internally-driven face plates are interchangeable. Back gears are close to the spindle, making all drive shafts high speed, and automatic stops are provided for the saddle and column for machines electrically driven.

The machine is driven by motor, constant or variable speed, or by belt. The motor required is 10 hp. and is mounted at the base as shown in the illustration. The machine is double back geared and by three levers 18 spindle speeds, reversible, are obtained. The spindle speeds are in geometrical progression and range from 5½ to 200 r.p.m.

The boring and drilling feeds to spindle are 8 in number, reversible, and range from 0.0076 to 0.45 in. per revolution of the spindle. There are 8 milling feeds to the column and saddle, which are reversible and range from 0.009 to 0.54 in. These feeds are direct from the spindle, back geared and in geometrical progression with no idle gears in mesh. Feed gears and shafts are of alloy steel. Rapid power traverse independent of feeds is transmitted to the saddle and column at a constant speed of 60 in. per min.

Operating controls are within easy reach from the platform attached to the column. Levers are interlocking, it being impossible to have any two conflicting speeds or feeds in action at the same time. The outer support is regularly made with 48 in. vertical and 48 in. horizontal traverse. Graduated steel scales for the main column and saddle, and for the outer support saddle and column are furnished reading to 1/1000 in. by use of the Verniers.

Guiding Members for Column, Saddle and Runway Are of the Square Lock Type with Steel Taper Jibs to Compensate for Wear. Gears are of special alloy steel



The saddle-carrying saddle contains the drive for the spindle, the feeding mechanism and the feed distributing mechanism. Drive gearing and shaft bearings are bronze bushed, the main spindle sleeve bushing being of phosphor bronze, scraped to a slight taper for taking up wear of spindle driving sleeve. The saddle is guided on the column by a narrow guide placed at the front nearest the cutting pressure. Adjustment for wear is made by two steel taper gibs. The saddle is raised or lowered on the column by a revolving bronze worm-wheel nut actuated by a quick pitch steel screw, either by hand wheel, power feed or quick traverse.

The column is of box construction with two sides straight and two tapering to a long, wide base cast integral with it. The screw for feeding is in tension and is placed near the guide. The column can be traversed in either direction by hand wheel, power feed or rapid traverse from the saddle. The runway for the column is wide and heavy. All guiding members for the column, saddle and runway are of the square lock type with steel taper gibs for compensating wear.

The spindle is an alloy steel forging ground to a sliding fit in its driving sleeve. Power is applied at the front end and the feed at the rear through a rack and pinion, the drive being through a small face plate with a coarse pitch gear or a larger face plate with internal gear. These face plates have slots and tapped holes for the attachment of milling cutters and facing heads. The spindle-driving sleeve is of semi-steel, ground to a taper fit and is provided with adjustable bronze taper shoes for taking up wear.

Screw chasing attachments can be furnished for from 2 to 16 threads per in. and for any length within the capacity of the machine. Universal tilting and revolving table or a plain revolving table, with movement by hand or power, can be furnished.

The general specifications include: Diameter of spindle, 4 in.; taper hole in spindle, No. 6 Morse; feed of spindle, 36 in., and vertical travel of spindle saddle, 48 in. The horizontal travel of the column is 48 in. The height of the spindle from 9-in. bed plate ranges from 73½ in. maximum to 25½ in. minimum.

Special Features of Blast Furnace Plant

Gas Burners Under Boilers Supplemented by Auxiliary Coal—Single Venturi Blast Regulating Device—Complete Water System Includes Many Safety Provisions

AMONG the auxiliary features of the new blast furnace plant of the Trumbull-Cliffs Furnace Co., Warren, Ohio, described at page 673 of THE IRON AGE last week, the methods of firing the boilers, of regulating the blast and of handling the water are of outstanding importance. The following paragraphs cover briefly these items.

Method of Firing the Boilers

There is provided 4000 hp. in five units of 800-hp. class "M" Stirling four-pass boilers, built for 231-lb. pressure and 125 deg. superheat. All boilers are gas fired, each being equipped with four improved 14-in. Birkholz-Terbeck burners, placed at the rear of the boiler under the mud drum. The mud drum is set at an elevation of 10 ft., to provide a large distinct gas combustion chamber. The burners are arranged for removal of cone for cleaning.

Control of gas at the burners is by means of butterfly valves on the individual legs to each burner, and gas is shut off by one large gate valve in the main leading from the large boiler house gas main. In addition, this main can be filled with water to form a water seal valve, thus safely isolating any particular boiler when it is to be entered for cleaning or repairs. The boiler house gas main itself is outside of the building at yard level; dust removed from it is washed through a concrete trench direct to the sewer. The main has an auxiliary bleeder at its end, as has also the stove gas main.

All five boilers have provision for auxiliary coal firing, being equipped with Marion shaking grates. Coal is brought into the boiler house by means of a track hopper which discharges onto a Jeffrey belt conveyor. This conveyor was used in the construction work for handling brick, and has been re-installed at the boiler house to eliminate the large amount of hand labor usually employed in unloading coal. This Jeffrey belt in turn discharges to a Weller Manufacturing Co. shuttle conveyor which runs along inside of the boiler house, by means of which coal can be discharged to any point along the boiler house floor.

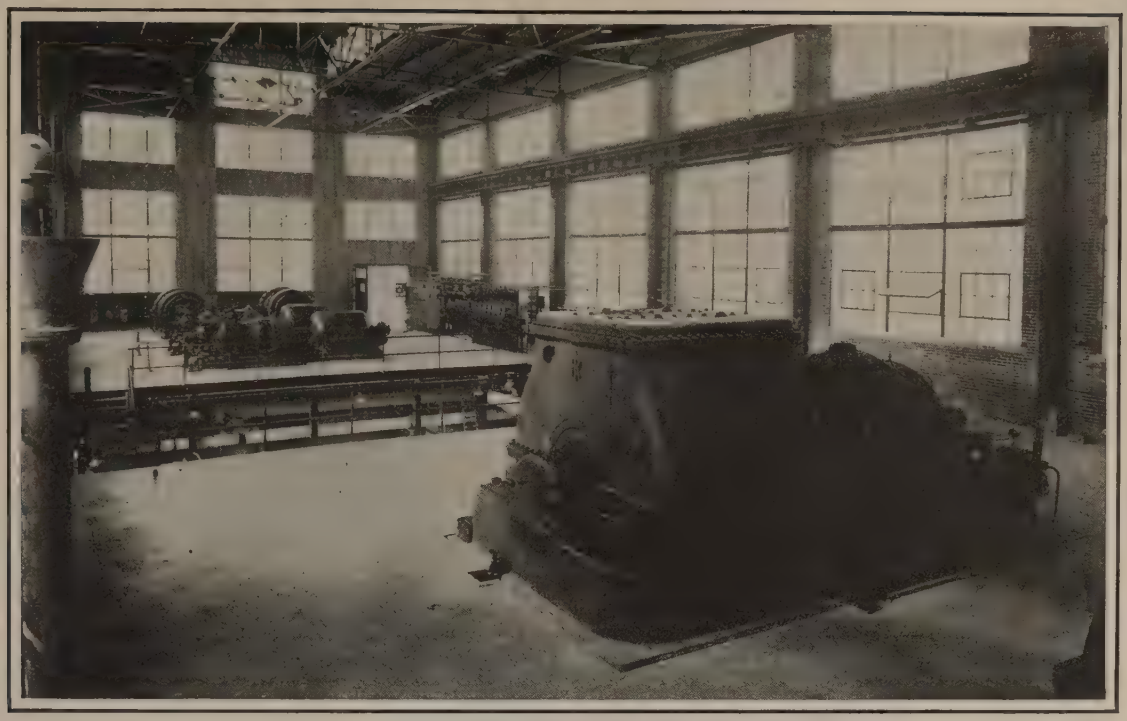
There are ash hoppers attached to the ash pits of each boiler. These hoppers are provided with gates at such elevation in the boiler house basement that a large truck can run beneath, on a concrete runway from yard elevation down into the basement floor of the boiler house. Ashes will thus be dumped direct from these hoppers into an auto truck, and used for fill on the property.

The boilers are substantially built, with particular reference to resisting gas explosions, and the fronts are so constructed that, by addition of a Dutch oven, any standard type of stoker can be placed in them, in the event either of expansion of the plant or desire to generate additional electric power with the existing units. The boilers are placed singly, right and left settings, with 6-ft. aisles.

The Blast and Its Regulation

Two Ingersoll-Rand turbo blowers comprise the blowing equipment. The air blower has five stages

Each of the Five 800-Hp. Boilers Has Four 14-In. Gas Burners, Placed at the Rear, Under the Mud Drum



Possibility of Considerable Future Expansion Is the Predominant Characteristic of This View in the Power House. The turbo-blower is in the foreground. Turbo-generator and motor-generator sets appear in the background, with the switchboard against the right wall. The excellent lighting is evident

and the steam turbine seven. These blowers have a nominal capacity of 45,000 cu. ft. of air per min. at 30 lb. pressure, and will blow 55,000 cu. ft. of air per min. at 22 lb. pressure. The turbines are of new Ingersoll-Rand design, having but two steam admission valves, one for normal load and one for overload.

The regulating device is also of an improved type, consisting of a single venturi instead of the old type of triple venturi. The single venturi is not so sensitively affected by leaks in the intake line, nor by dust or dirt in the air. There is a separate air intake for each blower, which is led up to a considerable distance above the power house roof. Recording gages are provided on each intake to record the amount and regularity of blast volume blown.

Safeguards Feature the Water Supply

The water system of the plant deserves particular mention, as considerable economy is effected in the use of water, at the same time retaining the very desirable element of simplicity of circulation, and furthermore obtaining the possibility of using different sources of water at many points, in the event of failure of any particular source.

Considerable space was saved at the river pump house, which is of novel design, consequently eliminating much concrete and excavation work. The suction well for the pump is inside the pump house, water being led from the pool outside into the tunnel through two 72-in. Link-Belt vertical traveling refuse screens. These are fitted with ⅜-in. screens and driven by 5-hp. motors.

In the pump house are installed three 12-in. 6000-gal. 115-ft. head Worthington pumps, motor driven. Two of these pumps, operating, deliver water to the turbo blower and to the turbo generator condensers. Tail water from the condensers is led by a weir to a sump running lengthwise of the pump basement. From this sump the three 4500-gal. Worthington service pumps, two operating, draw their supply and pump through a 20-ft. by 120-ft. standpipe located between the power and boiler houses.

This standpipe in turn delivers water to the blast furnace, cast house, hot blast stoves, cinder pit, gas washer, pig casting machine and water purifying plant, together with all other miscellaneous uses. The flexibility of this system lies in the fact that the lines are so arranged that, if desired, the standpipe can be by-passed altogether, or it can be used simply as a floater on the service line, no water being actually pumped through it.

Safety provisions are adequately taken care of by connecting the line, that leads from the river pumps to the condensers, to the service water line into which the power house service pumps discharge. In the event of these pumps for any reason being out of commission, the river pumps have sufficient head to keep water on the blast furnace bosh, stoves and water seals and to supply water to the feed water treating plant, thus assuring a supply of water that will prevent damage or serious accident. A further safety provision is afforded in having this same by-pass line from the river pumps discharge, if desired, into the sump from which the basement service pumps draw their supply. This may be found useful in case the condensers have to be taken off.

A further safety provision is found in an ingenious method of returning the bosh water. The overflow water from the furnace is all conserved, and led by a separate pipe line back to a cistern at the extreme end of the basement sump. As long as the level of water in this sump is kept up to the mark by the water coming from the condenser tail water pits, then the return water from the furnace overflows into the sewer and back into the river. However, if the amount of water coming through the condensers and thence to the sump should for any reason be deficient, then the return water from the blast furnace runs into the sump, from which the service pumps pull their supply. Under normal conditions of operation there is about a 40 per cent surplus of condenser tail water going into the sump, over and above the amount of water required at the plant exclusive of condensers.

To safeguard still further the plant supply of water, the lines of the standpipe are equipped with check valves, which will prevent the standpipe from emptying in the event of a break in the line. A final safeguard at the furnace is the provision of check valves in the two distinct water supply lines leading to the circle pipe. Between the circle pipe and these check valves is connected a line from the Worthington high-pressure pump. Inasmuch as this is normally continually kept floating on the high pressure line, the furnace bronze can be preserved in the event of failure of lines or service pumps by opening up the line admitting high-

pressure water to the circle pipe, the check valve preventing escape of this water back into the main service water line.

This high-pressure water is similarly piped up to the stove fittings and to the main isolating water seal valve; in an emergency the high-pressure pump can draw its supply of water from the standpipe which, in the event of a very bad accident or breakdown at the pumps or lines, would still remain full of water. It will be seen that the plant is assured of a supply of water that will last almost indefinitely in an emergency, by virtue of the provisions for re-circulation of water.

The boiler feed pumps similarly have a triple source of supply. Normally they take from the feed water heater. In emergency they also draw from the basement sump, from the blast furnace service water lines or from the line leading from the river pumps to the condensers. The turbines similarly draw on two sources for their supply of cooling water, i.e., the service water supply line and the condenser water supply line.

In addition to the Link-Belt traveling screens at the river pump house, the lines are further provided with Elliott twin basket strainers at both of the supply lines to the furnace circle pipe and to the stoves, and also at the line leading to the gas washer. The boiler feed line, the gas washer line and the furnace supply water line are fitted with veuturi meters. A tank is provided at the machine shop to which treated water is pumped from the power house basement for the use of the yard locomotives.

Machine for Assembling and Dismantling Hose

A machine for use in railroad shops in the dismantling and assembling of air-brake, signal and steam hose has been developed recently by the Covington Machine Co., Covington, Va. It is claimed that it will do its work without damage to fittings and without straining or cracking of clamps, besides effecting large savings in labor cost over the usual hand method. It is stated that on a test run, one man dismantled 100 air hose in one hour and assembled 25 air hose ready for service in the same length of time.

The Tools Shown Comprise the Full Equipment for the Complete Range of Work

The entire equipment of tools for the performance of the complete range of work is shown in the illustration. The change from one operation to another is said to be effected in less than 2 min. Air and signal hose are handled by the same tools except the nipple puller which can be put in place in 10 sec. when wanted. Other changes are quickly and easily made. Hose in any condition can be dismantled, even if cut off close up to the fitting. In assembling fittings into new hose injury cannot result as the hose is held rigid without clamping.

Drier Air for Blast Furnaces*

Investigations have shown that the moisture content in air at an altitude of 100 ft. above ground level is about 20 per cent lower than at the ground level, both measurements being made in the neighborhood of a blast furnace. This led to an inquiry as to whether such a difference is universal, or due to specific conditions surrounding a blast furnace.

Further investigation has indicated that a difference of moisture content as high as that observed in the present instance was by no means universal, and was probably due chiefly to the fact that air, even at an elevation of 100 ft. above the ground, in the neighborhood of a blast-furnace plant is very much colder than at the lowermost level. This is ascribed to the tremendous amounts of heat delivered to the air from blast-furnace or rolling-mill plants.

In fact, it is stated that, roughly, each 100 sq. ft. of the area of a blast-furnace plant is heated daily by 60 lb. of coke or coal, in addition to which there is a very large amount of water discharged every minute in the various cooling and washing devices. This leads to the conclusion that, to obtain as dry air as possible it is of advantage to take it from a high elevation.

To meet these conditions, the blowing-engine house at the Rombach mills, when reconstructed, in 1912, was arranged with the suction orifices of all the eight gas-driven blowing engines in a common suction tower 138 ft. high. After the new blower unit was completed, in 1915, fifty-three measurements were carried out, with the result that it was found that air taken through the top of the tower contained, on an average, 12 per cent less moisture than air at the ground level.

In this connection it was found that, when the wind came from the east and northeast, there was a rapid increase in the moisture content in air coming through the suction tower. This is explained by the fact that, at the distance of some 165 ft. from the tower, was a tall stack discharging the exhaust of all the engines driving the blowers. It was evidently the vapor from this exhaust that increased the moisture content in the air.

*From a paper by J. Bronn, in *Stahl und Eisen*, June 16.

Would Abolish Railway Labor Board

Iron and steel makers in the Pittsburgh and Youngstown districts are interested in the attitude of John G. Cooper of the Nineteenth Ohio district, who states that he will institute efforts in the forthcoming session of Congress to abolish the Railway Labor Board through amendment of the Esch-Cummins law. Mr. Cooper has been in consultation with a number of independent steel makers in the Mahoning Valley on the subject.

"The Railway Labor Board is not answering the purposes for which it was created and I am convinced that its abolishment will help to bring the railroad managements and their operating forces closer together," he states. "The time has come when the Government should, as far as possible, keep hands off all legitimate business. Many, looking into the future, realize that too much paternalism in Government is a real menace."

Fewer Accidents in Iron Mines

Reports received by the United States Bureau of Mines from operators of iron mines throughout the country show that accidents in the year 1920 resulted in 106 deaths and 9072 non-fatal injuries. The figures represent decreases of 33 fatal and 26 non-fatal accidents as compared with the previous year. The iron mining industry employed 45,990 men, who worked 13,574,788 shifts, which is practically the same as for 1919. Each employee averaged 295 working days, as compared with 292 the year before.

France Seeks Export Markets for Ore

Autumn Meeting of the Iron and Steel Institute at Paris —Developments in British Basic Iron Will Reduce Iron Ore Imports—Sir Hugh Bell on Politics and Trade

(*Special Correspondence*)

PARIS, FRANCE, Sept. 5.—The autumn meeting of the Iron and Steel Institute, of which the first session opened this morning in the hall of the Comité des Forges de France, will be remembered as notable in many ways. Not only is it the first foreign meeting since that held in Brussels in 1913, but the war which has intervened has changed the whole aspect of the iron and steel industry in Europe, and some indications of the nature of these changes were given in the papers and discussions.

War Questions Uppermost

Another feature which must have struck the thoughtful observer is one which previous meetings have not served to bring to the notice of the average member. This is the extent to which the doings and sayings of great industrialists, such as those at the head of the Iron and Steel Institute and the Comité des Forges de France, affect and are affected by the policies of the nations they represent. The prosperity of all modern civilization depends ultimately on the prosperity of industry, but it is a wise convention that bars political questions from what are intended to be purely technical discussions. Happily, the element of politics did not on this occasion threaten the harmony of the proceedings, although there were times when it was felt that the speakers were skating over very thin ice. Matters such as those which were hinted at and so skillfully avoided are much better discussed privately by those whose knowledge and influence may make discussion fruitful. And when the questions at issue are involved in questions of national policies on which there may be strong divergences in fundamental principles it is perhaps better to postpone discussion altogether until national policies are in better accord. This seems to have been the feeling of the meeting, and the discussions were very diplomatically confined to questions of technical interest.

In the absence through ill health of the president, Dr. J. E. Stead, to whom a telegram was sent conveying the good wishes of the meeting, the chair was taken by Sir Hugh Bell. An address of welcome was delivered by François de Wendel, president of the Comité, who urged the visitors to study the political conditions of his country during their short stay, so as to try to understand the French mentality in regard to post-war problems. He referred to the devastation of the French industrial establishments and pointed out that the "reparations," so far as they had been carried out, had all been made with French money. After stating the strong conviction of France as to Germany's longing for revenge, he said that the friendship of England and France was the best guarantee for the peace of the world.

Comment by Sir Hugh Bell

Sir Hugh Bell, acknowledging the address of welcome on behalf of the institute, recalled a conversation with the grandfather of the last speaker in 1869, prophetic of the Franco-Prussian war, and also his long-standing relations with the Schneider family. Referring to the disastrous seven years which have elapsed since the postponed meeting in France of 1914, he said it rested with ourselves to repair the disasters of the whole world. He agreed with M. de Wendel that we should face facts, although he deprecated political contentions and thought divergences of opinion were inevitable. He looked for a change of spirit. There was nothing wanting on the British side to make for France a situation as favorable as possible for reconstruction. His hope was that the eyes of Germany were opened and that her people now believe that of all the bad ways of gaining commerce war is the worst. Sir Hugh dealt very sympathetically with the injuries of France, indicating that the surest means of recovery lay, not in regarding the possibility of further German aggression, but rather in striving to re-establish international commerce on a sound basis.

Sir Hugh Bell then drew attention to the presence at the council table of Prof. Henry le Chatelier, observing that he had met his father in 1859. On behalf of the council and members he congratulated the professor on the fact that he was about to celebrate his jubilee. After acknowledgments from the professor, Sir Hugh presented the Bessemer medal to M. Charles Frémont.

Iron Ore Deposits of Eastern and Western France

THE paper with the above title by Prof. Paul-René Nicou, of Paris, gives an excellent account of France's iron ore resources and contains suggestions of the desirability of developing a strong export trade to Great Britain. The following is a fairly full abstract:

Britain's Need of Foreign Ores

Many changes have taken place in the relative situations of European iron-making countries within the period comprised between 1914 and 1921. One feature, however, remains the same, and that is the need of Great Britain for foreign ores. These ores she has sought in regions widely distributed, and in these regions she must remain vitally interested in order to ascertain whence and under what conditions she can best obtain the ores required for her blast furnaces.

A fairly considerable import trade in French ores into England had already sprung up before the war, from such ore fields as were adjacent to harbors, such as those of Normandy, Brittany and Anjou, for which Caen and St. Nazaire competed with each other. The ores of Algeria and Tunis, whose purity rendered them specially suitable for the manufacture of high-grade pig iron, were likewise arousing interest, as well as those of Lorraine, among which were the richer of the Briey ores, which had already reached those regions of the United Kingdom more particulaly engaged in the manufacture of phosphoric pig iron.

During the war the eastern ore fields of France were unable to be of any assistance to British metal-

lurgy, having been occupied, from the outset, by the German army, and it was not until after the armistice that the enemy evacuated this district. On the other hand the Algerian, Tunisian, Normandy, Anjou and Brittany ore deposits supplied British works, if not with very large quantities, to as great an amount as the exigencies of war permitted. Numerous colliers, laden with the coal necessary to French industry, returned with the ore cargoes of which the United Kingdom was in pressing need.

Now that circumstances have altered and that France, as the result of the recovery of Alsace-Lorraine, has become, of all the continental nations, the possessor of the largest iron ore resources, it is not surprising that British metallurgists should look once again to France as a source of supply, and that the relations which existed before and during the war should display a tendency to become closer and closer, to the great mutual benefit of both nations.

Production of French Iron Ore

To begin with, it may be of interest to compare present day production with the pre-war production, and briefly to sum up the whole situation in regard to the production of iron ore in France. Recourse will be had, for this purpose, to statistics collected by the Department of Mines. The figures for 1920 are provisional only. In 1913, the latest year for which statistics are not affected by the outbreak of the war, the total production of iron ore in France amounted to 21,917,870 tons, distributed as follows:

	Tons
Lorraine (Meurthe-et-Moselle)	19,978,937
Normandy	812,984
Anjou and Brittany	399,926
Pyrenees	370,347
Other districts	355,676

The overwhelming proportion contributed by Lorraine is clearly shown by the foregoing figures. It amounted to 91 per cent. To the total just given, in order to compare the outputs for 1919 and 1920, must be added the output of ore fields of recovered Lorraine, which produced 21,136,265, making a grand total of 43,054,135 tons, produced from districts now wholly French. Of this total the Lorraine deposits produced 95.5 per cent.

Compared with this total, the 1919 and 1920 figures show an enormous falling off. Those for 1919 were only 9,429,789 tons and those for 1920, 13,871,187 tons, and whereas the 1913 production of iron ore from deposits in Lorraine was 41 millions of tons, the 1919 and 1920 figures are only 8,634,526 and 13,072,419 tons respectively. The almost complete destruction of the mines and iron works of Meurthe-et-Moselle, systematically carried out by the Germans, is the chief cause of this falling off. The production of the rich calcareous ores of the Briey field, which in 1913 were mined to the extent of 15,103,849 tons, had fallen in 1919 to 645,245 tons, but recovered considerably in 1920, in which year it reached 3,466,619 tons. The Longwy ore field suffered similarly, and the output fell from 2,958,-167 tons in 1913 to 189,853 tons and 714,610 tons respectively in 1919 and 1920. In other words, these two ore fields, whose production in 1913 was 18,062,-016 tons, did not produce one million tons in 1919 and barely exceeded four million tons in 1920.

Other French ore fields were similarly affected, although for different reasons. Their production was pushed to a maximum during the war, as they were the only productive ore regions in France outside the German occupation. They therefore enjoyed the advantages of a huge demand, and an influx of enormously increased labor recruited from miners brought from the occupied coal and iron districts, from Moors and Kabyles brought from northern Africa, and from prisoners of war. From the time of the armistice these sources of labor have been almost completely withdrawn.

The metallurgical crisis that took place directly after the armistice owing to the lack of fuel in France similarly served to reduce the orders from home works, and even if some ore fields escaped lightly, others were seriously affected, as the following figures will show:

Ore Output in Other Regions, 1918-1920

	1918	1919	1920
Normandy	812,984	322,929	357,200
Anjou	399,926	52,211	119,984
Pyrenees	370,347	357,095	213,782
Other localities	355,676	63,028	107,802
Totals	1,938,933	795,263	798,768

Reduced demand for ore for export also helped to reduce production. It should, however, be noted that the proportional decrease in these districts, as compared with that of the whole of France, is 56 to 66. It should also be pointed out that the falling off in production of iron ore was not confined to the Lorraine portion of the eastern deposits. The Luxemburg output in 1913 was 7,333,372 tons, whereas in 1919 it was but 3,112,472 tons, and in 1920, 3,704,390 tons, or, taking the latter year as an example, only 50 per cent of the 1913 production.

Transportation of Lorraine Ores

Although the iron ores of Lorraine, the export of which across channel only commenced in 1912 with 28,014 tons (which rose in 1913 to 69,224 tons), have been a much shorter time on the British market than those of Normandy and Brittany, they are destined, sooner or later, very largely to be laid under contribution by British iron makers. The ores of this field are doubtless less favorably situated, from the point of view of transport, than those of Normandy, Anjou and Brittany, seeing that Homécourt, the northern extremity of the ore field, or, at any rate, of the export area proper, is 400 kilometers by rail from the port of Dunkirk, and that it is not yet feasible to make use of any waterway which might afford cheaper means of transport. The project of a north-eastern canal which should link up the Longwy metallurgical region with the Ardnnes and be in communication with existing waterways, thus improving considerably the local conditions, has been discussed over and over again; but the heavy cost which, in existing circumstances, such a project would entail must render its realization a matter of time. Meanwhile the Lorraine ore field will have to rest content with existing means of transport, if cargoes are to be exported from a French port. The canalization of the Moselle, a project often discussed before the war, which would allow of the transport of the Briey ores to Thionville, whence they could be sent, along the Rhine, to Rotterdam, seems likewise one of only distant realization. In these circumstances the low percentage of the Briey ores is an obstacle, in these days of heavy freight charges, consequent of post-war conditions, to any extensive export trade with Great Britain. It could only be on a lowering of these transport costs, and in combination with a return trade in metallurgical coke for use in Lorraine blast furnaces, that such a trade could have any chance of early development. Its importance is, however, so considerable that many minds have been occupied with its solution.

It has already been pointed out that only the richer ores of the Briey field could constitute the material for an export trade to Great Britain. The situation may be said to resemble very closely that of the Westphalian and Belgian blast furnaces, for which the question of railroad transport becomes increasingly important, and for which therefore it is sought to secure increasingly high percentages of iron in the ores transported.

The author has hitherto spoken only of Dunkirk as the French port of embarkation. This does not mean that no others are available. Calais might be a factor in the solution of the problem, while in Belgium, where the economics of railroad administration receive rather more attention that they do in France, the ports of Bruges, Ghent and Antwerp might well enter into consideration.

Ores Best Suited for Export

The ores suitable for export to a considerable distance belong to the great metalliferous formation which was discovered on French territory, extends into Luxemburg, and is found, owing to faulting, in Bel-

gium as well. The production of this vast ore field constituted, before the war, 28 per cent of the whole world output of iron ore, and was exceeded only by one other deposit, that of Lake Superior region in the United States, the ores of which were, however, only richer by 1 or 2 per cent of iron than the Briey ores.

The French portion of the deposit, now that Lorraine has been completely recovered, is by far the more important, seeing that in 1913 it yielded 41 millions of tons as against 6½ millions in Luxemburg and some tens of thousands of tons in Belgium. The increase in the production was most marked in the portions of the field most recently opened up, that is in the Briey basin. This basin had by 1913 reached a production of 15,103,849 tons out of a total of 20 millions from the whole of French Lorraine, or over 75 per cent.

Before its discovery and opening up the iron works of Lorraine had to add to their siliceous ores lean, chalky ores, or even lime, from other regions. They have since been able to use these rich limey Briey ores, thus increasing the iron content of their burden and diminishing their coke consumption. Hence they have been able to compete at far lower prices and under far more favorable conditions, with other countries.

The Older French Lorraine Field

The older French Lorraine ore field extends over 168,910 acres, and is divided into 114 concessions, which, from the standpoint of French mining law, comprises all that is actually workable. There are still thousands of acres which might form concessions either to the north, in the siliceous ore field of Crusnes, or to the south, around Nancy and the Forest of Haye. The entire surface may be estimated at 178,000 to 186,000 acres of workable ore as against 106,260 acres in recovered Lorraine, 8890 acres in Luxemburg, and a few hundreds of acres in Belgium. Of the total, two-thirds belonged to France even before the war, and France now possesses 97 per cent of the entire area.

After dealing briefly with the geology of these ore fields, the author states that the ore is a hydrated oolithic hæmatite formed of a number of small grains consisting of concentric layers, varying from microscopic dimensions to the size of a grain of millet seed. The filling between the grains may be calcareous or siliceous and the oolitic particles are much higher in iron than the cement, containing up to 50 per cent of iron in carefully separated portions. The color varies from light yellow to gray and from red to green or dull blue.

The characteristic feature of the ore is the phosphorus content, which for many years prevented its employment. This feature now constitutes one of its greatest advantages. The proportion of iron phosphide is, throughout the whole formation, practically uniform, and only varies between 1.7 and 1.9 per cent. It is therefore entirely unnecessary to estimate the phosphorus in works using the ore, or in the resulting pig iron which, as compared with other ores, such, for example, as Swedish, is a great advantage.

The iron content of the ore rarely exceeds, in ore dried at 110 deg. C., 42 per cent, and is generally between 32 and 40 per cent, in the seams mostly worked. It often falls to 30 per cent, or even 25 per cent in certain ferruginous chalk used as fluxes. In the Briey district the ore usually runs between 36 and 40 per cent of iron. As an exception there has been found, in a particular mine in the Landres field, a kind of coarse lenticular bed 60 centimeters in thickness, formed of a black ore resembling magnetite, this deposit occurring in the middle of the gray bed. The percentage of iron has exceeded 60.

The ordinary ore contains so much moisture and carbonic acid that it loses from 8 to 12 per cent of its weight on drying at 100 deg. C., and 14 to 24 per cent on roasting at a dull red heat. Attempts have been made to profit by these properties and to roast some of the ores intended for distant transport so as to avoid carrying a useless load over considerable distances. It would be easy thus to obtain from the Briey basin ores containing over 45 per cent of iron and sometimes reaching 50 per cent, but the resulting product readily falls into powder as the result of handling and is likewise highly hygroscopic. Hence these attempts had speedily to be abandoned, and at present the ores of Briey and of other Lorraine ore fields are used entirely in the raw state.

The Nancy Ores

The Nancy ore is usually highly silicious, containing from 12 to 16 per cent of silica as against 6 to 9 per cent of lime. In some localities it becomes calcareous and contains 14 per cent of lime and 10 per cent of silica, as in the Forest of Haye deposits. The iron ore percentages are usually low, being about 32 to 34, and rarely exceeding 35 per cent. From the point of view of iron ore resources the Nancy basin, including areas beneath the Forest of Haye not yet conceded, would appear to contain 200 millions of tons of workable ore. It was the only ore field which, during the war, remained available, being beyond enemy occupation. Output was naturally greatly reduced, as only French works were deriving their supplies from the ore field, and foreign works such as those of Belgium and in the Sarre, which were ordinarily customers, and the greater part of the works in the north of France, and connected with the ore field by waterways, found themselves completely isolated. The production of the Nancy ore field since 1907 has been as follows:

	Tons		Tons
1907	1,942,000	1914	1,030,000
1908	1,963,000	1915	118,000
1909	1,959,000	1916	697,000
1910	2,091,000	1917	846,000
1911	2,041,000	1918	527,000
1912	1,974,000	1919	669,000
1913	1,917,000	1920	816,000

Briey a New Field

The Briey ore field has only fairly recently been opened up and the three subdivisions of Landres, Orne and Tucquegnieux were fully outlined by 1902. The Orne ore field, the oldest known and worked, is situated to the south of the Avril fault. Shafts were opened in the following order: Homécourt (Fond de la Noue), 1897; Joeuf, 1896; Auboué, 1900; Moutiers, 1901; Jarny, 1909; Droitaumont, 1910; Valleroy, 1910, and Giraumont, 1914. The output of the Orne ore field in 1913 constituted 43.2 per cent of the whole output of the Briey region. It has diminished considerably since the war, the Germans having allowed several of the mines to become flooded, or having rendered them unworkable, which has necessitated, since the armistice, heavy repair work, besides which the bad mining methods followed by the German engineers have here, as elsewhere, greatly jeopardized the future methods of mining these deposits.

In the Landres ore field the gray seam, the only one workable, compensates greatly for the absence of the others. It varies in thickness from 5 to 9 meters, except in the west, where it falls, at Dommary, to 4 meters, and eventually pinches out. Throughout the Landres region the iron and lime in the ore, as dried at 110 deg. C., is always in the vicinity of 50 per cent, and varies but little from this proportion. During hostilities the Landres mines, such as those at La Mourière, Joudreville, and Landres itself, were worked by the Germans occupying the region under conditions no better than those of the Orne iron mines.

The Tucquegnieux ore field, which forms the third subdivision of the Briey basin, extends to the east of the Bonvillers, Norroy, and Audun-le-Roman faults, and to the mouth of the Avril fault which marks its southern boundary. Four pits are working, at Sancy, Tucquegnieux, St. Pierremont, and Anderny. They were opened successively in 1904, 1906, 1909 and 1910. The gray seam predominates and its thickness reaches 6 to 7 meters. The ore is fairly high in iron, particularly in the environs of Mairy, and has a markedly calcareous gangue.

Five Billion Tons in French Lorraine

After giving details of the deposits at Longwy, Crusnes, and the ore fields of recovered Lorraine, the author summarizes the resources of the French Lorraine deposits. He states that if all the ore fields be

taken into account it may be estimated that the ore resources of the Nancy field amount to 200 million tons; those of Longwy to 275 millions; those of Briey to 2000 millions, and those of Crusnes to 500 millions. To this estimate must be added the 1750 millions of tons attributed by Mr. Kohlmann in 1913, which gives nearly 5000 millions as the total iron ore reserves of French Lorraine. The ores of recovered Lorraine are obviously lower in grade, and not worth the long journeys required before they could be delivered to British centers. From this point of view it is only the Briey ores which need more detailed discussion.

In order to obtain, under the most favorable conditions, a uniform average composition, many of the mines of Briey have built huge bunkers into which are delivered throughout the day the ores derived from various working places, and where what may be termed automatic mixing takes place, with the result that the lower portions, on leaving the bunkers, yield extremely uniform results. The bunkers at Landres and at Sancy, for example, have a capacity respectively of 16,000 and 12,000 tons. Another factor which contributes to the uniformity of the outputs of any given mine is the degree to which the workings have extended, so that the bunkers receive ore from widely different working places in the same mine. It is thus easier to ascertain the average composition of the output of a mine which has been well opened out and is being fully worked than that of a new mine which has just begun working. In these circumstances it may be said, broadly, that the Briey ores of the gray seam, the only one hitherto worked, yield, on a sample dried at 110 deg. C., 36 to 42 per cent of iron, 9 to 14 per cent of lime, and 4 to 7 per cent of silica, the average moisture of the undried ore being 8 to 11 per cent.

The ratio of phosphorus to iron varies within exceedingly narrow limits, and corresponds exactly with that required in the manufacture of basic pig iron. It should also be noted that the sum of the iron and the lime content of the Briey ore amounts very regularly to 50 per cent.

These ores require less coke in blast furnace working than their low iron content would lead it to be assumed. A mixture of the Briey ores with the ordinary silicious ores of Lorraine leads in practice to a consumption of coke varying from 950 to 1050 kg. per ton of pig iron (19½ to 20½ cwt.). This easy reducibility is a property of no mean value.

Export Ores of Normandy, Anjou and Brittany

The iron ores of Normandy, Anjou, Maine and Brittany are, from many points of view, and particularly from their geographical situation, the most suitable of all the French deposits for British iron works. All the mines are in close proximity to the sea. Those of Segré, in the Anjou ore field, the farthest from ports of embarkation, are only 85 and 135 kilometers distant by rail from Nantes and St. Nazaire respectively, while the Ferrière and Halouze mines, the farthest south of the Normandy mines actually in operation, are within 75 and 80 kilometers of Caen.

The freight question is likewise favorable. The whole of western France normally looks for its coal requirements to foreign countries and, because of its proximity therewith, more especially to Great Britain, while the colliers can count on return cargoes of iron ore, a factor which must exert its influence on the freights each way. Taking the pre-war year 1912, when things were normal, and conditions of the kind to which all look forward in the future, the imports of coal at the three ports of Nantes, St. Nazaire and Caen alone amounted to 2,289,797 tons, and those of coke to 19,686 tons. Out of this total of 2,309,483 tons of fuel, no less than 1,976,536 came from Great Britain. Yet in this year the exports of iron ore from Caen to Great Britain amounted only to 93,604 tons, while those from Nantes and St. Nazaire together did not equal this amount. Before the war a large number of important German companies had acquired considerable interests in the iron ore mines of Western France, and a heavy trade with Westphalia had commenced, which militated against all attempts to foster an ore trade with Great Britain.

The Normandy deposits spread over the three departments of Calvados, La Manche and l'Orne. They are in point of importance the second largest deposits in France, notwithstanding that, according to the 1912 statistics, they contributed, as compared with Meurthe and Moselle, so small a proportion of the total output. The production of ore from the Normandy mines had appreciably increased during the years which immediately preceded the war, and the 1913 output of 831,637 tons would have justified the hope that in 1914 extractions would have reached a million tons. Great developments were in progress at the Soumont mines.

Since the war the situation has greatly changed. The northern works, such as Denain, Isbergues, Valenciennes and Pont-à-Vendin, have been completely destroyed by the Germans, or so vitally injured that it will take many years to restore them. This is one of the reasons for the notable decrease in the iron ore production of Normandy. The Caen works, which drew ore from the Soumont mines, taken over by a company which has eliminated the German element, cannot develop to the extent wished for. Hence the Normandy mines must look for their own development to the export trade with which they can easily cope, while meeting all demands likely to be made upon them for home consumption.

If it be difficult to give definite estimates of the amount of the Normandy deposits, it is still more premature to attempt to do so in regard to those of Anjou and Brittany. From a geological point of view these deposits considerably resemble the former.

During the war production of iron ore in the Anjou-Brittany ore fields fell off considerably, but even with existing appliances the mines of these regions should be capable of an output of 1,000,000 to 2,000,000 tons annually of ore high in iron if rather silicious, and containing a low percentage of phosphorus. Of this output two-thirds could easily be exported. The ports of embarkation are near to the deposits, and are already important centers of the coal trade from abroad.

While, therefore, awaiting more favorable conditions in the Briey district, British iron works can continue, in the future as in the past, to import into Great Britain the ores of Normandy, Anjou and Brittany which are unaffected by the transitory conditions which render the transport charges from eastern France for the moment prohibitive.

A late addition to the above paper was also presented in the form of a note on the devastation of the Briey ore fields only, giving the latest information. It appears that at the outbreak of the war there were 18 mines in operation in the Briey district and one being sunk, employing about 15,000 workmen. During the beginning of the war the field was under the guns of Metz, and for the greater part of the war it was in German possession. The works were dismantled and the mines were operated for the German industry. Only the precipitate nature of the German retreat prevented the destruction of the mines when the Germans left, as was done with the coal mines. Further particulars were given, to the same general effect, but it seems hardly necessary to dwell in too great detail on what may be termed the devastating aspect of the meeting.

Discussion

Prof. Henry Louis congratulated M. Nicou on his very admirable résumé of the iron ore resources of France, and said that his own magnetometric measurements had confirmed the opinion of M. Cayeux that the Normandy synclines were very deep. He ventured, however, to differ from the author when he said that Great Britain for many years to come must depend on foreign ores. He thought the author had been misled by the pre-war position, when about one-third of the ore smelted in British blast furnaces was imported. That was because it was cheaper and more convenient to import ores, owing to railroad freights being high and shipping low. As a matter of fact, Great Britain was better off as regards basic ores than either France or Germany. Home production had been greatly developed during the war and more and more basic steel

was made every day. According to the Geological Survey, Great Britain had 3400 million tons of workable mesozoic ores, as compared with 5000 million tons in France. There were were also 7000 million tons of coal-field ores in Great Britain. He had no hesitation in saying that the Geological Survey had much underestimated British resources, but that did not matter as, under present conditions, much of the ore was not economically workable. He thought a change would take place in the near future in British ore requirements, and that there would be a demand for rich ores to work with a minimum of coke in the blast furnace, in view of the high cost of fuel.

H. K. Scott pointed out that Professor Louis had omitted to consider that the British lean ores were much further from the blast furnaces than was the case in Lorraine, comparing ores of equal quality. He thought the cost of transport would make it impracticable to import ores from the east of France. As regards the large estimates of ore reserves which had been given, it should be remembered that most of the ore would have to be mined by underground methods, and it would be interesting to know what proportion would be actually got.

François de Wendel agreed with Professor Louis that the British ores had not hitherto been used as much as they might be.

Sir Hugh Bell said that British iron masters are now beginning to find that it is profitable to work the home ores, due to the many improvements made in blast furnace practice in recent years. The iron trade is essentially an international trade, and the best place for an English iron works is on the banks of a river—preferably the Tees. In the next few years the world would want all the steel that the iron masters could make on both sides of the Atlantic, on both sides of the Channel, and—if he might venture to say so—on both sides of the Franco-German frontier.

The business session was then adjourned until the following day. In the afternoon a deputation of the institute laid a floral tribute on the tomb of France's unknown warrior, and a deputation from the Council was received by the President of the French Republic at Rambouillet.

Sources of Iron and Steel Imports

WASHINGTON, Sept. 19.—The Iron and Steel Division of the Bureau of Foreign and Domestic Commerce has compiled a table showing the chief sources of iron and steel imports into the United States for the first seven months of 1921 as follows:

	Canada	Belgium	China	Sweden	United Kingdom	Japan
Total	13,569	7,801	5 823	2,702	2,693	2,002
Pig iron	1,692	5,007	5,823	100	400	2,002
Rails	11,692	....	....	....	....	....
Billets	....	2,422	....	246	....	....
Steel bars	40	144	....	1,093	579	....
Sheets and plates	9	100	....	78	1,360	....
Bar iron	56	128	....	756	53	....
Wire rods	49	....	....	429	25	....
Tin plate	31	....	....	....	276	....

The six countries accounted for all but about 2000 tons of the imports during the period under consideration. Australia contributed one shipment of pig iron; Germany sent 440 tons, fairly evenly divided between bars and sheets and plates; and Czechoslovakia sent 350 tons of bars. Other small shipments came from France, Austria, Norway, and Hongkong.

Imports of iron and steel into the United States totaled only 37,050 long tons during the first seven months of 1921. This amount is considerably below the pre-war rate, which ranged from 250,000 to 400,000 tons a year, and is much smaller than the figure for 1920, when 138,000 tons were imported up to the end of July. Pig iron alone amounted to more than 85,000 tons in the first seven months of last year, and rails were up to nearly 27,000 tons.

Navy Department Awards $310,000 Crane Contract

The Navy Department has awarded a contract to the McMyler-Interstate Co., Cleveland, coal and ore handling machinery, etc., for two 50-ton dry dock cranes, one to be erected on the dry dock at South Boston and one on the new dry dock at Puget Sound Navy Yard at Bremerton, Wash. The amount of the contract is about $310,000. The crane for South Boston is to be completed in 250 days and that for Puget Sound, in 280 days.

The cranes will be steam-operated and will travel on rails having a gage of about 22 ft., with 16 wheels on each side. The truck design as developed by this company to meet the Government requirements and specifications is of considerable interest from an engineering point of view.

The cranes are of the traveling, revolving type, with a movable jib or boom. They have a capacity of 50 gross tons at a maximum radius of 90 ft. 6 in. on the main hoist and a capacity of 15 gross tons at a maximum radius of 129 ft. 6 in. on the auxiliary hoist.

A similar crane, though somewhat smaller in capacity, was furnished by this company at the Puget Sound Navy Yard about 20 years ago. This company has supplied the majority of shipbuilding cranes in the United States Navy Yards during the last 10 years. Especially noted among these installations is "the League Island," the largest capacity crane in the world, designed for, and furnished to, the Navy Department at the Philadelphia Navy Yard at a cost of about $1,000,000 and completed in December, 1919.

Cost of Living Again Rises

Figures of the Bureau of Labor Statistics show an advance of about 3 per cent in the cost of living for August, compared with July, though the latest figure is 39 per cent below that for August, 1920. The average wholesale prices of the nine groups of commodities listed are 52 per cent above the average for 1913. Household furnishings are still, as for many months, the highest item on the list; and building materials have for months held the second highest place.

Metals and metal products, at 20 per cent above 1913, show the lowest price of all, with the sole exception of farm products, 18 per cent above 1913. The metal group has fallen 4 per cent during the month, and has lost 78½ per cent of the amount by which 1920 exceeded 1913.

In the following table, all figures given, except for the retail cost of food, are wholesale prices. All are from the Bureau of Labor Statistics, except those for finished steel, which show the averages for the months indicated of THE IRON AGE composite figures. All are based on 1913 at 100. The last column shows the extent of "liquidation" during the past year.

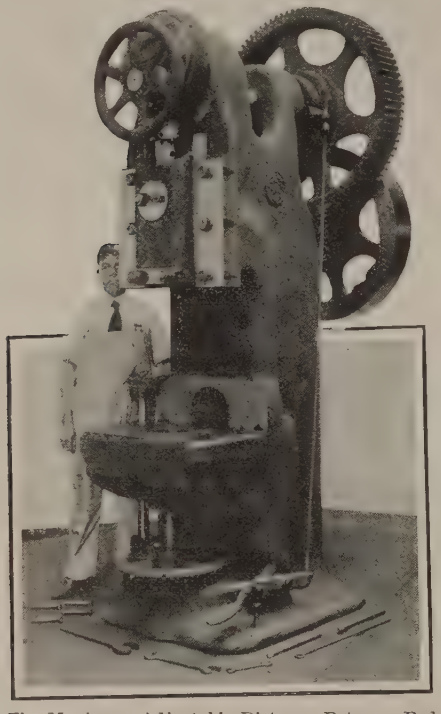
	1920	1921		Percentage Reduction	
	August	July	August	A*	B†
Farm products	222	115	118	47	85
Food, etc.	235	134	152	35	61½
Cloths and clothing	299	179	179	40	60
Fuel and lighting	268	184	182	32	51
Metals and metal prod.	193	125	120	38	78½
Building materials	328	200	198	40	57
Chemicals and drugs	216	163	161	25	47
Housefurnishing goods	363	235	230	37	50½
Miscellaneous	240	149	147	39	66
All commodities	250	148	152	39	65
Finished steel	239	148	141**	41	70½
Retail cost of food	207	148	155	25	48½

*Reduction in one year.
†Percentage cut from the excess of August, 1920, over the average for 1913.
**Since, reduced to 137.

Adjustable-Bed Punching Press

A new punch press the bed of which has a vertical adjustment for varying the distance between the bed and the ram has been recently brought out by the Ferracute Machine Co., Bridgeton, N. J. It has been designed for work requiring a long stroke and unusual height between bed and ram.

A great deal of attention has been given to strong and rigid connection between the bed and the frame. This is accomplished by means of heavy steel bolts, in addition to the support given by the 4-in. steel adjusting screw extending upward from the base. A projection at the back of the bed fitting a vertically planed recess or guide in the frame is designed to keep the bed parallel with the bottom of the ram under all conditions. These devices, it is said, eliminate all appreciable spring.



The Maximum Adjustable Distance Between Bed and Ram Is 30-In.

The press as shown in the accompanying illustration may be used for horning by inserting a horn in the 9½-in. hole in the frame at back of the bed. The hinge formed by the stud at the side of the press permits of swinging the bed out of the way when the machine is used as a horning press.

The ram has 3-in. adjustment and the bed, 9-in. A distance of 30 in. is given between the bed when it is adjusted to its lowest position and the ram when it is at the top of its stroke and highest adjustment. The ram stroke is 8 in. The press exerts a pressure of 70 tons and weighs 13,200 lb.

Metal Working in Kalamazoo

KALAMAZOO, MICH., Sept. 20.—There are 41 concerns in Kalamazoo engaged in the manufacture of products from iron, steel, copper and brass. The metal working industry is thus seen to be easily second in importance in this city and admits supremacy only to one other, that being paper making.

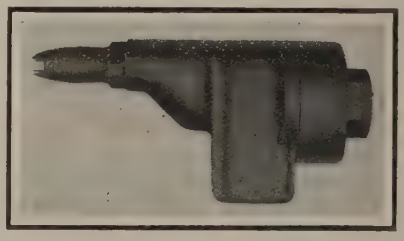
While complete reports are unavailable, the total resources of Kalamazoo's metal companies is in excess of $12,000,000. Their combined authorized capital is approximately $8,000,000 and the aggregate subscribed capital is over $5,000,000.

The corporation reports in the office of the county clerk show in detail the following statements for 1920 and 1919: In 1920 the combined resources totaled $10,733,422.49 as against $9,575,020.84 for the previous year, or a gain of $1,158,401.65 for the twelve months. During the same period there was a shrinkage in capital from $4,270,767 for 1919 to $4,217,627 for 1920.

Improved Oil Burner

An oil burner constructed to separate the gas fumes from the fuel oil, permitting the oil to pass through the orifice without pulsation, is being marketed by the Oil Burning Equipment Co., 5217 Germantown Avenue, Philadelphia.

Gases and oil, passing through the same orifice in a burner cause a fluctuation which sometimes results in extinguishing the flame and which is in most cases a detriment to complete combustion. Low gravity oil has to be heated to a comparatively high temperature to permit of atomizing and when heating the oil a certain amount of gas is produced. The burner described is designed to relieve by a separate channel the gas so generated.



Gases Escape Through Separate Channel in Top of Burner

The burner is shown in the accompanying illustration. The oil is held in suspension in the oil well, which is considerably larger in volume than the orifice through which the oil passes. The gases are thereby allowed to rise to the top of the well and escape through the gas channel in the top of the burner. In case any oil should pass through the opening with the gases, such oil, it is claimed, is heated to a high temperature in passing over the steam chamber and practically gasified in the gas channel. It is further claimed that even should the oil pass all the way through the gas channel to the burner tip it will encounter the steam coming from the mixing chamber and be completely atomized.

The burner is adaptable to heating and annealing furnaces as well as for other purposes. The tips are made in several types and sizes to meet the various requirements of burning fuel oil.

European Iron Ore Resources

France is now the leader among European nations in tonnage of iron ore reserves, with 35 per cent of the total for the Continent; the United Kingdom following with 18 per cent; Sweden with 12.5 per cent; and Germany with 11 per cent. Central and southern Russia, Spain, and Norway are the only others possessing more than 2 per cent of the total, according to a recent report issued by the U. S. Geological Survey (Bulletin 706); numerous maps, statistical tables, and charts relating to principal ore-bearing districts are included in a way to make a comprehensive and valuable report on this subject.

The St. Louis Coke & Chemical Co. is now supplying from its Granite City plant 3,000,000 cu. ft. of gas daily to the nearby towns of East St. Louis, Belleville and Edwardsville. This by-product gas is being bought and distributed by the St. Clair County Gas Co., which formerly manufactured gas for those cities by the use of oil. The Granite City company has a capacity of 8,000,000 cu. ft. of gas daily.

President Campbell Discusses Wages

Conditions in Youngstown Compared with Those in Other Districts—Why the Last Reduction in the East Was Not Followed

IN a message to employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio, President James A. Campbell discusses wages and business conditions in a very frank manner, pointing out some of the difficulties which confront the industry at this time. He solicits co-operation of employees "in meeting a situation which is the worst in the history of this company, if not in the entire history of this district."

"Perhaps the worst feature of the situation," he states, "is the fact that there seems to be no immediate prospect of its becoming better. There are some hopeful signs, but as yet no assurance of permanent improvement. That conditions will eventually change for the better we, of course, all believe, but when this will happen no one can foresee. There is great danger that no material improvement will take place before the end of the coming winter, and that in the meantime our difficulties may increase, rather than decrease.

"Mills in the Youngstown district are handicapped by a number of things entirely apart from the general depression and the lack of demand for their products. One of these is the extremely high freight rates, which make their freight costs over $7 per ton for delivery of products in the Chicago district, and rates throughout the West and Northwest are on the same high basis. On all Eastern orders our differential over Pittsburgh is about 90c. per ton on domestic and 60c. per ton on export business, and it is much greater as compared with Johnstown, Buffalo and especially mills located east of the Alleghenies. In addition to increasing the cost of delivering our products to both East and West, the last 40 per cent increase in freight rates had added very materially to our costs of producing everything we manufacture. For instance, the cost of assembling materials for a ton of pig iron is now about $10, while in 1914 it was about $5. Freight on coal has increased since 1914 from 70c. per ton to $1.50 per ton. Most of the larger plants in the Pittsburgh and lower lake front districts have advantages of water transportation not enjoyed by inland points. So that any advantages we may have in the matter of costs are not sufficient to compensate for the disadvantages arising from the higher freight rates we must pay on shipments both East and West. Prior to the last advance in freight rates, Aug. 26, 1920, we were in stronger competitive position than at present, but when freight rates are restored to a normal basis, this situation will be corrected.

"The wage rate in effect east of Pittsburgh is 25c. per hr. Buffalo has the advantage of a wage rate of 26c. per hr., or about 14 per cent less than that in this district. To meet the last reduction in the East, made July 15, this district should now be paying labor on a basis of 27c. per hr., instead of 30c., which would place it on the same relative basis always heretofore maintained.

"We did not follow this last wage reduction in the East because we believe that labor in the steel industry should not be reduced further until similar reductions have taken place on the railroads, in the building industry, in all of the mining districts, in textile mills, shoe factories and other industries.

"The conditions outlined above have combined to make operation of our plant difficult and costly. We have been and are losing money, and because of the extremely low prices prevailing, our losses will continue until selling prices are higher, or we are able to operate to capacity. A number of plants confronted by these conditions have been shut down indefinitely and their orders filled through other plants where costs are lower.

"What we are doing is to meet conditions as we find them from day to day, trying to secure our fair proportion of the business going, in order to give our workmen employment and help to carry as much of the necessary overhead expense as possible. But what can be done in this direction is limited by our ability to meet competitive prices."

Professor Commons's Views on Labor Problems

LABOR should not go in for legislation looking toward public instead of private ownership nor for participation of labor on boards of directors of corporations, is the opinion of Prof. John R. Commons, head of the economics department of the University of Wisconsin, in an article, "Basic Principles for Labor," which will appear in the "Official Labor Review," the annual publication of the La Crosse Trades and Labor Council, La Crosse, Wis.

Professor Commons is the man generally credited with the drafting of the Wisconsin workmen's compensation act—a piece of legislation that has since been copied in almost every State in the Union. He was also largely responsible for the unemployment insurance bill which was introduced in the last session of the State legislature by Senator Huber and defeated.

"Experience shows," writes Professor Commons, "that neither politics nor labor as a class can manage industry, nor assume the responsibilities of management. Industry cannot be efficiently managed on the basis of popular election of the boss. Efficient managers are self made in the struggle for profits.

"If this is so, then private ownership means great economic power in the hands of business men." Power brings responsibility. The best that legislation can do is to enforce responsibility where irresponsible business does not willingly accept it. Our child labor laws, minimum wage law, accident compensation law and others, are framed on this theory.

"The present business system is responsible for the great bulk of unemployment. Business should be required to assume a share of this responsibility instead of throwing the burden solely on labor. Business men are the only people in a position and with the ability to prevent unemployment. The accident compensation law has induced them to prevent accidents, also to insist that their employees shall prevent accidents, and requires them to bear something less than one-half the burden of unprevented accidents. The Huber unemployment prevention and insurance bill, before the recent legislature, applies the same idea to the prevention of unemployment, by requiring business to compensate workers for about one-third of the loss from unprevented unemployment.

"Federal legislation looking toward prevention of business cycles of prosperity and depression, by better control of money, credit, and banking, along the lines proposed by Irving Fisher and the Stable Money League, is just as much needed for labor as for farmers and business men. This is a big and difficult problem, to which labor should give as much attention as is given by bankers, business men, and farmers.

"Taxation is next in importance for labor. Labor should not try to throw increased taxes on business.

The prosperity of the farmer and business man means better business and more employment. Labor should endeavor to relieve business and farming of taxes and should help to throw the increased burden upon property and income that can not be shown to aid business men or farmers in increasing the prosperity of business and agriculture. The Grimstad bill providing a surtax on bare land values, and exempting buildings, improvements, machinery, personal property, standing timber, and soil fertility from further increase in taxes is an important step toward increasing the profits, wages, and employment that are necessary for prosperity.

"Labor's right to organize is no greater than employers' right to organize, and if labor wants to exempt unions from penalties, damages, and boycotts, it should be willing to exempt employers from penalties from blacklists as well as lockouts. In this respect the British trades disputes act of 1906 is better than the American idea of exempting union of labor, but not exempting unions of employers. The British act treats unions of employers to keep down wages exactly like unions of employees to keep up wages. Both are exempt from penalties. Legislation regarding these two kinds of unions should be entirely separated from the anti-trust laws which try to prevent combinations from keeping up prices. The wage bargain is different from the price bargain. Consumers are not organized; hence the need of anti-trust laws. And employers had not organized against labor until labor first organized against employers. Labor should advocate repeal of the anti-blacklisting law when it asks for exemption from the anti-trust law."

Another article of interest is "Unemployment Insurance" by State Senator Henry A. Huber, father of the unemployment insurance measure which was defeated at the last session.

Senator Huber explains the theories back of the unemployment insurance proposal and predicts that another session will see the measure—or one embodying many of its clauses—written into the laws in this State.

American Plan Adopted

Armour & Co., Swift & Co., Wilson & Co. and the Cudahy Packing Co., leading packers, have adopted the "American shop representation plan," thereby putting out of existence the closed shop in their plants. Matters of reciprocal importance between employer and employee are to be disposed of by councils made up of representatives of the company and of persons employed by it, and all men and women are eligible to election as representatives who are American citizens or who have taken out first papers. The plan was adopted after an expression of the workers of these concerns showing a large majority in favor of it. The shop council is the unit representing the workers and both parties to the negotiations have the right of appeal to a higher council and then to a national council standing for the branches of the company throughout the country.

All Independents Adopt Frick Schedule

UNIONTOWN, PA., Sept. 19.—Wage rates in the Fayette County or Connellsville bituminous district were stabilized last week when the last of the independents announced increases to the H. C. Frick Coke Co.'s present scale, which is that of November, 1917. W. J. Rainey, Inc., whose second reduction, to a point 15 to 20 per cent under the Frick scale, precipitated strikes at its plants and sympathetic strikes at other nearby plants, announced that the Frick wage scales would be effective at the Rainey plants but that operations would be resumed for the time being only at Paul, Stewart and Fort Hill plants, and possibly Elm Grove. The company, it was said, would mine only sufficient coal to supply the Rainey-Wood by-product ovens at Swedeland. It is expected that resumption will come at an early date at the Mt. Braddock, Revere, Royal and Allison plants.

Oliver-Snyder Steel Co. and the Washington Coal & Coke Co. also posted notices announcing the return to the Frick scale. Rainey was the only independent operation to make the second cut; return to the Frick scale by other independent operations, meaning an increase of approximately 10 per cent.

Announcement was made Saturday that coal production would be resumed at the Leisenring No. 1 mine of the H. C. Frick Coke Co. on Monday, Sept. 19. It is expected that other Frick mines will be started during the next few weeks. Until this week, the Frick company has been operating at about 40 per cent coal production. No ovens are in operation.

One hundred and nineteen ovens were fired at the Garwood plant of the Aetna Connellsville Coke Co. this week, it being reported that the company has landed a furnace coke contract for 5000 tons monthly during the remainder of the year at around $3.25 a ton. One coke sale of considerable magnitude to a jobber at $3.40 was reported in the region this week. Furnace coke quotations have been increased now to $3.50. There is a better demand. There is also a slight increase in foundry coke output in the region.

May Cancel Contracts

Employees of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have been advised by President James A. Campbell that those who purchased stock in the company under a special contract, providing for deferred payments, may cancel such contracts at any time. He says:

"When they were made, conditions were such that these contracts gave certain advantages to those holding them, but these conditions have changed in a way that no one could anticipate. The contracts are disadvantageous to the subscribers, and unless the holders have some special reason of their own for completing them, we would advise that they be cancelled and will be glad to return the money paid on them.

"It is our hope that those of our employees who have carried such contracts will benefit considerably by the fact that they have thus saved money that otherwise might have been needlessly spent and is now very useful. At the same time we regret that conditions should have prevented them from becoming stockholders in the company under a plan devised solely for their benefit."

Increase in Salaries of Patent Office Examiners Urged

The American Bar Association, at its recent meeting, held in Cincinnati, as stated by Clarence J. Loftus, counsellor in patent and trade mark causes, Chicago, who attended such meeting, adopted and approved the report of the patent section, which report, among other things, recommended that the salaries of the Patent Office examiners be increased substantially, and that such increase be assumed by raising the fee for filing applications for patents from $15 to $20, and urged that the matter be taken up with Congress to the end that the necessary enactments be promptly passed.

Appeal to President Harding

WASHINGTON, Sept. 20.—Appeal has been made to President Harding, according to Vice-President David Williams of the International Association of Machinists, to expedite the payment of $1,500,000 to 38,000 machinists and electricians awarded to them as employees of the Bethlehem Steel Co. by the former National War Labor Board. The War Department has ruled that it cannot pay the money to the employees in the absence of sanction by Congress, which the employees are seeking to have hasten action through request of the President.

A new method has been developed at the Northwest station of the Bureau of Mines, Seattle, Wash., for the determination of metallic iron in sponge iron, which has been found to be more accurate, simpler and more rapidly performed than any of the existing methods.

MACHINE SPEED CONTROL

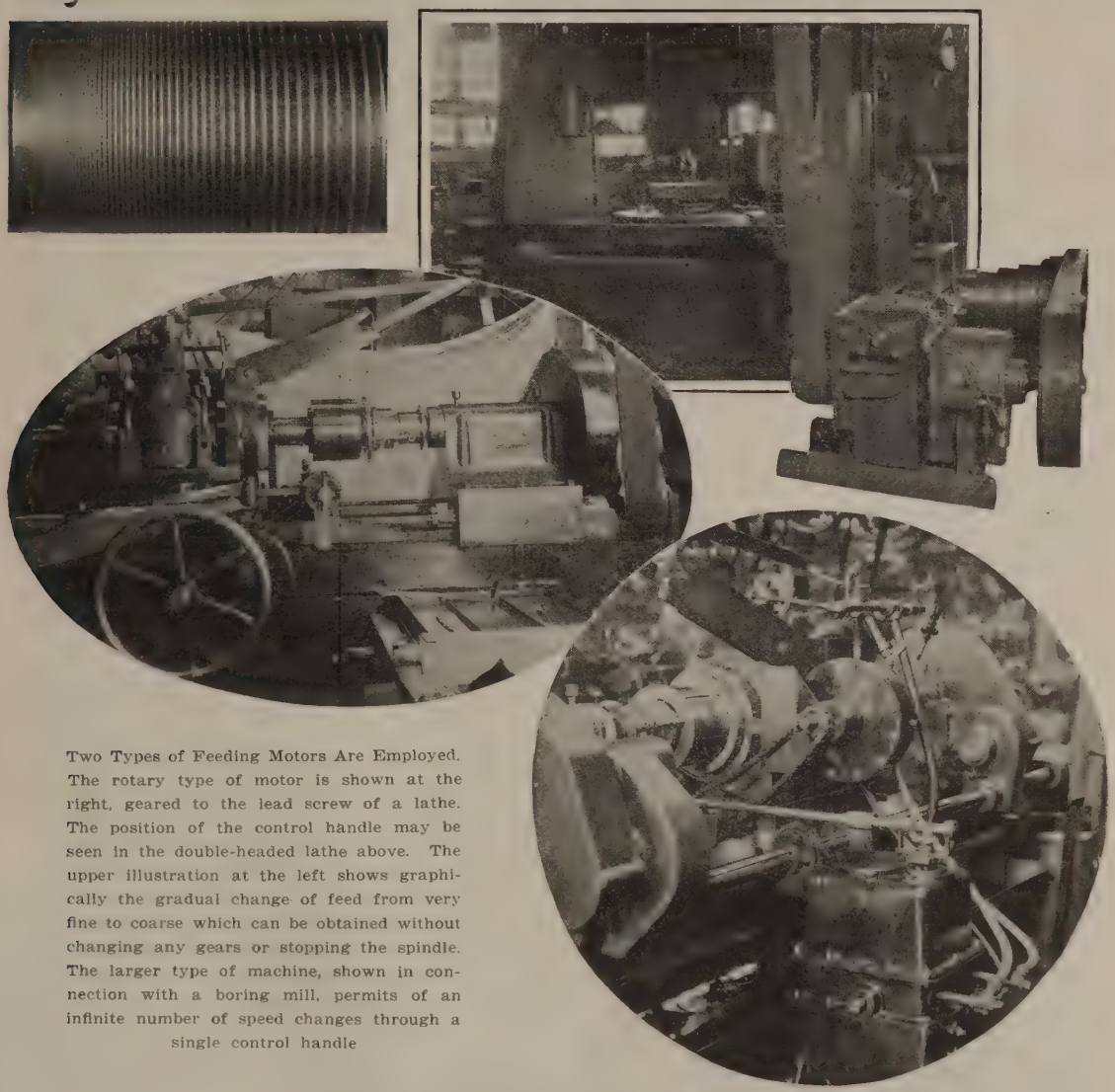
Oil Pressure Transmission for Control of Speeds and Feeds—Device Described

A recent development in the field of speed-control devices, adaptable to the variety of uses for which variable speed power transmission is required, is represented by the Oilgear system, brought out by the Oilgear Co., Milwaukee. It was developed especially for application to the feeding and rapid traversing of machine tool carriages and rams, but is said to be adaptable also to textile, paper mill, chemical and other machinery requiring variable speeds.

The device consists essentially of a pump which can be adjusted through a wide range of capacity and a motor driven by the working fluid, oil, received from the pump. The pump is driven from the machine tool countershaft, the motor being attached to the carriage or ram the feed of which it is desired to control. Two types of feeding motors are employed: the direct acting pushing cylinder, and the rotary. The pushing cylinder type is used when space conditions permit, and in equipping old lathes it is mounted at the rear of the bed behind the headstock, the piston rod extending toward the tailstock and being bracketed to the rear part of the carriage. The rotary type, shown in the accompanying illustration geared to the lead screw of a lathe, is employed in the case of very long machines and frequently for cross feeds, where screw control of the tool slide is necessary. The gradual change from a fine feed of 0.003 in., at one end to a coarse feed of 5/16 in., at the other, which this feed control gives without changing any gears or stopping the spindle, is graphically shown in the separate illustration.

An advantage claimed for this type of feed gear for heavy machine tools is the securing of rapid traverse movement without any additional mechanism, enabling the operator to move heavy carriages and rams promptly and without fatigue. The hydraulic feed permits the operator to readily increase the feeds when cuts become lighter, back out the tool for examination of cutting edge, and return it quickly into the cut without any disconnection of friction clutches, etc. Another advantage on many production jobs is the ability to use two or three different feeds in quick succession on short cuts.

In many cases, it is said, the improvement to be effected justifies installation of the device on machine tools already in operation. Such a case is the double-headed boring and tapping lathe shown. It will be noted that the control handle is within easy reach of the operator. Before installing the device the operator had to turn the large hand wheel more than 70 turns, requiring more than one-half minute of hard work in every 8-min. period, in order to back out the tools and place a new casting in the jig. In addition, the facing cut had to be fed by hand, as the existing feeds were not suitable. It is also noticed that the operator is no longer reluctant to run the tools back for occasional



Two Types of Feeding Motors Are Employed. The rotary type of motor is shown at the right, geared to the lead screw of a lathe. The position of the control handle may be seen in the double-headed lathe above. The upper illustration at the left shows graphically the gradual change of feed from very fine to coarse which can be obtained without changing any gears or stopping the spindle. The larger type of machine, shown in connection with a boring mill, permits of an infinite number of speed changes through a single control handle

examination. The speeding up of the rapid traverse and economies due to correct feeds and greater convenience of manipulation, is said to have effected in this case a 25 per cent increase in output.

Delivery of fluid from the feed controller, varied in quantity and direction, compels the feeding motor to perform exactly the function desired by the operator. The pressure in the system is great or little according to the resistance offered to the cutting tool, but the feed motor moves at the rate of speed wanted by the operator without regard to the pressure which it must exert to do the work. If this pressure rises above the maximum required for feeding, a relief valve opens and the feed motor comes to a standstill, without damage. This function is made use of in locating shoulders, etc., in the work to be machined, as it is only necessary to set rigid stops and let the carriage run against them as desired.

The variable delivery pump described, installed in connection with a 20-ton hydraulic assembling press and driven by the standard Oilgear feed controller, gave a quick return speed to the ram of from 6 to 7 ft. per min., with a pressing speed of about 6 in. per min. at 20 tons. Larger pumps would, of course, give more rapid ram traverse, suitable for production work. The press mentioned was used for general purpose work, mandrel pressing, straightening and broaching.

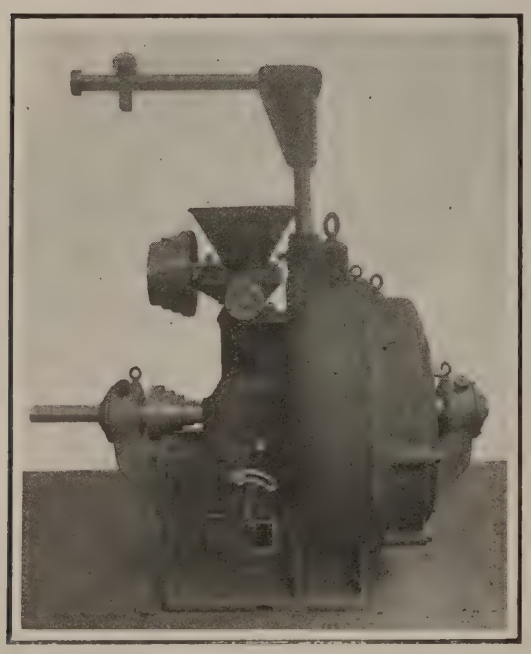
Variable Speed Drive for Spindles

A larger type of machine for driving the spindles of machine tools at any desired speed, from line shaft, constant-speed electric motor, or gasoline engine, has also been developed by the company. The unit shown in the accompanying illustration is of about 10 hp. capacity, and is for driving lathes, boring and milling machines, etc. The principle of operation is similar to that of the feed control system previously described, and secures for the operator an infinite number of speed changes in either direction through the manipulation of a single control handle. The speeds selected by the operator are obtained irrespective of changes in load. An automatic overload gear, adjustable to any desired maximum, prevents overloading the machine. When the maximum is exceeded the speed is reduced, stopping the tool entirely in case of a jam.

Coal Drying and Pulverizing Machine

A recent development of interest in the field of powdered coal apparatus is a self-contained machine recently brought out in England for the drying and pulverizing of coal, combining, it is said, the functions of the crusher or rolls, the dryer, the granulater, the pulverizer and the air separator. It is named the Atritor and manufactured by Alfred Herbert, Ltd., Coventry, England, and 50 Church Street, New York.

In England powdered coal is used principally for firing rotary cement kilns, and it is in that direction that the machine has been first applied. The makers claim, however, that it is equally adaptable to many other uses.



Raw Coal Is Fed into the Hopper at One End and Burnt in a Finely Divided State at the Other. The drying and pulverizing are simultaneous

The raw coal is fed into the hopper at one end and burnt in a finely divided state at the other. The machine is driven by a single motor and requires no auxiliary fans, elevators or conveyors other than what is necessary to feed the raw coal into the hopper. It is said to be continuous in action and to dispense with storage bins for the pulverized coal. The drying and pulverizing go on together, the product being burnt immediately without being given opportunity to absorb moisture. The volatile constituents pass into the kiln and are burned. The makers claim that the cost of operation in power and labor and the cost of maintenance is very small as compared with a plant of the usual type and that with the machine dust and dirt are entirely avoided.

The machine consists of a cast-iron casing in which there is mounted a disk, dividing the casing into two parts. The disk is fixed on the shaft which is carried in the bearings to be seen in the illustration, and which revolves at high speed. Four concentric rings of studs are mounted on the disk, the internal faces of the casing having similar rings of studs arranged so that the disk studs in revolving intermesh with them, without touching. Mounted on the disk at its periphery, on the coal inlet side, there is a fan provided which draws air into the casing.

The hopper has a worm feeding gear driven from the main shaft through a cone pulley arranged to give four variations of feed. The raw coal, which is required to be in pieces of not more than 1 in. cube, is delivered from the hopper into an annular opening formed in the casing around the revolving shaft, and on entering impinges against the disk. Through the same opening the fan draws its supply of air, which in the case of a cement works using the machine was obtained from the cinder cooler at an incoming temperature of about 550 deg. Fahr.

The revolving disk throws the incoming coal outwards away from the shaft, and the path of the fuel is fanwise, and between the fixed rings of studs on the casing and the revolving studs on the disk. Under the influence of the current of air set up by the fan and assisted by a second similar fan on the revolving shaft inside the casing, the coal continues its progress through the machine, traveling inwards away from the inside periphery of the case, between the studs on side of the disk pointing away from the inlet and the studs fixed on the casing facing it. The path of the coal is U-shaped, first away from the shaft and then toward it, the latter direction being against centrifugal force. An arrangement shaped like a Sirocco fan but revolving backwards, prevents the passage of unpulverized lumps, throwing them back between the fixed and revolving studs, where they are broken up. It is claimed that any fineness or dryness of the coal may be obtained, even though the moisture content is as much as 20 per cent, which is greater than usually met in practice. The air, as well as conveying the fuel, acts also as an aid to combustion.

The floor space occupied is 6 ft. 6 in. by 3 ft. 8 in.

It was announced at Detroit Saturday that, effective immediately, the Highland Park plant of the Ford Motor Co. would operate on a five-day basis.

Expansion Prospects as Seen by Washington

Necessity of Greater Movement of Steel to Foreign Lands—Germany's Competition Not Causing Alarm—Markets of Other Countries

BY L. W. MOFFETT

WASHINGTON, Sept. 20.—Reports coming to Washington indicate that the American iron and steel industry is not disturbed as much as other industries in regard to German competition in foreign markets. The view generally taken by steel manufacturers is that Germany has hardly begun to approach anything like normal conditions and that she has far to go before they are reached. In addition to the matter of reparations to be paid over a long term of years, it is pointed out that Germany still faces liquidation and deflation and that activities of her manufacturers in selling in foreign markets are based on more or less artificial devices which sooner or later must give way to natural laws. When that time comes, Germany will have to meet a real test of sound competition. For the present, it is claimed that not enough is known of Germany's commercial processes and her future to establish a clear idea of what may be expected in the way of permanent competition. This is the position of Government officials whose work involves a study of export business, but they feel convinced that what Germany has done and is doing at present is largely a makeshift and low prices quoted on steel and other products, much below those of American and British manufacturers, either represent actual loss to German makers, despite the depreciated mark, and small wages, or the German Government is resorting to heavy subsidies, such as were pointed out some time ago by Secretary of Commerce Hoover. Neither of these conditions, it is claimed, can be maintained indefinitely.

Very Low Prices Named

Attention has been called to the fact that German steel makers and manufacturers of hardware have closed contracts in Latin-American countries at ridiculously low figures, sometimes as much as 50 or 60 per cent under quotations of competitors, a situation which, it is held, cannot possibly accord with sound economics and financing. That this is evident is indicated by the fact that the German makers have been compelled in some instances to abandon their contracts, although it is rather puzzling as to the motive behind the German manufacturers in closing the contracts, unless it is that they hope to gain time in an effort to recover their position by disturbing the markets for manufacturers of America and other competing countries. The lower prices of German makers, it has been stated, may be partially, but far from entirely, explained by the fact that the quality of their products often is greatly below their pre-war standard. In this connection, Government officials are pleased with reports coming from American commercial attachés, consuls and trade commissioners showing that the American steel makers are paying the strictest regard to quality and, moreover, are establishing stronger foreign business relations by extending more liberal credit terms and meeting satisfactorily shipping requirements, such as those relating to packing, delivery, etc. At the same time, the opinion has been expressed that too much attention has been paid to price and that it will be necessary to make some sacrifices in this direction if future competition is to be met thoroughly. It is noted, however, that, as a general thing, American makers are offering tonnage at more attractive prices than British makers are, but this also, it is claimed, is a condition of the present and one that may not obtain long unless American producers stand ready to meet more sharply competitive conditions in the future when the world's purchasing power has recuperated.

Necessity of Expansion

While market conditions of the future are an unknown quantity, American steel manufacturers are thoroughly aware of the necessity of going into the world's markets as never before if they are to maintain satisfactory operations now that capacity has been expanded to such a degree as that which has been built up. Exports of steel tonnage sold during recent years by American producers have averaged approximately 10 per cent of their output. But, as pointed out to the Senate Committee on Finance by Chairman John A. Topping of the Republic Iron & Steel Co., in the course of hearings on the tariff, when he spoke for independent makers, it now is considered necessary to export 20 per cent of the present capacity, in view of home conditions. Roughly, according to Government officials, this will mean the exporting of not less than 7,500,000 tons of rolled steel annually. An idea of what this will involve in the way of building up foreign markets can be gained from a study of past exports. The largest export movement of iron and steel products from the United States was 4,820,216 tons, or about 65 per cent of the tonnage which would have to be exported if 20 per cent of the capacity is to go to foreign market. This shipment was made in 1920, under unusually favorable conditions from the American viewpoint because of the absence of measurably active competition from other steelmaking countries. The heaviest pre-war exports of iron and steel from the United States were made in 1912 with a total of 2,947,597 tons, 1913 ranking a close second with 2,760,133 tons.

Ante-bellum Exports

Further emphasizing the statement that the American industry will be compelled to be active in developing foreign markets if the 20 per cent of capacity is to be shipped abroad is the fact that the largest export movement of iron and steel from all important producing countries prior to the war, including the United States, the United Kingdom, Germany, France and Belgium, totaled approximately 14,500,000 tons, which moved in 1913. This is about 50 per cent of the above conservative estimate of what 20 per cent of the American rolled output will be.

The belief prevails that the American makers will have to concentrate largely on the markets of the orient, Latin-America and British dominions, and maintain their position in the markets of Canada, the largest of all consumers of American steel aside from the United States itself. While, of course, exports will go to continental Europe, doubt is expressed that it will be possible to meet competition in those markets from makers in European countries under normal conditions, except to a limited extent, as in the past. It also is a question as to how much expansion may be brought about in British dominions, except Canada, because of the more favorable tariffs prevailing and under consideration, for English makers. The proposed bar-

gaining tariff in the Fordney bill is expected to be only a partial offset of this situation.

Not Yet Threatened

Simultaneously with the study to develop foreign markets, the American steel makers, as they have indicated to Congress, want fair protection from foreign competition in the domestic market and it is generally conceded that they have asked only moderate protection. It is stated that, despite infrequent flurries of alarm, the domestic market has not been threatened since the war by foreign producers. Any apprehension that German makers would invade it extensively has proved unfounded so far. It is shown, for instance, that during the first seven months of the present year, only 440 tons of steel, chiefly bars, sheets and plates, have been exported to the United States from Germany and that the total imports from all countries for that period amounted to only 37,500 tons.

Restoration of normal conditions obviously may bring about an entirely new situation and one that will threaten American makers both in the export and domestic markets and it is largely because of this that a proper tariff against imports is sought and plans are being made to expand foreign markets. But it is doubted whether Germany will be a strong factor for a long period or ever will regain her past position, when she exported steel in much greater quantities than any other country, her exports in 1913 averaging 479,800 tons a month, or 5,757,600 tons for the year. At the same time, the potential power of Germany, when she recovers, is not being overlooked. The war has stripped that nation of some of its power to the advantage of France, which now is receiving attention as a probably more active competitor of the future. It is estimated that France now has a steelmaking capacity of 8,000,000 tons annually, of which 2,000,000 tons or 25 per cent will be in excess of home demands and therefore will be available for export. Exports of steel by French makers in 1920 were approximately 50 per cent greater than in 1913, averaging 77,750 tons monthly for the eight months of the former year.

When the situation is summarized, it is considered that the American industry is about to enter upon broader expansion than ever before, though it will be compelled to meet obstacles and sharp competition. It is with this view in mind, as it relates to American industries generally, that Government agencies, such as the new commodities divisions of the Bureau of Foreign and Domestic Commerce, are studying foreign markets as much as they can be studied under present circumstances, and are doing their best to keep American trade informed of those vital facts that will be helpful.

MORE ACTIVE MILLS

Operations in Mahoning and Shenango Valleys Are Improved

YOUNGSTOWN, OHIO, Sept. 20.—Following attempts to stabilize the steel market, operations in the Mahoning and Shenango Valleys are considerably improved this week, as indicated by the fact that 70 of 105 sheet mills are under power. The maximum of sheet mill capacity which has been engaged has been 40 to 45 per cent for many weeks. The development is held to reflect the recent price advances in sheets.

Of the 66 open-hearth furnaces in the district, 37 are charged, including 25 of the 51 independent units. Two of the three Bessemer departments are active, while steel output approximates 60 per cent, as compared with recent averages of 50 per cent. Tinplate and wire product departments also expanded their activities this week.

Current sheet mill schedules are: Brier Hill Steel Co., 16 mills; Republic Iron & Steel Co., 7; Youngstown Sheet & Tube Co., 14; Trumbull Steel Co., 12; Newton Steel Co., 10; Sharon Steel Hoop Co., 7; Falcon Steel Co., 5.

Operation of Mattie blast furnace at Girard of the A. M. Byers Co., Pittsburgh, may be started around Oct. 1, while it is currently reported that the Trumbull-Cliffs Furnace Co. is preparing to blow in its new stack about the same time, to supply hot metal to its open-hearth furnaces. The Byers company is operating 22 puddle furnaces and one skelp mill at its Girard works.

Trumbull Steel Co. has 16 tin plate mills on the active list this week. Seven of the Valley's 17 tube mills are rolling, four being operated by the Sheet & Tube company and three by the Republic company. Rod, wire and conduit production is sustained at 50 per cent.

Steel fabricators are enjoying a much better business, as indicated by the operation of its road mesh and hyrib departments night and day by the Truscon Steel Co. Officials report that August bookings were 100 per cent greater than those in April and that aggregate schedules are holding up between 65 and 70 per cent.

District units of the Carnegie Steel Co. are operating on a larger basis, supplying tonnage to other Carnegie company plants. Demand for sheet and tin bar has been such as to accelerate operations in affected departments. Three of the company's six blast furnaces in the Ohio Works group are pouring and additional stacks are likely to be blown in before the end of the month.

In the Shenango Valley, the most noticeable increase in operations has been in subsidiaries of the Steel Corporation, the American Sheet & Tin Plate Co. and the American Steel & Wire Co. The former is operating 20 tin mills and its full complement of sheets units, while the nail department of the latter at Farrell, Pa., is operating at capacity. The Valley Mould & Iron Corporation plant is on a 50 per cent basis.

Only one of 14 blast furnaces in the Shenango Valley is pouring, No. 3 stack of the Shenango Furnace Co.

Plant Operation

Ten of the 20 hot mills of the New Castle, Pa., works of American Sheet & Tin Plate Co. will resume operations Sept. 26. Old Meadows works of this company at Scottdale, Pa., a plant of 8 hot black sheet mills, started up Sept. 19, after having been down since about the middle of last April.

During the first week of September the Hendee Mfg. Co., Springfield, Mass., motorcycles, received orders for 700 machines. Working forces at the company's plant will immediately be increased.

The Chicago Railway Equipment Co., Chicago, will pay a 2 per cent dividend on Oct. 1, to all stockholders of record. This payment will be unusual in that it will be the one hundredth consecutive quarterly dividend of the company. The chief products of the company are brake beams and bolsters for railroad cars, steel transmission poles, reinforcing steel, and all kinds of malleable castings. Its subsidiary plants include the Franklin Steel Works, the Marion Malleable Iron Works, the Grand Rapids Malleable Works, and the Detroit Forge Plant.

The industrial situation at Anderson, Ind., has improved, with the reopening of the rod mill of the American Steel & Wire Co. The wire mill continues in operation. The Ames Shovel & Tool Works and the Anderson Foundry & Machine Co. have resumed operation.

Out of a total of 21 plants, chosen at random from the major industries of Terre Haute, Ind., two are reported operating at 100 per cent capacity, 14 at around 75 per cent of normal, four show no increase in business and one is idle, with no definite plan for resumption.

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ESTABLISHED 1855

THE IRON AGE

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How Much Work Is Being Done?

There is a difference between business being "good" and its being "active." There may be heavy operations without much profit, and indeed there may be a loss. The terms are not interchangeable, just as it has been found by painful experiences of the individual that earnings and prosperity are not the same thing. Many men had large incomes in 1920 and did not prosper or advance.

As many lines of business are not particularly profitable at this time it is of interest to inquire how much work the country is doing, to see whether the lack of profits is attributable to inactivity in general or to something else. Statistical information of the greatest weight indicates that much work is being done.

Debits to individual accounts at banks are reported by the Federal Reserve Board as indicators of the volume of the nation's business. Figures for recent periods make the following showing, in millions of dollars, while the lag or decrease from the figures for the corresponding periods in 1920 is given:

Bank Debits, Millions of Dollars

Four Weeks Ended	Amount	Lag
May 25	$30,852	17 per cent
June 22	30,651	15 per cent
July 20	29,174	19 per cent
Sept. 7	25,551	20 per cent

In considering the average lag of 18 per cent one must remember that there have been large decreases in dividend payments and large reductions in salaries and wages, while commodity prices have so declined that the same money transfer represents a much greater quantity of merchandise. One can hardly avoid the suggestion that the quantity of business done has increased, when the total of transfers of money has decreased only 18 per cent.

Another indicator to be considered is employment and unemployment. The latest figure for the number of names dropped from payrolls is 5,735,000. That is about one-eighth of the total number gainfully employed during the fore part of 1920. We have heard so much of increased output with decreased personnel that we cannot avoid concluding that if seven-eighths were on full time they would be doing much more work than were the eight-eighths last year. Of those not out of employment many are on short time. There is no indication, however, that there has been a great decrease in the quantity of work, of all descriptions, being done.

A third indicator is the freight movement on the railroads. The June report showed 28,141 million net ton-miles of revenue and non-revenue freight movement, which is 20 per cent more than the average movement in the five years ended June 30, 1914, while it is only 31 per cent below the rate in the best single month on record—August, 1920. The ton-mileage of last June was accomplished with little help from ore and coal movement. If it be said that the movement was largely of road-building and therefore of unimportant material, it is to be noted that a made road does not average over 10,000 tons per mile in weight, while the material is not transported an average of 100 miles, so that there is much less than one million ton-miles of freight per mile of road built, while the June freight movement was 28,141 million.

The country has really been doing a great deal of work in the past few months. One hears much of the inactive lines and little of the active lines. The inactive lines, therefore, may be expected to pick up. There is some abnormality in the situation now, but not as much as there was in 1920, with prices and wages abnormally high and service rendered abnormally low.

The Unemployment Conference

Sharp differences of opinion as to the best methods of conducting the unemployment conference at Washington are likely to develop. Naturally there is a desire to rule out subjects upon which the conferees are likely to disagree, and every one who wishes to see the conference succeed will hope that serious disagreement may be avoided without ignoring fundamental principles which must govern in arriving at wise conclusions.

On one point there can hardly fail to be general agreement—that is, that there should be no division, nominally or actually, into groups representing different classes of people. President Harding has taken a decided stand against any such classification of members of the conference, and Secretary Hoover will act in harmony with the President, thus

avoiding the rock on which the first industrial conference of the Wilson administration split.

Although the conference was not the subject of consideration when General Pershing spoke at the recent dinner in Washington celebrating Lafayette-Marne day, a sentence in that address may well be remembered in connection with the approaching meeting. "The policies of this republic are not determined by labor unions or by any other organizations, but by the consensus of opinion of its patriotic citizens of whatever affiliations."

The members of the conference are confronted by the difficult problem of reducing unemployment in accordance with sound economic principles. If they enter upon their task without regard to what any group of citizens may selfishly advocate, they will take an important step in the right direction.

One of the principles which cannot be ignored is that, in a period of readjustment such as the world is now passing through, labor cost must be reduced in harmony with other costs, and any effort, whether organized or not, to prevent an equitable reduction is a cause of unemployment and will retard the return of prosperity. Thousands have already joined the army of the unemployed because they were not willing to accept reasonable reductions or were not permitted by labor unions to do so, and there is grave danger that many thousands on railroads and in plants may be forced into idleness on account of radical leadership. At the same time, employers have great responsibilities. Most of them have shown a keen appreciation of that fact by giving employment to as many men as possible and by reducing wages only when and to the extent imperatively necessary; but some have not always realized that the loss of a job means much more to the employee than the loss of dividends to the employer.

The Washington conference may be able to accomplish much in bringing about better distribution of work and encouraging public improvements. But all of this would be in the nature of palliatives. A more important achievement, even though not so noticeable in direct effects, will be secured by impressing upon all employers and employees the vast importance of the part they must take in the reconstruction of a troubled world. Never before was there such great need for unselfish and enlightened co-operation.

Elihu Root, in a recent address, said that "it is not what a nation does for itself, but what it does for humanity, that makes it great." It is equally true that the greatness of an industry is not measured merely by the money it makes, but also by the service it renders its employees and the public, by contributing to the well being of those who are employed and by winning the respect and good will of all the people.

A comparison of the world demand for steel in 1920 with that of 1913 is now possible. The statistics of the five leading producing countries—the United States, Great Britain, France, Belgium and Germany—show iron and steel exports last year of 11,499,500 tons, as against 15,737,400 tons in 1913. This decrease of about 27 per cent is in the face of extravagant predictions of a heavy worldwide demand as a result of the war. Yet in the light of post-war developments the showing is excellent. Of particular interest, apart from the fact that the United States and Great Britain changed places last year, the former being the largest exporter in 1920, whereas Great Britain was well ahead in 1913, France exceeded her 1913 exports last year by 54.7 per cent, while 63 per cent was the increase in the case of the United States. Germany's iron and steel exports in 1920 were about 30 per cent of those in 1913, while Belgium's recovery from the effects of the war is measured by exports last year that were 56 per cent of those for 1913.

Stainless Iron

A new alloy steel has appeared in England concerning which some important predictions are being made. It has been called stainless iron, "for want of a better name," and is a direct derivative of the now famous stainless steel, also a British invention.

Stainless iron is really stainless steel with a carbon content of about 0.10 per cent or less. Three British firms are making it and it is a product of the electric furnace. So far as known it has not yet been made or exploited in this country. This new low carbon chrome-iron alloy is distinctly softer than stainless steel and is thus suited to various manipulative operations. Because of its malleability it is offered for a wider range of uses in forging, pressing and stamping than stainless steel, which is admittedly hard to handle and difficult of heat treatment. Already success is reported in producing automobile wheel disks, hoods, bodies, and other products subject to corrosion or tarnishing, thus eliminating painting and varnishing. It is claimed that it will modify industry in the future so far as light metals are concerned; also that, while it is more expensive than brass, it is easier to keep clean. In fact, the pioneers in rustless iron are confident that its possibilities are well nigh unlimited.

The new alloy is expensive, because carbon-free ferrochromium is essential in its manufacture. Its discovery is a striking example of the possibilities of only a slight modification of present simple or complex alloys. The mere lowering of the carbon transforms an alloy heretofore found difficult to handle, into a radically different product. Similar changes in the composition of other alloy steels now in use are being studied and give promise of equally valuable and interesting results.

American Tin Plate Preferred

Before the war Japan was a large buyer of Welsh tin plates. In 1913 that country purchased 5.7 per cent of the total British exports. In 1920 this proportion was only 2.8 per cent, or a decline of about 50 per cent. In 1913 Japan purchased an insignificant proportion of the American tin plate output. During the war that country was forced to obtain its supply from American makers. The interesting fact is that this practice has continued, Japan having bought in 1920 as well as in 1919 about 22 per cent of the total American tin plate exports.

These facts have not been overlooked in Great Britain. Inquiries were made through diplomatic

channels and the commercial counsellor to the British Embassy at Tokio reports as follows:

1. Japanese buyers were forced to take American tin plate during the war, and having become accustomed to it are not disposed to change.

2. The conditions encountered by buyers of British tin plate when it once more became available were not such as to dispose them to prefer it to American. Prices were subject to surcharges for increases in cost of labor and materials, and shipping clauses were also uncertain. These conditions were of course due to labor and economic difficulties in England.

3. Tin plate which did arrive from England was not of the high quality to which buyers were accustomed before the war; while American tin plates have improved in quality since the war, and American manufacturers pay special attention to the adaptation of their product to the requirements of the Japanese market. It is understood, for instance, that for the manufacture of tins for kerosene and foodstuffs by automatic machinery, they are ready to give soft, tough material for ends and stiff material for bodies, to cut the plate so that the grain runs as the buyer desires, etc.

4. There are more suppliers of English tin plates than of American and therefore greater variations in quality.

Of special significance are the statements that Welsh tin plates have not been of the quality to which buyers were formerly accustomed and that the American product has improved in quality since the war. It is to be noted, moreover, that American makers pay special attention to the adaptation of their product to the needs of the Japanese. Commonly heretofore, American exporters have been reproached for their failure to have their products meet the preferences of foreign buyers.

These facts furnish an impressive example of what can be done by American producers of other steel products needed by foreign buyers. Although Welsh tin plate is available at a lower price than American, the latter has been able to hold its Japanese trade due to the reasons mentioned. Superior quality, due partly to larger unit production, and adaptation to the buyers' needs are cardinal points in the holding as well as the expansion of the steel export trade of the United States.

"Contract" Buying of Steel

It is a question whether the practice in vogue in the finished steel trade for many years, that of making "contracts," will be revived. It has been largely disrupted in recent years. There was the Government control of the trade during the war, which practically shelved contracts, and then there was the period of price strain in 1920, when the independent producers were indisposed to accept contracts while the Steel Corporation designated to each customer the amount of contract tonnage it would accept.

Apart from these influences tending to break the trade of its habit, there has been some general disposition on the part of producers to get away from the practice, particularly in the case of annual contracts. Until a few years ago, for instance, it was the practice in the tin plate trade to make contracts for a whole calendar year. Many of the tin plate consumers insisted it was necessary for their safety that they be "protected" by a contract for the whole year. The producers claimed otherwise, and eventually effected what they considered a signal reform. The agricultural implement trade likewise felt that it needed "protection" for its "season," and in many years contracts were made in April or a little later for a manufacturing season that was not to begin until the following August. That practice, also, was modified more or less.

The contract system in the sale of finished steel products has been the subject of much criticism. With considerable justice the usual contract was dubbed "jug-handled" or "option" or "accordeon," because of the flexibility in interpretation as to the quantity of steel actually shipped under it. All the arguments against this system of doing business were logical, and they were more or less convincing except for one that ran the other way, the argument that whatever might be said against the system the practical showing was that both the steel producers and their customers had been quite successful in a business way while doing business after this style year after year.

The vitality of the contract system lay in the fears entertained by both producers and consumers, producers fearing that they might not have orders, consumers fearing that they might not be supplied with steel. When business prospects were fairly good the producers oversold and the consumers overbought. If business turned out to be good the mills fell behind in deliveries and were unable to realize on price advances as soon as circumstances really justified. If business proved poorer than expected the sellers had opportunity to make concessions quietly to their customers, to induce specifying, and the market was less disturbed than if the consumers had hawked their specifications throughout the trade.

There was one evil of the contract system that did not receive as much criticism as it deserved, and that was the evil of the steel market being made to appear stronger that it really was. When conditions were improving, there was what was called "forward buying" and the trade got more or less into the habit of confusing cause and effect. There was forward buying, and then actual tonnage demand upon the mills increased. It was not the contracting that produced the improvement in deliveries and consumption, but rather it was the prospect of improvement that had brought about the so-called "forward buying." The point is illustrated by the fact that in the past few weeks there has been comment in some quarters to the effect that the steel market was in poor condition, because there was no "forward buying." The producers regarded such references as a grim joke, for what they wanted was an immediate operation, not an uncertain prospect of an operation in future.

As conditions stand now, steel consumers may change from a policy of strictly hand to mouth buying to a policy of buying for short periods ahead. It will be interesting to observe signs that the period is to lengthen.

Work has been resumed in five of the Colorado Fuel & Iron Co.'s mines in Las Animas County, Colo. These mines were closed recently following a walkout of the men as a protest against a reduction in wages. About one-third of the strikers returned. The company charges that the men are being intimidated, but no disorders have been reported.

CORRESPONDENCE

Against a Duty on Ferromanganese

To the Editor: The brief as submitted by John J. Howard, general manager of the Lavino Furnace Co., Philadelphia, arguing for a duty on ferromanganese, as published by your valued paper of Sept. 8, has just been brought to the writer's attention, and I feel sure as a leading publication of the iron and steel trade that you will grant the writer a small space in order that he may show a few of the inaccuracies published in this brief.

Mr. Howard advises that he is representing the following companies:

Lavino Furnace Co.
E. E. Marshall
American Manganese Mfg. Co.
Southern Manganese Co., electric furnaces at Anniston, Ala.

It may be well to know that Mr. Marshall and the American Manganese Mfg. Co., as far as all practical purposes are concerned, as to selling are one and the same thing. The Southern Manganese Co., having electric furnaces, or making ferro by the electric process, is not a factor in commercial ferromanganese. The Lavino Furnace Co. and Mr. Marshall have acted in the past as practically one in making a price on ferromanganese, and where it has been possible to maintain prices they have acted in entire accord with one another.

Mr. Howard makes the immediate claim in his brief that ferromanganese should not be classed with pig iron or other semi-raw products, but as a "finished product." The writer really feels that there can be no possible argument as to an error in this statement. Ferromanganese is just as much a semi-raw material as pig iron, ferrosilicon or other products made direct from the ore. The best comparison as to the use of ferromanganese is that it is "the salt to the cook." No steel can be made without the use of ferromanganese for the purpose of deoxidizing or cleaning the semi-finished product. In making steel it is just as necessary as salt to the palate.

When he speaks of the necessity of having a ferromanganese industry in this country he must realize that up to the year 1914 all the steel works, with the exception of the United States Steel Corporation, and at times the Cambria and Bethlehem steel companies, purchased their ferromanganese where they could buy it cheapest, the above named concerns making ferromanganese for their own uses when they felt the necessity of so doing. The ore supplies at all times for any ferromanganese made in this country have come from foreign countries, principally Russia, India and Brazil, and as Mr. Howard rightly argues it would be useless hardship not only to the steel works but the producing companies to place a duty on manganese ore, as there is not sufficient manganese ore available within ordinary railroad transportation limits to induce the mining thereof. In fact, during the war, when every available part of this country was searched there was so little high grade ore discovered and that in such distant parts, that it would not be a factor in producing standard 78 to 80 per cent ferromanganese in this country.

Mr. Howard goes on further to state that in order to protect this new found industry the makers of ferromanganese should have a 25 per cent ad valorem duty based on American values. They require this duty not for the purpose of protecting the ore miners but for the sole and absolute purpose of making sufficient profit in the making of ferromanganese to keep this infant industry on its legs and at the expense of every user of ferromanganese in this country. He continues:

> The unfair methods practised by the foreign producers in the past lead us to conclude that only an exorbitant specific duty would afford the American industry adequate protection. It is for this reason that we should have an adequate ad valorem duty, with the added advantages of the American valuation plan to meet the situation.

> As the result of pernicious propaganda on the part of the American agents of the English ferromanganese producers the question has arisen why, when former tariff bills did not carry a higher duty than $4 a ton, it should now be necessary to impose a duty that would protect the manufacture of ferromanganese.

And again he states:

> The dominating factor of the foreign producers is the British pool, whose avowed purpose is to reclaim the American trade and to drive the American maker out of business by unfair competition.
>
> This unfair competition has already been brought to the attention of the United States Government and is in process of investigation by the Federal Trade Commission.

Since Mr. Howard has filed this statement the trial examiner of the Federal Trade Commission has submitted the proposed finding as to the facts and conclusions before the Federal Trade Commission. This has been filed after many hearings and much testimony has been taken, with the following results, and the writer quotes as follows from this finding, page 11, article 19:

> There was no collusion between the English principals of the respondents and none on the part of respondents to fix prices. Each was in active competition with the other and incidentally they were all in competition with such American producers as had ferromanganese to sell; the efforts of the English producers were solely directed to the sale of their own product; but at the same time they were anxious to obtain the highest price possible and were reluctant to reduce the selling price.

And again on page 13, articles 22 and 23, the following are the concluding sentences:

> There is not a scintilla of evidence that respondents or their principals commonly or systematically imported and sold ferromanganese in the United States at prices substantially less than the actual market value of ferromanganese in England.
>
> There is evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the industry of manufacturing ferromanganese in the United States, and there are no facts and circumstances proven from which such intent can logically or legally be inferred.

With such a distinct and absolute finding, there can be no doubt that all questions such as raised by Mr. Howard in regard to pool operations have been proved untrue.

In Mr. Howard's quotation from the London *Iron and Coal Trades Review* of Aug. 12, page 224, he has omitted the most important part of the quotation, which the writer will give herewith below, exact wording as published in this paper of the date referred to by Mr. Howard:

Ferromanganese:	£	s	d
76 to 80 per cent, loose	18	0	0
76 to 80 per cent, export	14	10	0
76 to 80 per cent, packed	19	0	0
American, 80 per cent d/d		$70.00	

Mr. Howard might not have been aware of the fact that "for export-English" means distinctly Japan, Australia, China or other countries outside of America. The American quotation is distinctly $70 d/d, or in other words $70 f.o.b. seaboard in this country. As recently as date of Aug. 12, the American price of ferromanganese was $65 to $68. Again, Mr. Howard, while giving the production of ferromanganese through the war period, neglects at the same time to give the prices of ferromanganese not only during this period but during the period of five years before the war. The writer furnishes herewith quotations as given in Metal Statistics for the period of 1909 to 1920:

	Aver.		Aver.
1909	$42.73	*1915	$92.21
1910	40.49	*1916	164.12
1911	37.25	1917	309.17
*1912	50.40	1918	245.83
*1913	57.87	1919	132.16
*1914	55.80	*1920	172.33

*Contract Prices Tariff Off. Oct. 4, 1913, $2.50.

The above merely gives the average for each year during this period, but if any one desires to consult the Metal Statistics he can obtain the prices month by month. It will, of course, be noted what prices were obtained by the American producers during the war period or when English ferromanganese was not available. It might have been of considerable interest to the readers of Mr. Howard's argument to note the profits of the American producers during the periods

in question. Mr. Howard has stated that the steel interests, as evidenced in their testimony, were not opposed to a duty on ferromanganese. The writer does not know what part of this testimony Mr. Howard refers to or to what extent the steel interests he refers to might agree to a duty placed on ferromanganese, but the writer has before him numberless letters protesting against this duty on ferromanganese as being purely a fraternal one for the benefit of practically one or possibly two interests, to which every maker of steel in this country will pay his toll.

There is no question at the present time that we are in a most extremely difficult position as to our export business. With Germany, France and England making a most strenuous effort to corral the business which we are most eager for and which is absolutely necessary for our steel works to have, it does seem to be poor policy to saddle every one of the makers with the extra cost of the added duty for the benefit of such a few as are now asking for this. Of oll the products which should come in free to this country it is conceded that there is a greater argument for ferromanganese coming in here at the cheapest possible price than possibly any other semi-finished material, for the simple reason that there are practically no ores that can make this product here.

If a high duty should be levied it would make just so much additional cost to every buyer of ferromanganese and every steel works in this country, even to those works that produce their own ferromanganese, as the added demand for manganese ore would be such that the price of this mineral would be greatly enhanced by the very great increase in the demand made here. If a duty were placed, it would be so purely for the sake of protection and benefaction, and not for revenue, and we believe it would be strongly against the feelings of the greater part of the Republican party.

FRANK SAMUEL.

Philadelphia, Sept. 16, 1921.

Embrittling Effect of Pickling Upon Carbon Steel

To the Editor: In an interesting article on page 334 (Aug. 11), Mr. C. J. Morrison claims that the perplexing problem of acid-brittleness in steel sheets and wire has at last been solved by the aid of the microscope. May I not, with all due respect to Messrs. Morrison and Zanzinger and to the art of metallography, advance a claim in behalf of the pioneers who, at least 50 or 60 years ago, following the general introduction of sulphuric acid as a pickling agent for wire rods, worked out the practice of baking rods and wire to remove acid-brittleness. It seems only just to admit that *they solved the problem* while our generation at most has been able to show the mechanism through which acid produces and heat subsequently removes the condition noted.

Even for the credit of this lesser achievement the chemist has a claim prior to that of the metallographist. It has been common knowledge in the wire trade for the past 10 to 15 years that acid-brittleness is accompanied by, and presumably the result of, the presence of hydrogen in solid solution in the steel, and that upon baking the steel at low temperatures, hydrogen is evolved and brittleness disappears. It is a well established fact that when hydrogen is generated as the result of an attack upon steel by the common mineral acids in hot dilute solution, a portion of the hydrogen is absorbed by the steel through the process of "occlusion" and the steel coincidentally becomes hard on the surface and brittle. It is susceptible of proof in the laboratory that such steel upon heating gives off liberal quantities of hydrogen and regains its original physical properties. The degree of dehydrogenation is a function of time as well as temperature. A short exposure to 500 deg. is no more effective than a longer exposure to 200 deg. and it is even possible to restore toughness to pickled wire by leaving it on the mill floor for two or three weeks with no other treatment. The subject has been sufficiently studied to convince the persons interested that the relation between occluded hydrogen and acid-brittleness is that of cause and effect.

Can Mr. Morrison say as much of the metallographical phenomena described in his article? It would seem to the writer that Mr. Morrison has said either too much or too little. The junction lines between grains are presumably nothing but geometrical lines, indicating planes of contact. They are naturally the first points of attack by acid. If they are actually widened by the action of acid, and this is not merely a surface phenomenon, comparable to the deep etching of a specimen, the result of such widening would presumably be not the embrittling of the steel but its complete disintegration.

I am not prepared to accept Mr. Morrison's conclusion that "brittleness is due to the increase in width of the junction line," nor, without further evidence, to believe that the increased width of the junction lines, except upon the surface, is regularly associated with acid-brittleness. If the widening exists as a surface phenomenon it is easily explained. If it persists throughout the steel it has not been explained at all.

KENNETH B. LEWIS,
Manager of Sales,
Morgan Construction Co.

Worcester, Mass., Aug. 24.

Universal Steel Classification Code

To the Editor: I have read with a great deal of interest the article in THE IRON AGE of Sept. 1, by Messrs. Knerr and Collins, entitled "Universal Steel Classification Code." After a careful study of the matter I believe their proposed system is superior to that of the S. A. E. and I wish to add my indorsement to their plan.

Under the present system of research and investigation new alloying elements of great importance are being discovered every day. A few years ago these elements were regarded as rare metals of insignificant importance. Several good examples of these are titanium, uranium, zirconium, molybdenum, all now finding their way into commercial steels. Who knows at what date some of the other rare elements may come to the front? If this were to happen it would require another revision of the S. A. E. code. Having now 14 elements of alloying importance, with only nine numerals to handle them, where and how would we be able to take care of six or seven more, without extending classification numerals indefinitely? Under the proposed method this is a very easy thing to do, having 24 possible letters, giving a large margin for the future without any change of the basic arrangement.

Take some of the following steels, for instance: Manganese, 18 to 20 per cent; nickel, 3.25 to 3.75 per cent; silicon, 0.40 to 0.60 per cent; carbon, 1.80 to 2.00 per cent; manganese, 14 to 17 per cent; nickel, 3.50 to 4.50 per cent; chromium, 1.00 to 2.00 per cent; silicon, 0.70 to 0.80 per cent; carbon, 1.40 to 1.70 per cent; manganese, 11.00 to 13.00 per cent; chromium, 0.40 to 0.70 per cent; silicon, 0.55 to 0.65 per cent; carbon, 1.10 to 1.30 per cent; manganese, 11 to 13 per cent; copper, 1.25 to 1.90 per cent; silicon, 0.40 to 0.60 per cent; carbon, 1.10 to 1.30 per cent. Then take the steels of the high nickel series; steels such as were used for helmets and rifle-proof armor during war time, containing carbon, 0.37 to 0.47 per cent; manganese, 0.95 to 1.05 per cent; nickel, 1.90 to 2.10 per cent; silicon, 0.15 to 0.25 per cent, and vanadium, 0.15 to 0.25 per cent. While these are all special or "X" steels, the proposed code gives a very simple way of showing their exact classification by means of letters. This would be a very difficult matter to accomplish by means of the numeral system.

The standardization of the alloy steels is a matter of great importance to both the manufacturer and the purchaser and a good system of classification would help greatly to promote a better understanding of the situation. The ability of the electric furnace to furnish high temperatures and the quality of product it makes possible will, I believe, bring many more elements before the steel world which heretofore have been considered of no practical value.

LARRY J. BARTON,
Metallurgist.

Southern Pacific Lines, Sacramento, Cal.
Sept. 8.

WORLD FOUNDRY EXHIBIT

To Be Held in 1922 by British Foundrymen at Birmingham, England

In connection with the annual convention of the Institution of British Foundrymen in 1922 it is proposed to hold an international exhibition of foundry equipment and materials during the convention week, at Birmingham, England. The exhibition will be open from June 15 to June 24 and will comprise exhibits from the United States, France, Belgium and England, embracing every phase of foundry work. It is the first exhibition of this nature held in England and an influential council has been appointed to make it a success.

Invitations to attend have been sent to the American Foundrymen's Association and papers will be contributed from this association as well as from the French and Belgian associations. The exhibition will include appliances and materials in connection with ferrous and non-ferrous foundry trades. English foundrymen are looking forward to seeing modern American foundry equipment and it is expected that the American manufacturers will take advantage of the opportunity.

The exhibition will be held in the large Bingley Hall, which is well adapted for the purpose, every convenience being provided for exhibiting plant in motion. As a large portion of the space has been applied for, it is necessary that American exhibitors send in their applications without delay, addressing them to the Secretary of the Chamber of Commerce, Birmingham, England.

Pittsburgh Foundrymen's Association Elects Officers

The first monthly meeting of the 1921-1922 season of the Pittsburgh Foundrymen's Association, held at the General Forbes Hotel, Monday evening, Sept. 19, was featured by the presentation of "The Story of Ingot Iron," a three-reel film prepared by the United States Bureau of Mines at the plant of the American Rolling Mill Co., Middletown, Ohio.

Appropriate resolutions were adopted for the late Bayard Phillips, secretary of the association for a number of years, who died Aug. 30.

E. D. Frohman, Pittsburgh district sales manager S. Obermayer Co., who attended the international convention of Rotary Clubs in Scotland last summer, and Samuel Sleeth, retired superintendent of the foundry of the Westinghouse Airbrake Co., Wilmerding, Pa., who made a trip last summer, recounted their European experiences.

Officers of the association and the committees for the ensuing year follow:

President, F. H. Clay, Allegheny Steel Co.; vice-president, Samuel B. Cuthbert, Carnegie Steel Co., Braddock, Pa.; secretary and treasurer, William J. Brant.

Executive Committee.—A. J. Hartman, United Engineering & Foundry Co.; John Field, Union Steel Casting Co.; John W. Guay, Fort Pitt Steel Casting Co.; Thomas A. Wilson, Rogers, Brown & Co.; W. B. Robinson, THE IRON AGE.

Foundry Fund Trustees.—William J. Brant; J. Lloyd Uhler, Union Steel Casting Co.; Charles H. Gale, Pressed Steel Car Co., McKees Rocks, Pa.

Program Committee.—W. B. Robinson, chairman, THE IRON AGE; George F. Tegan, THE IRON AGE; L. B. Snow, Hickman, Williams & Co.; William K. Frank, Damascus Bronze Co.; E. D. Frohman, S. Obermeyer & Co.

Membership Committee.—John W. Guay, chairman, Fort Pitt Steel Casting Co.; McKeesport, Pa.; Thomas A. Reynolds, McConway & Torley Co.; H. M. Meixner, Hempfield Foundry; Harry Petty, American Steel Foundry Co.; J. S. McCormick, J. S. McCormick Co.; Gustav A. Bauman, Jones & Laughlin Steel Co.

Social Committee.—A. J. Hartman, chairman, United Engineering & Foundry Co.; L. A. Way, Duquesne Steel Foundry Co., Coraopolis, Pa.; H. P. Spilker, Sterritt-Thomas Foundry Co.; R. W. Jones, Union Switch & Signal Co., Swissvale, Pa.; C. D. Carey, Verona Steel Casting Co., Verona, Pa.; O. C. Dobson, Carborundum Co.; J. Lloyd Uhler, Union Steel Casting Co.; W. S. McConnaughey, Armor Plate Department, Carnegie Steel Co., Homestead Steel Works, Munhall, Pa.; Everett Smith, Sterling Steel Foundry Co., Braddock, Pa.

COMING MEETINGS

September

Association of Iron and Steel Electrical Engineers. Sept. 19 to 25. Annual convention, Hotel La Salle, Chicago. Secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis. Secretary, L. F. Boffey, 19 Park Place, New York.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

A British View of the Tariff on Vanadium

Commenting on the proposed American tariff on metals, and alloys, the *Metal Bulletin*, London, has the following in a recent issue regarding vanadium alloys:

"In view of the proposed new American tariff on imported metals and alloys, it is understood that the Board of Trade has been asked to give the subject its attention, in the interest of British manufacturers. Vanadium is a special case in point. The United States possesses a fairly complete monopoly of this metal, but as the raw material is all derived from United States-owned mines in Peru, consumers in America will be prejudiced by the duty to be imposed. Furthermore, in the case of a British manufacturer exporting to the United States steel containing vanadium, a further duty would become payable on the vanadium content, notwithstanding that the vanadium had already paid duty in the form of concentrates.

"It is a curious instance of warped mentality which advocates the exclusion of overseas products from our market, and simultaneously protests against the exclusion of our products from overseas markets. Surely what is sauce for the goose is an equally toothsome relish for the gander. The way things are going at present there will soon be no geese and consequently no use for sauce."

New Set of Weight Cards

The American Sheet & Tin Plate Co. has issued a new and revised set of weight cards covering black sheets, galvanized sheets, and formed products. These cards are 14 x 20 in. and are clearly printed. They are of particular value to all buyers and users of sheet steel, who are requested to send for them. The company will also send one of its perpetual calendars upon request.

The Titanium Alloy Mfg. Co., Niagara Falls, N. Y., announces the addition of a commercial department to its physical laboratories. There are four units: Testing laboratory, metallographic laboratory, room for experimental heat treating and small experimental foundry.

How Steel Prices Have Been Liquidated

Analysis of the Basic Facts Shows Steel Lower Than All Other Products Save Those from the Farm and Certain Metals—Building Materials and Furniture Still High

BY SIDNEY G. KOON

PERSISTENT statements, said by a daily paper to have general acceptance in Wall Street, and that have been finding their way into the financial reviews and editorial columns of the Metropolitan dailies, are to the effect that "steel has not yielded adequately"—referring, of course, to prices. One paper had it, a few days ago, that the prices of building construction materials " had broken sharply * * * before much was said about a re-action of steel quotations."

What are the facts?

Finished steel is now 37 per cent above its 1913 average; building materials are still 98 per cent above their 1913 level; "all commodities," comprising the nine groups studied by the United States Department of Labor, are 52 per cent above 1913. The only items below steel now are farm products and some of the non-ferrous metals—practically all being raw materials. In general, they are not manufactured products to the same extent as finished steel, and hence contain less of the high cost of labor than is found in steel.

Furthermore, so long as the assembling of the raw materials to produce a ton of finished steel requires the railroad transportation of five tons of ore, coke, limestone, coal and many smaller items, the present abnormal freight rates will continue to hit steel harder than any other major commodity produced in the United States.

Steel prices today are lower, with relation to inescapable costs, than they were before 1914. In other words, the maker of steel beams, bars, rods, wire, plates, sheets and other products has a smaller margin between cost of materials, fuel, transportation, labor and supplies, and the price he can get in the open market for his product, than he had before the war. And that margin is now below his fixed charges; it was not so before.

The question then is:

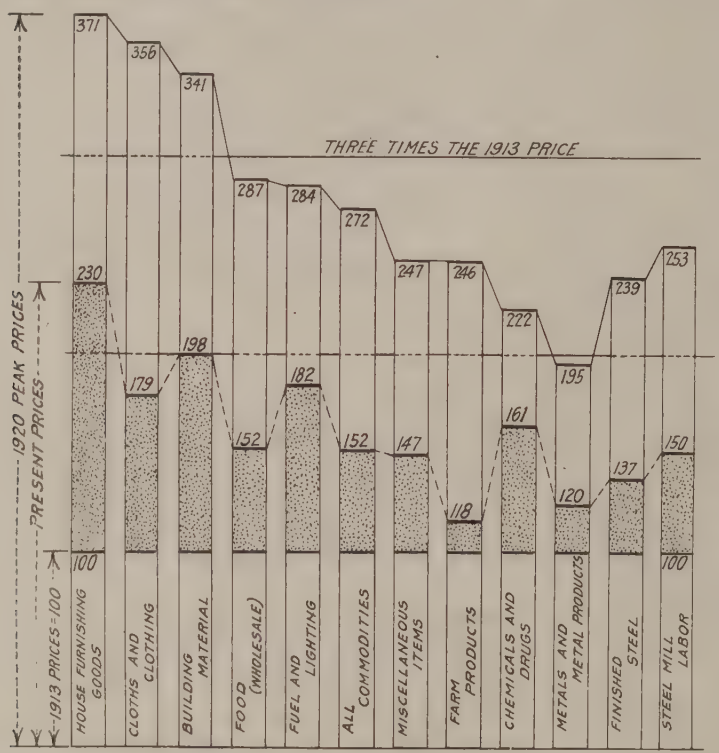
Just how much additional loss do these financial writers wish the steel industry to take in disposing of its output? Losses are now the portion of every manufacturer of steel. How much *more* loss is demanded before the admission will come that "steel has yielded adequately?"

A student of facts—not sentiment—will note that house furnishing goods are 130 per cent "up" from 1913; building materials, 98 per cent "up"; fuel and lighting, 82 per cent "up"; cloths and clothing, 79 per cent "up"; chemicals and drugs, 61 per cent "up"; while steel is only 37 per cent "up." Such an investigator, still in the pursuit of facts—not sentiment—may be pardoned if he wonders why writers in "The Street" are directing their fire at a class of products which have already yielded far more than any of the others mentioned—far more than the average of all.

If completion of general liquidation is desired—and few will question it—then it would seem that the greatest gain in that direction might come from attacking the prices of products which are farthest from it. Steel being, with few exceptions, nearest to pre-war figures, any raid on it must necessarily yield more meager returns than an equally vigorous drive on those in which there is evident profiteering, some being still more than 100 per cent above the pre-war level.

Now as to the facts back of the above figures:

For some years the Bureau of Labor Statistics of the Department of Labor, Washington, has collected prices from all over the United States, from which monthly index figures of the cost of living are prepared. These are all wholesale prices. On pages 100



Wholesale Prices of Nine Groups of Commodities, Together with Their Average, as Reported by the Bureau of Labor Statistics; at Right, Prices of Finished Steel, Based on THE IRON AGE Composite, and Wages of Common Labor, as Paid by the United States Steel Corporation

In each case the lower white section represents the price in 1913 (called 100). The total height of each bar shows the 1920 peak price reached by the corresponding item, the figure being shown also. The upper white section outlines the present recession from the peak of 1920. The shaded area indicates the amount by which present prices exceed those of 1913, the relative price to-day being also shown.

and 101 of the *Monthly Labor Review* for July, issued by the bureau, will be found quarterly figures from January, 1913, to January, 1918, and monthly figures from January, 1918, to May, 1921, inclusive. Average figures for each calendar year from 1913 to 1920, inclusive, are also given. Figures for June, July and August have since become available. All figures are based on the average for 1913, that average being placed at 100.

These figures cover the nine groups of commodities shown in the appended table, and the (weighted) average of all commodities. They do not include steel, as such, but cover it under the general heading "metals and metal products."

It happens that corresponding data for finished steel products are available in THE IRON AGE composite figures. During 1913, the average price per pound of steel rails, bars, beams, plates, sheets, wire and pipe was 1.663c. To-day (Sept. 19) it is 2.279c. Its 1920 peak was 3.974c. These figures, reduced to the basis of 100 for 1913, are shown in the table, as well as on the diagram. The seven products named represent 88 per cent of the total output of finished steel. THE IRON AGE composite is a straight average of the seven individual price figures.

Item	Average for 1913	Peak of 1920 Amount	Month	Present Figure
Farm products	100	246	April	118
Food, etc.	100	287	May	152
Cloths and clothing	100	356	Mar.	179
Fuel and lighting	100	284	Sept.	182
Metals and metal products	100	195	April	120
Building materials	100	341	April	198
Chemicals and drugs	100	222	Sept.	161
House furnishing goods	100	371	Sept.	230
Miscellaneous	100	247	June	147
All commodities	100	272	May	152
Finished steel	100	239	Aug.	137
Steel mill common labor	100	253	All	150

Let us look at it in another way:

Steel has receded 102 "points"; in 1920 it was "up" 139 points; its liquidation is therefore 73.4 per cent. Except for the other metals and the farm products and food, not another item has liquidated so much as 70 per cent. The figures follow:

Item	1920 Excess Over 1913	Present Drop in Points from 1920	Percentage Liquidation
Farm products	146	128	87.7
Food, etc.	187	135	72.2
Cloths and clothing	256	177	69.1
Fuel and lighting	184	102	55.4
Metals and metal products	95	75	78.9
Building materials	241	143	59.3
Chemicals and drugs	122	61	50.0
House furnishing goods	271	141	52.0
Miscellaneous	147	100	68.0
All commodities	172	120	69.8
Finished steel	139	102	73.4
Steel mill labor	153	103	67.3

Having studied these figures from all angles, the open-minded student of economics again faces the question:

Why do the Wall Street analysts and the financial writers strain at a 37-per cent gnat and swallow a 98-per cent camel, a 130-per cent elephant, several other 60-or-more-per cent lions? Would it be a help to better times to force the steel industry into the ruinous position of copper?

Railroads operating between Cleveland and Pittsburgh by way of Youngstown have been requested to reduce the rate on iron and steel from Pittsburgh to Cleveland. The rate of 24c. per 100 lb. is higher than the combination of the local rate from Pittsburgh to Youngstown with that from Cleveland to Youngstown. Each of these rates on steel is 10½c. per 100 lb., making the combination rate 21c. The demand for the cut is made by Cleveland interests buying steel in Pittsburgh. A hearing was conducted Sept. 14 at Columbus by representatives of the Interstate Commerce Commission.

The American Society of Safety Engineers will hold a meeting at the Engineering Societies Building, New York, Sept. 23, at 8 p.m., at which the tentative safety code for ladders will be discussed.

More Steel Men at Higher Wages

Employment in iron and steel works has taken a turn for the better, according to the August report of the Bureau of Labor Statistics, which shows a gain of 4.9 per cent in number of men employed in 113 plants, as compared with July, and a gain of 15.4 per cent in the payroll, evidencing a decrease in the proportion of men working on short time. Of course, the figures are far below those of last year, but the improvement is the first in some time.

It will be noted that the men in automobile plants are making, on the average, about 75 per cent more per day than the men in steel mills. Workers in car building and repairing are making 42 per cent more than those making the steel with which the others work.

Comparative figures for July and August, 1921, and August, 1920, in iron and steel mills, automobile factories and car building and repairing shops follow:

Month	Number of Establishments	Number of Men	Half-Month Payroll	Average Pay Envelope
Iron and Steel				
July, 1921	113	97,902	$3,774,977	$38.56
August, 1921	113	102,698	4,357,361	42.43
August, 1920	116	180,797	13,879,882	76.77
Automobiles				
July, 1921	47	78,908	2,620,015	*33.21
August, 1921	47	74,283	2,522,602	*33.96
August, 1920	52	129,194	4,549,257	*35.22
Car Building and Repairing				
July, 1921	61	43,373	2,569,383	59.24
August, 1921	61	44,201	2,672,613	60.47
August, 1920	61	70,198	5,113,734	72.85

*Weekly.

Fabricated Steel Business in August

The amount of business booked for fabricated steel work in August showed that the recent rate has been well sustained. The total for August, according to the statistics collected by the Bridge Builders and Structural Society, George E. Gifford, New York, secretary, was 59,300 tons, compared with 60,200 tons for July. The percentage of the capacity of the country's bridge and structural shops taken by the August bookings was 33, against 33½ for July. The average for the six months ended with August was 57,550 tons, the leanest month being May, with 50,800 tons, and the best month June with 66,900 tons. The business for January and February totaled no more than 57,600 tons for the two months. The total bookings for the eight months, 403,000, was 28 per cent of rated capacity.

Canadian Production of Pig Iron, First Half of 1921

Canada's output of pig iron for the first six months of this year amounted to a little less than 70 per cent of that for the corresponding period of 1920. The actual figures for the six months' period were 309,206 long tons in 1921 and 449,810 long tons in 1920. The bulk of the output was basic iron, about one-fifth of the total being foundry iron, and a small percentage malleable iron. The output for June showed a further decline from preceding months.

On the other hand, the production of steel ingots and castings in June was the largest for any month up to the present time, the total being 64,103 long tons, or an increase of more than 12,000 tons over the May figure. The June production for this year is somewhat higher than the pre-war monthly average. The total for the six months' period, however, shows a larger slump from the level of 1920 than is the case for pig iron. The total for the half year in 1920 was 547,000 tons, as compared with 259,000 tons in 1921.

The Missouri Iron & Steel Corporation, St. Louis, with properties at Haigart, Mo., and the St. Louis Iron & Steel Co. have been merged, and the name changed to the Consolidated Steel & Iron Corporation. The board of directors also has authorized the issuance of $2,000,000 of preferred stock.

INDUSTRIAL LEADERS

Well-Known Manufacturers Among Members of Unemployment Conference

WASHINGTON, Sept. 20.—Among those accepting invitations of the President to be members of the unemployment conference, which is to begin at 10 o'clock next Monday, are Chairman Charles M. Schwab of the Bethlehem Steel Corporation; President Clarence Mott Woolley, Detroit, of the American Radiator Co.; William Kelly, Vulcan, Mich., of the Penn Iron Mining Co.; President T. E. Edgerton, Nashville, Tenn., of the National Association of Manufacturers, and President Joseph H. DeFrees, Chicago, of the Chamber of Commerce of the United States. In all, 37 had accepted invitations to attend the conference, in addition to members of the Economic Advisory Committee of the Department of Commerce, and other replies are expected. It was intended at first to confine the list of members to 25 or 30, but it was found necessary to enlarge it.

Secretary of Commerce Hoover has been appointed by the President as chairman of the conference, and, it is announced, it is expected that it will at once dissolve into special committees for the formulation of definite plans for submission to the conference as a whole. These committees will, no doubt, it is stated, seek co-operation from further representatives of labor, employers, and civic bodies in formulation of their views. Secretary of Labor Davis, who, of course, will be a member of the conference, has been directing a renewed survey of unemployment in preparation for the conference and co-operating in making the plans for it.

The invitations of the President state that "The conference is called to inquire into the volume and distribution of unemployment, to advise upon emergency measures that can be properly taken by employers, local authorities and civic bodies, and to consider such measures as would tend to give impulse to the recovery of business and commerce to normal."

In the announcement given out by Secretary Hoover it is stated:

"In naming the members of the conference, it has been the desire of the President to secure geographic representation and at the same time have regard to the different elements of the community who are interested and can be helpful in the problem without any attempt at proportional members of particular groups. Those of experience in those industries where there is the largest degree of unemployment have been called upon in larger proportion than from trades where there is less unemployment difficulty. It was impossible to include representation of the whole of some 50 trade groups in the conference and hold its size within workable limits."

Organized labor is to be represented by a number of conferees, among them being President Samuel Gompers of the American Federation of Labor.

AGAINST STOP-WATCH STUDIES

A Second Address by Frank B. Gilbreth Before Members of the Taylor Society

At a dinner meeting of the New York section of the Taylor Society, held at the Flatiron Building restaurant, Sept. 15, Dr. Frank B. Gilbreth, consulting engineer, Montclair, N. J., continued his arraignment of stop-watch time studies in a paper entitled "Micro-Motion Study for Current Use." In it he replied to criticisms of a previous paper of his, made at the April 11 meeting of the Philadelphia section and subsequently published in the June Taylor Society bulletin. In publishing the criticisms, the editor, Dr. H. S. Person, managing director of the society, asked Dr. and Mrs. Gilbreth for more data—descriptions of cases and figures contrasting micro-motion and stop-watch results and suggested a continuation of the discussion of time study. Dr. Gilbreth was vigorous, both in matter and in manner, in making his answer and the evening's discussion was at times heated. The paper, which was a detailed refutation of the arguments of the opponents of micro-motion studies, was read only in part. In summing up, Dr. Gilbreth said:

"According to the managing director of the Taylor Society, the one and only point remaining at issue is conceded to be 'whether the stop-watch technique is so unscientific as to be unsuitable for the determination of standard times and standard rates as a basis for current wage contracts.' What proof has been offered, and in the light of the evidence by what stretch of the imagination can the inaccurate non-method recording stop-watch method be called scientific?

"We have shown that the Taylor philosophy does not countenance standard rates unless founded on real standard times. This leaves simply standard times for current use.

"We ask now, Do the stop-watch advocates still want times for current use only? If so, we claim that even then we can secure more accurate data for less cost.

"If they concede any use for such data in addition to 'current use,' we have still further won our contention, on this one remaining point at issue as to the relative merits of the two methods, for we can furnish all such necessary data, whatever its use.

"Our data are and will continue to be accurate, and their cost as used for current use is and will be negligible, for our data for current use are a by-product of data for permanent use.

"Dr. Person has made certain requests, for the Taylor Society and the public. We have been and shall be glad to accede to these requests. We now consider ourselves justified in making a few requests, as follows:

"1. Of the stop-watch time study men, that they state exactly what they claim their inaccurate non-method-recording stop watch can do for standard times for 'current use' that the micromotion study method cannot do far better.

"2. Of the Taylor Society, that after such data as are requested are submitted, it evaluate the data and publish the findings, without fear or favor, for the sake of science in management.

"3. Of the Taylor Society, that it determine at once the stand that it proposes to take on the subject of accuracy of fundamenal data of management and decide whether it intends to live up to its name as a 'society to promote the science of management' or not.

"4. Of Dr. Person, that he write a paper in which he reviews the 'creed of the management engineer' in its relation to time study and estimates the extent to which this society has lived up to that creed, laying special stress upon keeping faith with one's science and one's fellow engineers, for such faith lies at the base of faith with one's clients and with the community."

Among those taking part in the discussion were Dr. H. S. Person, W. N. Polakov and W. H. Leffingwell. The chairman of the meeting was H. A. Hopf, of the Federal Reserve Bank.

The Basset Direct Process Not Yet Commercial

The report of the Société d'Ougrée-Marihaye (Belgium) a large shareholder in the French Basset Co., warrants the conclusion that the Basset process of iron and steel manufacture has not yet passed the experimental stage, and that the revolution in metallurgy promised by M. Lucien Basset seems still to be far from realization. This statement is made by the London *Ironmonger*.

Ford cars to the number of 117,696 were shipped in August; Studebaker cars were 8642 in number. Shipments of automobiles amounted to 2 per cent above July, but were 28 per cent below August, 1920.

Great Activity at German Steel Works

Most Mills Sold Up for This Year—Semi-Finished Materials Scarce—Heavy Export Selling, Particularly in Railroad Lines

(By Aerial Mail to London)

BERLIN, Sept. 2.—The heavily increased demand in the German iron and steel market which set in with the renewed drop of the mark three weeks ago has assumed still greater proportions and industry is evidently on the eve of another boom period which may outrival that of 1919 to 1920. Prices have been climbing at an unprecedented rate during the past few weeks and there are no indications of a slowing down as yet.

An examination of the causes responsible for the tremendous activity obtaining at the mills shows that the depreciation of the German exchange represents a large share of the present prosperity, evidenced by the heavy export orders. In the domestic market, too, the effects of the fresh deterioration of the mark are noticeable. Customers are anticipating further price advances resulting from dearer raw materials and are overwhelming mills with orders. Aside from the purely speculative reasons, there are other underlying motives of the present boom. The proposed new taxes, whatever their ultimate form, will lead to a general increase of production and living costs. The latter have already sharply risen during the past month and show a further upward tendency. Strikes have been more numerous of late and may be considered as a prelude to another period of wage claims. Serious economic disturbances appear unlikely, as industry has done very well during the past year and can well afford to pay increased wages. The "buyers' strike" no longer exists. It is noteworthy that the rapid upward trend of the market is in a measure caused by a gradual revival of the building trade, where many big projects such as canals, locks, long distance power stations, etc., call for fairly large tonnages of material.

Many Mills Filled for the Year

Under pressure of the enormous demand, mills are finding it difficult to cope with incoming orders. Rhenish-Westphalian mills are now, generally stipulating terms of delivery ranging between 3 and 4 months and most of the mills are sold up for the remainder of the year. Such is the activity in some departments that mills frequently refuse orders or deliberately quote prohibitive prices.

The heaviest price increases have been in the sheet market where 3100 m. ($29.55) per ton is now being named for light plates as compared with 2000 m. ($19.00) at the end of May. Bar iron has jumped to 2700 m. ($25.65) and the Hösch steel works is reported to be asking even 2800 m. ($26.60). The Krupp-Rheinhausen is offering limited quantities of material only, because of the heavy call by the various works of the concern, and the same applies to the Gutehoffnungshütte. The Dortmunder Union has still a limited tonnage to clear off; Phoenix is accepting bar iron specifications for larger gages only. Thyssen, Rhenische Stahlwerke and Haspe are still in a position to meet the demand though quoting higher prices.

Increased Demand for Pig Iron

With the general improvement, a better tone prevails in the pig iron market. Demand by foundries is active and shipments, which showed an increase of 25 per cent during July compared with June, registered a further increase in August.

There is a marked scarcity of semi-finished material. Sheet mills are reporting very satisfactory orders, particularly in light plates, while heavy sheets are less in demand because of the temporary lull in shipbuilding caused by the slump in ocean freight rates, the repurchase of former German vessels, and the precarious situation in international shipbuilding. By far the greatest activity prevails in the wire market, where domestic customers have difficulty in obtaining material, as mills are engaged on large export orders. Base prices for wire nails are around 330 m. ($3.14) per 100 kg. and for open-hearth bolt and rivet stock 350 m. ($3.33) is named. Large export sales of galvanized wire have been made recently with prices in the neighborhood of £12 15s. 6d. ($48.29) per metric ton f. o. b. Hamburg, for No. 8 gage. Demand for barbed wire is also good although prices have not been advancing as rapidly, latest export quotations being 400 m. ($3.80) per 100 kg. f.o.b. Hamburg. The majority of wire mills have specifications on hand for four months ahead and small orders for early delivery are only accepted at premiums.

Export Movement Growing

It is evident that the prolonged struggle in the English coal mining industry as well as the conditions which recently prevailed in Upper Silesia have enabled the Rhenish-Westphalian industry to strengthen its position in the international market. "The German iron industry, aided by the low value of the mark, has at present very little to fear from foreign competition, with the possible exception of the United States." This is the view of a prominent industrialist. Foreign inquiries and orders have been rather numerous, even Belgians appearing as buyers. Japan and China have been heavy buyers of bar iron, while Holland and the United Kingdom have been in the market for rails and track supplies. Apart from wire and wire products, bar iron and sheets are the principal export items. Scandinavian customers have lately contracted for large shipments of light plates, particularly dynamo and transformer sheets. The Russian Soviet Government is also actively buying and has just closed for immediate delivery of a large tonnage of wire nails. Some of the export orders include railroad cars for Belgium, while the agricultural machinery and implement manufacturers have booked substantial orders in Holland and Roumania. The Steffens & Nölle construction shops have just been awarded the contract for the building of a railroad bridge across the Nirova, at Narva, by the Esthonian government. The contract will probably total 26,000,000 Esthonian marks. The German tender is stated to have been 11 per cent lower than the lowest British offer. A list of 10 cranes to be erected at the port of Reval will probably also go to German firms. On tenders recently issued by the Bulgarian Government for railroad freight cars, German quotations were lower than French, Belgian, Italian, and Czecho-Slovakian competition and were close to the lowest bidder, Hungary.

We quote as follows per metric ton; with prices for export averaging 5 per cent higher:

	Marks	
Ingots	1,650	$15.67
Blooms	1,900	18.05
Billets	1,900	18.05
Sheet bars	1,950	18.52
Bar iron	2,700	25.65
Structural shapes	2,650	25.17
Squares and rounds	2,550	24.22
Flats	2,400	22.80
Angles	2,500	23.75
Hoop iron	2,600	24.70
Wire rods	2,700	25.65
Sheets, heavy	2,200	20.90
Sheets, medium	2,500	23.75
Plates, light	3,100	29.45
Sheets for stamping, planished	4,000	38.00
Sheets, galvanized	5,000	47.50
Pipe		
Boiler tubes, 2½ in., per meter	22	0.21
Boiler tubes, 3 in., per meter	33	0.31
Gas pipe, 1 in., per meter	11	0.10
Gas pipe, 1½ in., per meter	18	0.17
Gas pipe, 1 in., galvanized, per meter	27	0.26

The Heller Brothers Co., 879 Mount Prospect Avenue, Newark, N. J., has merged its subsidiary organizations, the Rex File Co. and the Vixen Tool Co., under the Heller Brothers name.

BELGIAN MARKET IMPROVES

Decline in Prices Halted—Mills Make Better Deliveries Than Germany—Government Buys 60,000 Tons of Rails

(Special Correspondence)

CHARLEROI, BELGIUM, Sept. 3.—Following a period of almost unparalleled depression, the Belgian market latterly has shown distinct signs of improvement. It is too soon to anticipate a steady advance of prices during the coming months, but it means much that the downward movement of prices has been halted. Prices had reached a level which rendered profitable operation of mills impossible. Three factors of the recent improvement merit attention: First, it should be borne in mind that production had been reduced to a minimum during the past few months, output of pig iron in July amounting to 45,000 tons compared with 93,000 tons average monthly production during 1920. Obviously any slight increase in demand would immediately affect the market and recent weeks have shown clearly that production was inadequate to meet the demand. Second, the German iron industry is brimming with activity and while German quotations are lower than any Continental prices, the mills are unable to compete with Belgian producers on delivery. So great is the discrepancy in terms of delivery that in many markets German competition is practically eliminated for the present. Third, inquiries and orders from abroad, especially overseas, have been rather satisfactory of late. Japanese importers have been active in the Belgian market during the past fortnight.

The Saint-Léonard Co. at Liege has secured an order from a Spanish railroad company for 20 locomotives and tenders on a bid of 3.67 pesetas per kilo for engines and 1.92 pesetas for tenders, the total contract being valued at 5,562,000 pesetas. The Compagnie Centrale de Constructions, Haine-St. Pierre, has booked an order for 250 cars for China. The Franco-Belge Co. at La Croyere have orders on hand valued at 76,000,000 fr. China placed an order for 13 cars, 12 freight cars, and 8 bridges of 30 meters span each with the Ragneno Works at Malines, totaling 9,000,000 fr. A rail order for 4000 tons for the Dutch colonies went to the Rehon works of the La Providence Co. at Marchienne-au-Pont.

Outstanding in domestic business is the Government order for 60,000 tons of rails and track supplies.

Iron of British Analysis Produced

An interesting feature of the pig iron market, aside from the resumption of operations at some stacks which have been idle, is the adaptation of production to English demands. The Providence Belge, for instance, is now producing a special grade of pig iron of high manganese and low phosphorus content such as is turned out by Scottish furnaces. For this grade 265 fr. per ton is asked compared with 225 fr. for inland foundry iron No. 3. The present price of Belgian basic pig iron is around 185 fr.

Demand for semi-finished material has also been better during the past fortnight. Although supplies of domestic producers are not large, no arrangements for increasing production are reported, so far mills evidently preferring to continue obtaining their material from France and Luxemburg. Nominal quotations are as follows: Basic blooms 280 fr., basic billets 295 fr. sheet bars, 315 fr. With foreign material dominating the situation, however, there can be no consideration of a "Belgian" market in semi-finished material.

The general improvement is reflected in a hardening of prices for finished material although no distinct betterment can be reported as yet. Beams, bolts and nuts, and the tube market are still unsatisfactory but hoops and sheets as well as bars have recovered. Export quotations for Belgian mild steel bars advanced by 2s. 6d. to £8 2s. 6d. to £8 5s. probably as a result of a rise in Luxemburg export quotations. Wrought iron bars No. 3 also registered a slight recovery, quoting about £8 12s. f.o.b. Antwerp, while No. 2 iron remained stationary at £7 10s. to £8. No material change has taken place in domestic quotations. A marked revival is noted in the hoop iron market where present export prices have reached the 500 fr. level compared with an average inland price of 520 fr. and some makers even naming 550 fr. Cold rolled material, however, under pressure of German competition, has remained unchanged. The rail market, through recent substantial domestic and foreign orders, is developing favorably with prices tending upward. A rapid change has come over the wire market. Although the mills had to lower domestic and export prices toward the middle of August, the past fortnight brought a fair volume of orders, particularly from the Far East, for wire rods and products, sending prices up to the level of the first week of August. We quote galvanized wire for export at 18s., plain bright wire at 14s., barbed wire at 20s., and nails at 14s. per 100 kg. f. o. b. Antwerp. Tube prices were reduced 5 per cent.

Exports of Pig Iron, Bar Iron and Rails Increase

A factor in the further improvement of the market is the extent to which French competition may be effective. It is noteworthy that the Government recently made a 50 per cent reduction in freight rates on ores from the frontier to Liege and Charleroi, which corresponds to about 10 fr. per ton and is expected to result in cheapening of production costs by 30 to 40 fr. per ton. It is hoped that this reduction will bring Belgian prices to a competitive basis. On the other hand, this advantage is offset by the marked reduction of French coke prices (30 fr. per ton) while the declared readiness of the French Government to lower freight rates on iron and steel with a view to aiding export trade is being seriously considered. Belgian iron and steel exports during the first half of 1921, compared with the same period of 1920, are shown below:

	Metric Tons	
	1921	1920
Pig iron	61,251	4,698
Semi-finished	3,100	2,700
Sheets and plates	61,910	52,997
Bar iron	223,978	139,771
Beams, girders, etc.	19,767	18,061
Rails	67,344	15,570
Wire and wire nails	29,000	30,000
Cast-steel products, machined	33,000	27,700

The bar iron figures are significant. Not only have shipments been nearly doubled compared with 1920 but a comparison with the 1913 figures—308,706 tons, shows that this year's exports are 75 per cent greater than those of the last peace year.

Situation in France Unfavorable

LONGWY, FRANCE, Aug. 29.—Very few furnaces are in operation in Lorraine, only 18 units working out of the 67 existing furnaces. The de Wendel works is responsible for 9 furnaces, Knutange for 2, the Hagondange works 3, Rombas 2, Auduh 1, and Thionville works 1 furnace. In Strassburg the labor agitation against wage reductions is still acute and the workers are returning to work with great reluctance. The coal traffic at the harbor of Strassburg is increasing, large quantities of fuel being shipped from the Ruhr and Sarre districts.

It does not appear that the reduction of 50 francs per ton in the price of coke will seriously affect the price of pig iron. The pig iron producers have been operating at a loss and no substantial reduction seems possible. The manufacturing consumers of iron are complaining that no reduction has been decided on in the price of fuel for their use, the decline of 50 francs applying only to the steel works and furnaces.

In the automobile industry there is a slight improvement. The Peugeot works is now producing 700 cars and 250 motorcycles per month. French manufacturers are extremely anxious to receive a share of the large specifications which have been submitted to them recently. Two steel works have booked 12,000 tons of heavy section rails. Output in light sheets is so curtailed that it is almost impossible to obtain sufficient for the automobile industry.

ON THE ART OF BUYING

Profits and Growth of Business Depend Upon Wisdom in Purchases

BY JOHN J. RALPH*

Buying is the crystallization of all thought, initiative, planning and dreaming of the entire organization. It is the most important single concrete thing done by the entire organization. All moneys received from any source, less profits and plus losses, are expended as a result of past or present buying.

In all times the prophet has been the most honored of men and considered to be the wisest. The past is past and we can find those who can tell of it. The present is here and what is is. The future is to come and who can tell what is to be? Yet every purchase made is a gamble on the buyer's foresight into the future.

For every purchase made the buyer receives his reward. If wise, it is profit; if unwise, a loss. Further, every unmade purchase which hindsight shows would have been wise nets a loss in profits foregone. Caught between alternatives, he must buy, for unless he buys he cannot sell.

In ordinary times, when conditions are seemingly constant and the future cast in the same mold as the present, and there is no indication of crisis, the problems of buying seem simple. Just anticipate the same for to-morrow as is happening to-day, plus the normal increase or less the normal decrease.

Mistakes in buying are absorbed without realization of the foregone profits, and not until they have sapped the life blood and there is no longer vitality to meet new competition, changed industrial conditions, or new methods of production, are mistakes realized.

Buying as a Function of Management

Buying is not an independent operation. It is a distinct function of management and is the final declaration of decisions reached. Costs are a combination of the results of past buying and present purchases. Overhead is the cost of capitalized past buying. Running expense is the cost of present buying. Sales costs are the price paid for the distribution of product.

What fixes the price obtained for product? Demand, competition and supply. Competition is largely misunderstood. It embraces competition of dissimilar goods as well as the struggle between producers of the same article. This very largely fixes price. Profits are the difference between price and cost, are they not? Yet cost is the price of buying.

Buying is an opportunity. Always there have been those who made profits in every line. To-day in almost all fields there are those starting out who will grow, and some who will become great. This will come because of their management, and the final showing of their management will be in their purchases.

Some will purchase with foresight. Others will live through their ability to purchase knowledge and skill. Not a few will score through wise buying of production equipment. Money is the master instrument of others, while many will find their living margin in their ability to obtain distribution at low cost.

A certain amount of foresight in each of these will insure success. Pre-eminence in each will make certain not only growth but phenomenal results.

The high cost of sales is really the high cost of buying. Who pays the selling cost in any industry? The man who buys the products of that industry. And he pays the cumulative cost of all the previous buying, clean down to the raw materials as they are taken out of the earth.

The Different Elements in Buying

All buying is not equally important. The purchase that saves ten dollars per year for ten years is many times more important than the purchase that will save twenty dollars this year. Neglecting to make a purchase that will make ten dollars for ten years is many times as serious an oversight as that which loses twenty dollars in the bill that comes in to-morrow for goods to be used immediately.

Of prime importance is, of course, the basic purchase involving site and building selection. On this will depend largely the overhead the plant will be under during its natural life. Labor, taxes and transportation ease or trouble are what are bought with the site and building, also an interest charge. These will have their effect on every dollar's worth of product put out. Hidden away in the balance sheet, not realized for what it is, for all the coming years it pays dividends for foresight or takes toll for the lack.

Of less importance is the equipment, for the life of this is not so long, and losses here can be more easily seen and remedies applied. But the importance is greater per dollar of purchase than for current goods, because it is also a mortgage on the future, and the product cost sheet renders a daily and yearly judgment on the quality of the purchase.

Per dollar, current buying is the least important, for it is in the plant to-day and released to-morrow. The total of profit and loss is small per unit and is quickly taken. Yet while it is the least important, it is the most insistent in making itself recognized. If one's judgment has been vindicated, the proof is easy, and quickly seen in the variation of price level or in the ease or difficulty of passage of product through the shop. If that judgment has been bad, there is the pile of scrap in the yard that tells of poor quality, the customer's complaint, or the tell-tale market quotation.

Yet even in this purchasing there is one type of error of judgment for which there is no penalty record. Where in the balance sheet is the item that says—

Lost Sales due to:

Improper working tools and consequent lack of quality?

High prices, the result of cumulative bad buying?

Poor prices due to:

Inferior product or out of date design and materials?

Neither these nor several other items are to read from the yearly balance sheet, for that tell-tale shows only what was done, and offers no recrimination on the results and penalties paid for sins of omission.

The Influence of Quantity

The design and characteristics of the output having been settled, there is a tendency to consider the matter closed, and to feel that further buying for materials and current supplies is merely a matter of form. This is not correct. No judgment that covers a period of time should be treated as absolutely right, for there is always an advance possible in the art, whether in the development of new materials, new methods of manufacture, or new possibilities of perfection of output.

In many cases the savings possible on any one piece are extremely small, but the cumulative effect may well be large. Five dollars is not large, but five dollars net is 5 per cent on $100 of investment, and it is upon net returns on investment that the health of any enterprise depends.

* 40 Flushing Avenue, Jamaica, N. Y.

Electrical Engineers Meet

CHICAGO, Sept. 20.—The Association of Iron and Steel Electrical Engineers convened at Hotel LaSalle, Chicago, yesterday, for a five-day meeting, with an attendance of 500. On Tuesday afternoon, the members were the guests of Chicago independent steel mills at an outing held at Northwestern Park, near Chicago. Games and dancing were features of the program. The association has added 125 members in the last nine months, its present enrollment being 1350.

The first meeting of the newly organized Associated Technical Societies of Detroit, was held in the Detroit Board of Commerce, Sept. 16. Prof. John C. Parker, of the University of Michigan, presented the ideas and aims of the new organization. Every technical association in Detroit was represented at the meeting.

Iron and Steel Markets

IMPROVEMENT HOLDS

Chiefly in the Lighter Products

An Advance in Sheets—Heavy Lines Still Unstable

The steel trade recognizes the good effect of the stir in the wire trade connected with the recent price advance, and on a smaller scale the sheet market has had some notice in the past week. Three or four independent companies have announced an advance of $5 per ton. It is not yet clear how far this will be followed. The Steel Corporation has made no change, though it is expected to do so, and thus far the chief effect has been to give a few mills more sheet orders at their former prices than they have had in some weeks.

The larger contribution the lighter products —wire, sheets and tin plates—are making to current mill operations is emphasized by a further slight increase in total steel output, as expressed in ingots, at the same time that the heavier products —rails, plates, structural shapes and bars—show on the whole no increase.

A gradual increase in the buying of steel, even though actual consumption may not change in any marked degree, is a common expectation for the autumn months, but buying for forward delivery is not looked for until 1922. Meanwhile there is a definite effort by steel manufacturers to limit their losses on current business. Plate mills particularly have suffered, and in several cases such mills have been shut down to await some sign of price stability.

An effort is being made in the Pittsburgh district to lift the prices of semi-finished material. Recently on a 5000-ton inquiry for slabs $29 at Youngstown was quoted, as against the usual $30, but later the $29 price was withdrawn.

There are indications that makers of hoops, bands and strips will make a stand for a $5 advance over the recent low level in that line.

Reductions in wrought pipe announced Sept. 16, amounting to $8 to $10 per ton on standard and line pipe, only recognized formally the lower basis on which sales had been made for some time. There is a $10 reduction on lapweld steel boiler tubes, but the seamless tube trade continues without published prices. Presumably iron pipe will not remain above the level of steel.

Structural steel lettings, which at times seem to be increasing, are shown to have been fairly uniform for six months ending with August. The August total was 59,300 tons, or about one-third of a month's fabricating capacity, while the six months' average was 57,550 tons. Lower prices continue to be reported on fabricating and erecting. At Chicago the uncertainties of building trades wages are holding back much projected work.

Recent price advances on Northern pig iron have given Southern iron an opportunity to come into Northern markets, but no large sales have been made. Considerable business is still pending in the East, including one inquiry for 10,000 tons from a Massachusetts melter. Some eastern Pennsylvania furnaces have advanced their quotations 50c. and sales of 5500 tons of basic in the Pittsburgh district have been accompanied by an advance of 25c., making the prevailing quotation $19.25, Valley. Buyers in the Chicago district are specifying more freely and throughout the country the pig iron market is showing more firmness.

On the present low rate of production sellers of pig iron still have a margin on which prices may be edged up further, without giving owners of idle furnaces encouragement to blow in.

Inquiries for small lots of lake iron ore have been received at Cleveland from companies which usually produce steel-making iron only, but are considering going into the manufacture of foundry iron if suitable ore can be obtained at price concessions. It is now estimated that the shipments of ore by lake will not exceed 21,000,000 tons.

The reduction in British ferromanganese to $58.35 at Baltimore and Philadelphia has led to a fair amount of buying, and domestic ferromanganese has been reduced to equivalent delivered prices.

Exports of iron and steel for August are estimated at 73,792 tons, apart from several unimportant items unreported. This is the lowest tonnage since January, 1909, and compares with 86,523 tons in July, 1921, and 431,484 tons in August, 1920.

On the recent 4000-ton Japanese rail order placed in this country the delivered price was slightly under $50, much of the freight being absorbed by Japanese interests having vessel space. Another export inquiry on which there is sharp international competition is for 16,000 tons of 80-lb. rails for the Bolivian Government.

Pittsburgh

PITTSBURGH, Sept. 20.

Realization on the part of steel manufacturers that recent prices over-discounted such benefits as have accrued from the liquidation of labor and other costs is finding reflection in an effort to put back prices to levels more nearly in line with present day conditions. The Brier Hill Steel Co. and the Inland Steel Co. in the past week announced an advance of $5 per ton in the prices of sheets, and this step has been followed by all but a few of the other independent makers. The American Sheet & Tin Plate Co. has not yet taken action, although it is admitted officially that it will make this advance. Effort also is being made to lift the prices of semi-finished material and it is probable that before this week ends makers of hoops, bands and strips will announce an increase of $5 per ton over the recent low point. Meanwhile, the recent advance in wire products gradually is being established, at least on nails, sales of which have been made at $2.90 base, per keg, Pittsburgh. Actual advances in other products are lacking, but in a broad way steel manufacturers are making a good deal of an effort to get away from ruinous prices, as recent competitive quotations are commonly designated. The only exception to this trend has been steel tubular goods, which the National Tube Co. reduced $8 to $10 per ton, effective Sept. 16, this reduction being met by all of the independent makers.

Fairly good business continues in the lighter

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton:	Sept. 20, 1921	Sept. 13, 1921	Aug. 23, 1921	Sept. 21, 1920
No. 2X, Philadelphia‡	**$21.34**	$20.84	$20.84	$53.51
No. 2, Valley furnace†	21.00	21.00	20.00	50.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	22.00	22.00	20.00	46.00
Basic, del'd, eastern Pa.	19.25	19.25	19.00	51.26
Basic, Valley furnace	**19.25**	19.00	18.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	22.00	22.00	20.00	46.50
Malleable, Valley	20.00	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.46	50.96
L. S. charcoal, Chicago	33.50	33.50	33.50	58.50
Ferromanganese, del'd	*60.00*	70.00	70.00	....
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	60.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	60.00
O.-h. sheet bars, P'gh.	30.00	30.00	30.00	67.50
Forging billets, base, P'gh.	34.00	34.00	34.00	75.00
O.-h. billets, Phila.	35.74	35.74	35.74	65.74
Wire rods, Pittsburgh	**41.00**	38.00	42.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh., lb.	*1.65*	1.70	1.75	3.25
Finished Iron and Steel,				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	2.00	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	*1.60*	1.65	1.75	3.25
Steel bars, Chicago	*1.75*	1.85	1.93	2.73
Steel bars, New York	*1.98*	2.03	2.13	4.13
Tank plates, Pittsburgh	*1.60*	1.65	1.80	3.25
Tank plates, Chicago	1.75	1.75	1.98	3.03
Tank plates, New York	*1.98*	2.03	2.18	3.63
Beams, etc., Pittsburgh	*1.60*	1.65	1.80	3.10
Beams, Chicago	1.80	1.80	1.98	2.83
Beams, etc., New York	*1.98*	2.03	2.18	3.48
Steel hoops, Pittsburgh	2.15	2.15	2.25	5.50

Sheets, Nails and Wire, Per Lb. to Large Buyers:	Sept. 20, 1921 Cents	Sept. 13, 1921 Cents	Aug. 23, 1921 Cents	Sept. 21, 1920 Cents
Sheets, black, No. 28, P'gh.	2.75	2.75	2.75	7.50
Sheets, galv., No. 28, P'gh.	3.75	3.75	3.75	9.00
Sheets, blue an'l'd, 9 & 10.	2.20	2.20	2.25	5.50
Wire nails, Pittsburgh	2.90	2.90	2.75	4.25
Plain wire, P'gh.	2.60	2.60	2.50	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$14.50**	$14.00	$13.00	$37.00
Carwheels, Philadelphia	17.00	17.00	17.00	43.00
Heavy steel scrap, P'gh.	**14.00**	13.50	13.00	28.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	25.50
Heavy steel scrap, Ch'go.	**11.50**	11.00	11.00	24.50
No. 1 cast, Pittsburgh	17.00	17.00	16.50	42.00
No. 1 cast, Philadelphia	17.00	17.00	17.00	40.00
No. 1 cast, Ch'go (net ton)	13.25	13.25	13.00	33.50
No. 1 RR. wrot, Phila.	15.00	15.00	14.00	34.00
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.00	23.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$2.75	$16.50
Foundry coke, prompt	4.25	4.25	3.75	17.50
Metals				
Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.25	12.25	12.00	18.75
Electrolytic copper, N. Y.	**12.12½**	12.00	11.75	18.75
Zinc, St. Louis	*4.17½*	4.20	4.17½	7.80
Zinc, New York	*4.67½*	4.70	4.67½	7.80
Lead, St. Louis	**4.45**	4.40	4.25	8.25
Lead, New York	**4.65**	4.60	4.40	8.00
Tin, New York	*26.50*	26.75	26.12½	44.00
Antimony (Asiatic), N. Y.	4.45	4.45	4.50	7.12½

*The average switching charge for delivery to foundries in the Chicago district is 50c. per ton.

†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 20, 1921, Finished Steel, 2.200c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets

These products constitute 88 per cent of the United States output of finished steel.

Sept. 13, 1921,	2.279c.
Aug. 23, 1921,	2.321c.
Sept. 21, 1920,	3.974c.
10-year pre-war average,	1.684c.

Composite Price, Sept. 20, 1921, Pig Iron, $20.01 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 13, 1921,	$19.81
Aug. 23, 1921,	18.97
Sept. 21, 1920,	47.83
10-year pre-war average,	15.72

products, such as nails, wire, sheets and tin plate, and the response to the reduction in steel pipe has been satisfactory, at least as far as merchant pipe is concerned. The heavier lines still are sluggish, although some fair sized structural projects recently booked by the American Bridge Co. have brought business in plain material to the Carnegie Steel Co. There is not much question that the slant of demand is upward, but to chart it would disclose a saw-tooth, rather than a straight line. The common expectation is that the remainder of the year will see a gradual increase in business, but there are few who expect that the industry will get into anything resembling a normal stride until next spring. It is emphasized this week that so long as railroad freight rates remain unliquidated and are an obstacle to a reduction in costs and selling prices, there hardly will be confident buying. Few now expect that there will be any reduction in rates before Jan. 1.

General plant operations are somewhat heavier than they were recently, but the gain is chiefly on the side of finishing mills. The Jones & Laughlin Steel Co. last week put on an additional blast furnace at its Woodlawn, Pa., works to make Bessemer iron because of the demands for merchant pipe. This change, however, is accompanied by some reduction in open-hearth furnace operations. A few open hearths have gone on in the Youngstown district and the Wheeling Steel Corporation has resumed making steel at its Portsmouth, Ohio, works. There has been an increase in active ingot capacity of Carnegie Steel Co. of about 5 per cent from the average of the past few weeks. The plants of the American Steel & Wire Co. in this district are running heavier, both in the making and the finishing of steel. The American Sheet & Tin Plate Co. is running 70 per cent of its sheet mills and more than 50 per cent of its tin plate mills, or about double the rate of a month ago. Mattie Furnace of the A. M. Byers Co., at Girard, Ohio, will go into blast about Oct. 1.

The pig iron market is dull but firm. The trend of scrap prices still is upward, but the flurry in coke occasioned by the appearance of several inquiries at the time when labor troubles threatened appears to be subsiding.

Pig Iron.—Although actual business is extremely limited, there is no sign of uneasiness on the part of producers, and consequently no tendency to deviate from prices established a few weeks ago. We are raising the minimum price on basic iron 25c. per ton to $19.25, because three lots involving 5500 tons re-

cently were sold at that price and there is nothing to indicate that any tonnages now are available at less. The asking price of all makers on this grade is $20, furnace, but as yet this figure has not found basis in sales. Only carload lots of Bessemer are being moved and these usually at $20, Valley furnace. There is one inquiry for 1500 tons of Bessemer but the specification calls for iron of less than 0.02 in sulphur and few makers are interested. One who has some iron of this kind has quoted $21, Valley furnace, against the inquiry. The National Radiator Co. has put out an inquiry for 3000 tons of No. 2 and No. 2X foundry iron for delivery over the remainder of the year, in equal amounts, to its plants at New Castle and Johnstown, Pa., and Trenton, N. J. The price of $21, furnace, for No. 1 grade is well observed.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.25 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.00

Ferroalloys.—American makers of ferromanganese are meeting English competition. We note the sale of 100 tons of 78 to 82 per cent domestic material to a West Virginia steel maker at $65.25 delivered, as compared with $70, the price on the last previous sale. This price was above the delivered price of English material, which at $58.35 c.i.f. Atlantic seaboard, would mean $63.55 delivered, Pittsburgh district. The Trumbull Steel Co., Warren, Ohio, seeks 100 tons of 80 per cent ferromanganese for October delivery. There is no reason to quote other than minimum prices in a dull market like the present one. Melters do not seem interested in spiegeleisen and the only sale recently noted in 50 per cent ferrosilicon was a carload to a Pittsburgh steel foundry interest at $60, furnace, freight allowed.

We quote 78 to 82 per cent domestic ferromanganese at $65 delivered; 76 to 80 per cent, $68; 78 to 82 per cent British ferromanganese, $58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $36.50; 11 per cent, $39.80; 12 per cent, $43.10; 13 per cent, $47.10; 14 per cent, $52.10; silvery iron, 6 per cent, $25; 7 per cent, $26; 8 per cent, $27.50; 9 per cent, $29.50; 10 per cent, $31.50; 11 per cent, $34; 12 per cent, $36.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Although actual business still is of moderate proportions, interest on the part of consumers in the market is keen, evidence of which is found in rather numerous inquiries. Generally, makers are not disposed to sell sheet bars at less than $30, but a large Eastern maker is said to have cut substantially below this figure and one other maker, competing for business, has met the lower price, which, it is understood, was $28. We note the sale of a fair sized tonnage of forging billets at $35, Pittsburgh, but nothing of importance recently has been done in rerolling billets, nor in slabs. The latter forms generally are held at $30.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Demand still is rather limited despite the somewhat livelier market in wire products, and while all makers now are quoting $41, Pittsburgh, for the base size of soft rods, no claim yet is made that this price has been established by considerable sales. However, none of the makers is willing to consider less than $41 now. Chain makers are specifying fairly well, but demands from rivet manufacturers still are few and small. Prices are given on page 772.

Steel Skelp.—Very little demand exists for either pipe or boiler tube skelp and prices are merely nominal. On the latter grade, some makers still are talking 1.90c., but there have been no sales recently at that price. On pipe skelp, the common asking price is 1.75c., but quotations of 1.70c. have failed to bring orders and with sheared plates available at 1.65c. the common belief is that skelp will have to go that low to interest buyers.

Structural Material.—The American Bridge Co. has taken 4200 tons for the addition to the department store of the Joseph Horne Co., Pittsburgh, and 1800 tons for 16 Government river barges. This company also will fabricate and erect 100 tons for an addition to the plant of Wyckoff Drawn Steel Co., Ambridge, Pa. The McClintic-Marshall Co. reports taking 525 tons for the Southard Street viaduct, Trenton, N. J., and 355 tons for a new building for the Bell Telephone Co., Scranton, Pa. The Jones & Laughlin Steel Co. has taken 100 tons for a new building for the Walmer Hardware Co., Wilkinsburg, Pa. Competition for structural awards still is extremely sharp and the price advantage entirely with investors. If no consideration is given overhead and other charges, the bids against some projects would indicate a plain material base considerably below current quotations. Plain material is in somewhat better demand as the result of recent awards, but there is room for considerable improvement. The common quotation on structural beams is 1.65c., Pittsburgh. Prices are given on page 772.

Iron and Steel Pipe.—Effective Sept. 16, the National Tube Co. reduced quotations on all kinds of steel tubular products. In standard pipe and line pipe, the reduction, as compared with the July 7 card of the company was $8 per ton on butt weld and $8 to $10 per ton on lap weld. The company in the latest card makes a change in the size brackets on lap weld pipe. In the July 7 card, 7-in. to 12-in. pipe took the same discount, but in the new card, 7-in. to 8-in. pipe is quoted at one discount and 9-in. to 12-in. pipe at another. New prices on oil well casing, tubing and drive pipe also are down $8 to $10 a ton. On large outside dimension pipe for large oil and gas lines, the reduction runs from $10 per ton in the larger sizes to $14 per ton in the smaller sizes. There has been a rebracketing of sizes of water well casing, the smaller sizes holding at the July 7 discounts, while sizes from 4¼-in. up have been reduced from $9 to $25 per ton. Independent makers quite generally have adopted the new card. The new prices more than absorb any concessions from the July 7 card which have been made on standard pipe, but do not approximate the prices which have been named against recent inquiries for line pipe, in which, in markets like the present one, very low prices, usually come out because of the large lots ordinarily sought and the eagerness of makers for such business. So far, there has been no change in wrought iron pipe, which was reduced $10 to $12 per ton by leading makers on Sept. 1. Business in standard pipe is fairly good, but could be much better than it is in old country goods. Line pipe inquiries are fairly numerous and a few are for good sized tonanges. Discounts are given on page 772.

Nuts, Bolts and Rivets.—New demands are few, but makers are getting a larger number of specifications against old orders than was the case recently. Price cutting is less severe and quotations mean a little more than they did recently. Prices and discounts are given on page 772.

Iron and Steel Bars.—Activity still is lacking in merchant steel bars and prices are rather poorly defined. Some makers still are asking 1.75c., but this is at least $2 per ton above the price ideas of buyers, and some are not willing to go even that high, in view of the reports from other centers of business being done at a lower figure. These, who may have big tonnages to place later, regard 1.50c., base, as the ultimate level, but tonnages which might develop such a price are lacking at the moment. Small lot business generally is being done at 1.65c. to 1.70c., and this also is the range on concrete reinforcing bars. Makers of iron bars are disinclined to consider less than 2.25c. for so-called refined iron bars.

We quote steel bars rolled from billets at 1.65c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—There is a fair run of orders for small lots of standard spikes, the railroads merely taking on such supplies as they actually need. The general asking price is $2.50 base, per 100-lb., but this has become

more of an asking than a selling price, because competition has developed a quotation as low as $2.40 and this is the basis of most sales. Similarly, $2.75 base is asked for small spikes and bolts and barge spikes, but the more common selling price is $2.65. Prices are given on page 772.

Steel Rails.—Light sections rolled from billets still are generally quoted at 1.75c, base, but this is largely an asking price because the demand is very limited and there is no question that a concession of $1 and possibly $2 per ton would be made on anything like an attractive inquiry. Requirements of both the contractors and the coal mines, at the moment, appear to be small. Specifications against orders for standard rails are better this month than they were in August, but in view of the fact that not much time remains between now and winter for laying rails and that the railroads have considerable tonnage due them on old orders, it is probable that there will be a considerable carry over of 1921 business into 1922.

We quote 25 to 45-lb. sections, rolled from new steel, 1.75c.; rolled from old rails, 1.60c.; standard rails, $45 mill for Bessemer and $47 for open-hearth sections.

Wire Products.—The common report is that both jobbers and manufacturers now are specifying promptly against their orders and that business is more satisfactory than it has been at any previous time this year. However, most of the shipments carry the prices in effect prior to Sept. 12. Sales of nails at $2.90 base per keg have not been numerous, nor have they involved very large quantities, but makers are adhering to the new base.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Sheets.—Recent action of several independent makers in advancing prices $5 per ton appears to have stimulated buying for the reason that the American Sheet & Tin Plate Co., which has not yet followed the advance, this week is scheduling 70 per cent of its sheet mills which compares with 52 per cent last week and about 35 per cent a month ago. Youngstown district independents also are operating about 70 per cent this week. A number of independent makers have followed the lead of the Brier Hill Steel Co. in marking up prices $5 per ton, but a number of others are waiting on the American Sheet & Tin Plate Co. to take this step and that company is expected to make the advance. In holding to the bases of 2.75c. for black, 3.75c. for galvanized and 2.25c. for blue annealed, the leading interest is stipulating that orders taken at these prices are for shipment at its convenience and that its prices for contract or forward deliveries are $5 per ton higher. The Inland Steel Co. is making a double quotation on blue annealed sheets, quoting 2.25c., base, on the heavier gages and 2.50c on the lighter. Prices are given on page 772.

Tin Plate.—The report still is one of an urgent demand for early shipment and no weakening in prices. There have been reports that production plates have sold at $5 per base box, Pittsburgh, but so far as the American Sheet & Tin Plate Co. is concerned the price still is $5.25 and independents in this and nearby districts deny having shaded this quotation, at least on domestic business. On export sales it is admitted that orders have been taken as low as $4.50, this price having been dictated by Welsh competition. Stock items are reported to be pretty well liquidated and most makers now will not consider less than $4.75 per base box for such material. Operations are holding up well. The American Sheet & Tin Plate Co. schedule for this week calls for the operation of 52 per cent of its mills, while McKeesport Tin Plate Co. is running all of its 44 mills, the Jones & Laughlin Steel Co. 50 per cent, and the Wierton Steel Co. 39 of its 50 mills, or almost 80 per cent. The latter company yesterday started up eight mills at its Clarksburg, W. Va., plant.

Cold-finished Steel Bars and Shafting.—Orders for both screw stock and shafting have shown some increase in the past week, but the market still is a long way from being active. Plant operations range anywhere from 10 to 50 per cent of capacity with most makers nearer the lower than the higher figure. Independent makers generally are quoting 2.40c. base, Pittsburgh, for cold-rolled or drawn screw stock and shafting and are getting this price in most districts. The American Steel & Wire Co., however, is quoting 2.35c. and independents are meeting this price in competitive districts. Ground shafting still is quoted at 2.75c. base, mill.

Plates.—Demand still is limited and there is no special change in the general situation except that possibly makers are a little less eager for business carrying a price of less than 1.65c., than they were recently. There is no money even in large tonnages at that price, and the number of mills which will take business at that figure is smaller than it was recently.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.70c. f.o.b. Pittsburgh.

Boiler Tubes.—A new card dated Sept. 16, of the National Tube Co., reduces prices of all sizes of lap weld steel tubes $10 per ton and this cut has been followed generally by other makers. The National Tube Co. has not yet resumed issuing public quotations on seamless boiler tubes. No change has been made yet in discounts on charcoal iron boiler tubes, but one is expected shortly, not only because of the cut in steel tubes but because iron tubes were not cut when iron pipe declined Sept. 1. Demand is slow for all kinds of tubes, but particularly for iron tubes, due to the relatively high prices. Discounts are given on page 772.

Hoops and Bands.—A rather determined effort is now being made to restore the recent base of 2.25c. for both hoops and bands. As far as cooperage requirements are concerned, practically all makers now are quoting this price, but on the heavier gage which can be rolled on bar mills, competition is being encountered and there remains some basis for a price of 2c.

Hot-Rolled and Cold-Rolled Strips.—Less tendency to cut prices is noted, and while sales of hot-rolled strips carrying a price of 2c., and in cold-rolled strips at 3.75c., have not entirely ceased, the more common quotations now are 2.25c., base, for hot-rolled and 4c., base, for cold-rolled strips. It is probable that mills which have been naming the low prices will withdraw them shortly because of the big losses they spelled.

Cut Nails.—Public quotations still are 3c., base, at mill for carloads and 3.10c. for less than carloads, but on carload business 2.90c. has been done and on really attractive orders 2.75c. would not be turned down without consideration. Demand in this district is moderate.

Coke and Coal.—The market is no stronger and possibly is slightly weaker than it has been. Inquiries against the prospective lighting up of a number of idle blast furnaces have almost petered out and now that labor troubles in the Connellsville district appear to have been amicably adjusted, there is not the anxiety for spot tonnages there was last week and the week before. The A. M. Byers Co. will blow in its Mattie furnace, Girard, Ohio, Oct. 1, and has contracted for 15,000 tons of coke per month for four months, beginning Oct. 1. The business did not go to any of the Connellsville district operators and the common assumption is that the coke will be provided from a steel works by-product plant. Details as to prices are not avialable. Furnace coke still is quotable from $3.25 to $3.50 per net ton, oven, but the market is not as firm at those prices this week as it was last week. Foundry coke finds a steady demand at about the same prices as a week ago, although it is claimed that on some recent business as much as $4.75 has been obtained. The coal market is quotable from $1.75 to $2 for mine run steam, $1.85 to $2 on mine run by-product and $2.25 to $2.75 for mine run non-union gas.

Old Material.—Trend of prices still is upward, though there is little apparent activity by melters. Quietly, however, they are putting out inquiries, while a number of high-priced contracts are being readjusted, the melters taking on additional tonnages at a price which brings down the average. Dealers lacking supplies sufficient to meet their contracts in steel works grades are showing some anxiety to cover them.

(*Continued on page* 775)

Chicago

CHICAGO, Sept. 20.

The feature of the steel market during the past week was an advance of $5 a ton on black and galvanized sheets by independent mills and a reduction of from $8 to $10 a ton on steel pipe by the National Tube Co. During the days of grace allowed to customers by the sheet mills, heavy purchases were made at the old prices with the result that producers have accumulated substantial backlogs sufficient, in some cases, to keep their capacity busy for from two to three months. Jobbers have covered on sheets just as they covered when wire and nails were advanced, and it is interesting to note that they are also taking a livelier interest in bolts and nuts notwithstanding the fact that discounts are still soft.

Cast-iron pipe continues to move in fairly good volume, and prices, particularly on the smaller sizes, are stiffening. In the heavier steel commodities, plates, structurals and bars, there are as yet no signs of price stability and the situation appears to be reaching the point where mills will find it cheaper to shut down their capacity and take the overhead loss chargeable to their idle equipment rather than continue to take business at going prices. One local producer, in fact, has had its plate mill idle for over a fortnight, and is disinclined to resume operation until prices advance to a point which will permit it to roll steel without incurring a heavy loss.

New business in pig iron is light, but specifications against contracts are coming in more freely, being received in some instances from melters who had not authorized shipments for seven months.

Mill operations in this district show a slight gain. The Inland Steel Co. is now on a 30 per cent basis, while the operations of the Illinois Steel Co. reached 36 per cent the middle of last week only to decline again to 30 per cent.

Pig Iron.—There are few new inquiries or orders of size to report, but specifications against contracts are coming in more freely. In some cases, melters who have not specified for seven months are asking for shipments. The exhaustion of melters' yard stocks probably accounts for the recent rebound of the market to a larger degree than increased operations. While it is undeniable that melt in this district is appreciably larger than a month or two ago, the situation among foundries is decidedly spotty. With some exceptions, intermittent operation seems to be the rule. With the receipt of orders for castings, the melter is led to believe that the turn has come, only to find himself without work a week or two later. A Milwaukee sanitary manufacturer has bought 600 tons of resale Southern foundry, 2.75 to 3.25 per cent silicon, at a flat price of $25 delivered. An inquiry for 200 tons of low phosphorus is current. Reports from the South indicate that furnace output there is on the increase. One merchant furnace was recently blown in and two others are scheduled to go in in the near future. One Southern producer is now quoting on first quarter business at the present price of $19, base, Birmingham. Beehive foundry coke is growing firmer, the minimum quotation now being $4.50, Connellsville, with some producers holding at $4.75.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$33.50
Northern coke, No. 1, sil. 2.25 to 2.75	22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	22.00
Northern high phos	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil	22.00
Basic	22.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	32.82

Ferroalloys.—The reduction of foreign ferromanganese to $58.35, seaboard, brings the local delivered price down to $66.75. Two local sales of about 100 tons each have been made by domestic producers at this price, and an inquiry for 200 tons for Chicago delivery has just been issued. A number of carload inquiries for spiegeleisen are current. Some local steel mills are releasing shipments against alloy contracts. A large Chicago user is reported to have bought a car of 50 per cent ferrosilicon at less than $62, delivered.

We quote 78 to 82 per cent ferromanganese, $66.75 to $75 delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The Chicago, Milwaukee & St. Paul has let repairs of 100 composite gondola cars to the Western Steel Car & Foundry Co. The Pittsburgh & Lake Erie has awarded repairs on 1000 freight cars to the Standard Steel Car Co. The American Refrigerator Transit Co. is considering the repair of 100 refrigerator cars.

Structural Material.—Although some craftsmen have returned to work, the local building situation remains unsettled and it is still strongly felt in some quarters that the only solution is the introduction of the open shop. In the meantime, uncertainty is holding back much projected work. Structural activity in other sections of the West is of a more encouraging character and mills report a slow increase in their bookings in plain material. An accumulation of orders has permitted the Inland Steel Co. to resume the operation of its 28-in. structural mill. Much of the current fabricating work is small, involving from 20 to 100 tons per job. The largest pending project, the Government hangar at Belleville, Ill., involving 3600 tons, has been advanced another step towards construction through the taking of bids on the general contract. The W. M. Sutherland Building & Construction Co., St. Louis, is low bidder. Notwithstanding the trend towards betterment, the volume of current construction work is not yet sufficient to change the broad aspects of the market. Competition between fabricators is still very keen and plain material prices are soft. Fabricating awards include:

Standard Oil Co., 50 stills, Whiting, Ind., 1500 tons, to Petroleum Iron Works.

Consolidated Water Co., power house, Biron, Wis., 114 tons, to unnamed fabricator.

Michigan Lumber, Land & Iron Co., owned by Henry Ford, automobile body plant, Iron Mountain, Mich., 250 tons, to Worden-Allen Co.

Union Saw Mill Co., Huttig, Ark., conveyors, 125 tons, to Worden-Allen Co.

Evansville, Indianapolis & Terre Haute Railroad, bridge over Eel River, 200 tons, to Mount Vernon Bridge Co.

Prospective business includes:

Great Northern Railroad, single track draw span bridge, State of Washington, 530 tons, bids taken Sept. 19.

Huntington-Ohio Bridge Co., toll bridge, Huntington, W. Va., 4000 tons of structural as well as reinforcing steel, plans being prepared by C. A. P. Turner Co., Minneapolis.

The mill quotation on plain material ranges from 1.80c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—Railroad orders for standard spikes and track bolts are numerous, but small, ordinarily ranging from 500 to 1000 kegs each. The largest individual order reported is 2500 kegs of spikes bought at 2.40c., Pittsburgh. Inquiries for tie plates are negligible, but there is a slight improvement in the demand for light rails.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills.

Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—Demand has not recovered sufficiently to give any semblance of stability to the market. Prices still vary widely, extreme concessions being made whenever a large inquiry of attractive specifications appears. A local mill will furnish about 2000 tons, principally plates, for 15 oil tanks at Humboldt, Kan., the fabricating award of which was noted last week. A price of 1.60c., Chicago, is reported to have been quoted on this tonnage, but confirmation is lacking. Present going prices are so unsatisfactory that one local interest which recently shut down its plate mill has determined not to resume operation until business can be booked without loss. Railroad car repair work is steadily gathering momentum and constitutes the chief feature

of the plate market. While many roads seem disposed to let repairs to car builders, a few lines have materially increased their own shop operations. The Burlington is reported to have eight shops running full.

The ruling mill quotations range from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—Although demand is still far from satisfactory, jobbers are buying more freely than heretofore and prices are showing some signs of firmness. Among manufacturing consumers, the automobile plants are still foremost. Their operations, however, have fallen off somewhat during the current month with the result that purchases of bolts and nuts have been scaled down accordingly. The output of the leading maker of cheap cars is said to have decreased 15 per cent. This company, however, is in the market for from 12,000,000 to 15,000,000 nuts as well as a quantity of bolts for October requirements. For mill prices, see finished iron and steel f.o.b. Pittsburgh, page 772.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Little tonnage in mild steel bars is coming on the market and most new business is in small lots. Prices are still irregular, going quotations ranging from 1.75c. to 1.95c., Chicago mill, depending on the size of the inquiry and the desirability of the specifications. Demand from manufacturers continues light and reinforcing jobs are not so numerous as some time ago. Considerable local work is still being held in abeyance because of the uncertain building situation. The Kalman Construction Co. has been awarded 200 tons for a bank at Sheboygan, Wis., and the Corrugated Bar Co. has the contract for 125 tons for a sewage disposal plant at Indianapolis. Demand for bar iron is at a low ebb and mill operations are intermittent. Mills rolling rail carbon steel bars are on a somewhat more satisfactory basis, although orders are still far below normal.

Mill prices are: Mild steel bars, 1.75c. to 1.90c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, square and hexagons. Jobbbers quote hard and medium deformed steel bars at 2.53c., base.

Sheets.—The Inland Steel Co. last week announced advances of $5 a ton on black and galvanized, bringing the former up to 3c. and the latter up to 4c., base Pittsburgh. This action was followed by most other independents and in the days of grace allowed by the mills buyers hastened to cover their needs for some time ahead. The American Sheet & Tin Plate Co. has not yet advanced. The Inland company is now operating all of its hot mills and is booked ahead until the latter part of December. Other mills likewise have accumulated substantial backlogs. Notwithstanding the changed complexion of the sheet market, many buyers continue to press the mills with inquiries calling for prompt shipment, often setting definite dates of shipment which cannot possibly be observed. Jobbers and roofing manufacturers have been especially prominent in the current buying movement, although purchases have been widely distributed. There has been no change in the price of blue annealed, as competition from mills rolling light plates is an obstacle to any tendency toward firmness.

Mill quotations are 2.75c. to 3c. for No. 28 black, 2.25c. for No. 10 blue annealed and 3.75c. to 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Wire Products.—Buying is still active, but purchases at the new prices are mainly in small lots for prompt shipment. Some jobbers have covered their needs for a month or two ahead, but on the whole buyers are not piling stocks. Railroad purchases are still of the hand-to-mouth variety. Mill operations are rapidly improving as a result of the increased demand. For mill prices see finished iron and steel, f.o.b. Pittsburgh, page 772.

We quote warehouse prices f.o.b. Chicago: No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Cast Iron Pipe.—Pipe shops are well booked in sizes ranging from six to 10-in. with the result that prices are firmer. No bids of less than $33.50, Birmingham, on those sizes are reported, and some makers are adhering to a minimum of $34. Negotiations on 3800 tons for Hammond, Ind., are approaching a conclusion. The United States Cast Iron Pipe & Foundry Co. is the only bidder on 1700 tons of 60-in. for Cleveland. The opening of bids on 300 tons at Forest, Ohio, was postponed until Sept. 23. The Lynchburg Foundry Co. is low bidder on 450 tons for Spring Wells, Mich.

Recent lettings include:

Decatur, Ill., 400 tons, to National Cast Iron Pipe Co.
St. Paul, 175 tons, to Glamorgan Pipe & Foundry Co.
North Platte, Neb., 940 tons, to Colorado Fuel & Iron Co.
Sidney, Ohio, 300 tons, to James B. Clow & Son.
Springfield, Ohio, 80 tons, to United States Cast Iron Pipe & Foundry Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Warehouse Prices.—Lap-weld and seamless boiler tubes have been marked down, the reduction on 4-in. lap-weld being from the former price of 40c. a foot to 36½c., while the reduction on 4-in. seamless was from 57c. to 47c. per foot. Prices on charcoal iron tubes remain unchanged.

Old Material.—Limited consumptive demand still characterizes the market. A steel mill bought about 1000 tons of heavy melting at $11.75 per gross ton delivered, while an iron mill paid $12 a net ton for 1000 tons of No. 1 railroad wrought. Aside from these purchases, there has been little buying by users. A growing demand for car wheels is noted, but on the other hand cast and malleable grades, which were comparatively active in recent weeks, are now dull. Sellers continue to buy railroad material, but are not bidding prices up as actively as heretofore. Some advances are noted in the quotations below, but on the whole the market has undergone little change. Railroad offerings include: The Rock Island, 3800 tons; the Elgin, Joliet & Eastern, 625 tons, and the Chicago Great Western, 500 tons.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Relaying rails	27.50 to 30.00
Car wheels	14.00 to 15.00
Steel rails, rerolling	13.00 to 13.50
Steel rails, less than 3 ft	12.50 to 13.00
Heavy melting steel	11.50 to 12.00
Frogs, switches and guards cut apart	11.50 to 12.00
Shoveling steel	11.00 to 11.50
Low phos. heavy melting steel	13.25 to 13.75
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	14.50 to 15.00
Iron car axles	18.50 to 19.00
Steel car axles	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.50 to 11.00
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.50 to 11.00
Steel knuckles and couplers	11.50 to 12.00
Coil springs	13.50 to 14.00
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	10.50 to 11.00
Brake shoes	11.00 to 11.50
Railroad malleable	13.00 to 13.50
Agricultural malleable	13.00 to 13.50
Country mixed	9.00 to 9.50

The K. & L. Radiator Co., Allentown, Pa., manufacturer of automobile radiators, has filed notice of change of name to the Mack-Landis Corporation.

The Autocar Co., Ardmore, Pa., manufacturer of automobile trucks, has arranged for a note issue of $1,500,000. David S. Ludlam is president.

New York

NEW YORK, Sept. 20.

Pig Iron.—Of the inquiries for foundry and malleable iron reported pending last week, a wheel company in the St. Louis district has purchased about 3000 tons of Southern foundry iron and 800 tons from a St. Louis furnace, and it is expected that a Massachusetts machine company, which has been inquiring for 10,000 tons, will close before the end of the week. The General Electric Co. has bought about 2000 tons and sales amounting to from 2000 to 3000 tons have been made in the immediate New York district, including 750 tons of No. 2X for October delivery. Several inquiries for fair tonnages of high silicon iron, including one for 300 tons of 3 per cent silicon, are pending. In eastern Pennsylvania, $19.50 furnace continues to be the minimum for No. 2 plain with $19 for the same iron at Buffalo.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$23.02
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	22.52
East. Pa. No. 2 fdy., sil. 1.75 to 2.25..	22.02
Buffalo, sil. 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.) 28.16 to	29.16

Ferroalloys.—The reduction in the price of British ferromanganese to $58.35, seaboard, announced a week ago, has had its effect and the market has been more active than in many weeks. Sales are reported as totaling at least 1000 tons, most of it British alloy. Sales of the latter are reported to have been made at $58.25, seaboard, or slightly under the price announced last week. Some domestic ferromanganese has been sold in competition with this price and the American makers are evidently willing to quote on the basis of the British seaboard price, the delivered price varying with the location of the consumer. Under the circumstances there is no definite domestic price, such as has prevailed recently, but generally it may be figured as the British quotation plus freight to the point of consumption. Besides the sales mentioned there is an inquiry for 125 tons from one consumer for early delivery. The spiegeleisen market is inactive, with prices unchanged. There is absolutely no demand for high-grade manganese ore, quotations for which are nominal. In view of the very considerable accumulations in this country, imports of manganese ore have fallen off sharply in recent months. The 50 per cent ferrosilicon market is inactive but steady. Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal.	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard..	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard....$20.00 to	$25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude, per net ton, Atlantic seaboard.....	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York.....55c. to	60c.

Finished Iron and Steel.—A slight improvement in demand for steel products is accompanied by weakness in prices, particularly on plates, shapes and bars. The advance of $5 a ton on sheets by leading manufacturers, which was put into effect the latter part of last week, apparently is not general, as some companies have not notified their sales representatives here to make any changes. Thus the range in prices on sheets is from 2.25c. to 2.50c. on blue annealed, 2.75c. to 3c. on black and 3.75c. to 4c. on galvanized, all base Pittsburgh. Soft steel bars are now quoted from 1.50c. to 1.60c., Pittsburgh, the lower price applying usually to reinforcing quality, while plates and shapes have declined to 1.60c., Pittsburgh, and even this price does not seem firm at the moment, though sales representatives of the steel companies are informing their customers that prices are "on the bottom." It is interesting to note that each month since May has shown a slight gain in structural steel work and the record for September will doubtless show a substantial gain over August. Included in this month's lettings is the Federal Reserve Bank, New York City, mentioned last week, requiring 14,000 tons of steel. The general steel contract was awarded to Post & McCord, New York, and the American Bridge Co. will roll and fabricate the steel. A number of large apartment houses for New York are being informally figured upon, including one at Riverside Drive and 110th Street and another at Broadway and Ninetieth Street. The Hedden Iron Construction Co. has been awarded 800 tons for an apartment house near Broadway and 110th Street. The American Bridge Co. was awarded 700 tons for a bridge between Troy and Cohoes, N. Y., also two buildings for the Driver-Harris Co., Harrison, N. J., totaling 200 tons. Bids went in Saturday on an interstate bridge at Trenton, N. J., requiring 500 tons. A warehouse for R. H. Macy & Co. at Thirty-sixth Street and Eleventh Avenue, New York, was awarded to the Levering & Garrigues Co., 1200 tons. The First National Bank, Richmond, Va., is in the market for an addition, 700 tons. Several other large projects which have been in the market for weeks are being indefinitely held up. Some very low prices are being made by fabricators, an example being a $58 price for fabrication and erection of a warehouse, a beam and column job. Little of importance has developed in the way of general inquiry for steel products, most of the inquiries and orders being for small tonnages. The General Petroleum Corporation, 71 Broadway, New York, is inquiring for 1500 to 2000 tons of plates and smaller tonnages of angles, channels and bars for fabrication of plates. It is planned to ship the steel by boat from New York to California. Bids will possibly be received also on completely fabricated tanks. The Western Pacific Railroad is in the market for 1000 50- or 70-ton general service steel gondola cars. No new railroad repair work has come into the market.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c. to 1.98c.; plates, 1.98c. to 2.03c.; structural shapes, 1.98c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—The number and size of transactions continue on a par with August business. Although no official changes have been made, except in pipe prices, there is less tendency to shade by the smaller warehouses. Galvanized sheets, No. 28 gage, are undoubtedly still obtainable at 4.75c. per lb., and within a week one transaction is reported at a price better than 4.50c. per lb., but the price is generally 5c. per lb. Small lots of blue annealed sheets, No. 10 gage, are reported as high as 3.53c. per lb., although the average quotation is 3.28c. per lb. The recent reduction of steel pipe by mills from $8 to $10 per ton has been followed by a warehouse reduction of from $8 to $12 per ton, which is expected to aid materially in stabilizing quotations, heretofore largely nominal. Brass and copper prices are unchanged since Sept. 1. The lowest quotations for these products on page 786 are the prices on medium and large-sized lots out of stock, while the higher prices are for small lots from warehouse. Dealers in old metals report a firmer tone and believe that, if it continues for a week or two longer, it may be considered as a permanent improvement. We quote prices on page 786.

High-Speed Steel.—Business is confined to a few small orders, although a majority of producers report a slight improvement this month. Quotations continue nominal at 90c. to $1 per lb. for 18 per cent tungsten high-speed steel.

Cast-Iron Pipe.—No fresh municipal inquiries have come before the trade, though private buying continues satisfactory. Prices in this district are being held fairly firm, those who use the recognized proportions of pig iron and scrap claiming that lower prices cannot be made. We quote per net ton, f.o.b. New York, carload

lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—Some items have taken a slight raise the past week, though otherwise there is but little change. Dealers in this vicinity have their yards well stocked with material and it is expected to take considerable buying by mills to force the prices up markedly. The two principal items changing hands are heavy melting steel and No. 1 machinery cast, the latter item having risen in price. One eastern Pennsylvania mill is reported to have paid $12.75 for choice heavy melting steel.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to $7.50
Steel rails, short lengths, or equivalent	8.50 to 9.00
Rerolling rails	11.50 to 12.00
Relaying rails, nominal	37.50 to 40.00
Steel car axles	11.00 to 11.50
Iron car axles	18.00 to 19.00
No. 1 railroad wrought	11.50 to 12.00
Wrought iron track	9.50 to 10.00
Forge fire	5.50 to 6.00
No. 1 yard wrought, long	10.00 to 10.50
Light iron	3.50 to 4.00
Cast borings (clean)	5.50 to 6.00
Machine-shop turnings	3.50 to 4.00
Mixed borings and turnings	3.00 to 3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	8.50 to 9.00
Stove plate	9.50 to 10.00
Locomotive grate bars	10.00 to 10.50
Malleable cast (railroad)	8.50 to 9.00
Car wheels	11.00 to 11.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to $18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to 16.00
No. 1 heavy cast, not cupola size	14.00 to 15.00
No. 2 cast (radiators, cast boilers, etc.)	9.50 to 10.50

Birmingham

BIRMINGHAM, ALA., Sept. 20.

Pig Iron.—Last week closed with Birmingham iron very firm at base of $19, silicon 1.75 to 2.25. A few lots had been sold on a $19.50 base by one maker, but $19 was the rule. The $19 base applies for all fourth quarter. One maker sold out on the 1000 tons of low silicon on yards and joined the galaxy of those with none. Another maker sold 850 tons in 11 lots in five days, all but 120 tons for prompt delivery. Two carloads brought $19.50. The feature of the week was the reappearance of buyers from the Middle West. Evansville took three lots from one maker in the same day. Ohio points booked small lots and Louisville reappeared for a small tonnage. A sale of 500 to 700 tons in Chicago territory was made. It was 2.25 to 2.75 silicon and brought $19.50. A proffer of 2000 tons at $19.50 for the first 1000, which was to be 2.25 to 2.75 silicon, with same price for the second 1000, which was to be 3.25 to 3.75 silicon, was turned down. Following the advice of Southern makers, melters in the South are ordering fourth quarter requirements at $19 and getting away from the hand-to-mouth system. A Southern pipe maker took 1500 tons during the week for October and November delivery. There are inquiries for other pipe tonnage. The stack of the Central Iron & Coal Co. at Holt resumed Monday after nearly a year of idleness. The company has no iron on yards. Indications point to a total of 60,000 tons of merchant iron on Alabama yards by Oct. 1. A small advance in price is regarded as coming soon.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Cast-Iron Pipe.—The high pressure pipe market is not active, although total bookings by Birmingham plants last week approximated 4000 tons, the National Cast Iron Pipe Co. getting 1000, United States Cast Iron Pipe & Foundry Co. 2500 and American Cast Iron Pipe Co. 600 tons of known bookings. The National Cast Iron Pipe Co. continues to operate at about capacity. The base is $35 for 6 in., with larger sizes selling at shaded prices. Sanitary pipe is fairly active at the base of $40 with $30 extra heavy.

Coal and Coke.—Domestic coal is much brisker, due to the stimulation caused by rise in cotton prices, and steam coal users are more inclined to discuss future contracts. Standard foundry coke remains at a base of $6.

Old Material.—Yard men are less inclined to take offers of the consumers and some are holding for higher prices. No. 1 cast is not as easily gotten at the quoted price as formerly and No. 1 steel is held $1 higher than the quotation by some yards. A general marking up in another week if steel and iron remain as firm is expected. We quote per gross ton, f.o.b. yards, as follows:

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	9.00 to 10.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Boston

BOSTON, Sept. 20.

Pig Iron.—Business, current and prospective, is better. Prospective business aggregates all of 20,000 tons, including 10,000 tons No. 2 plain, fourth quarter shipment, from a heating appliance manufacturer; 1000 tons No. 2X and 1000 tons No. 1X, shipment over the rest of the year, from a textile machinery interest; and 500 tons No. 2X, last quarter shipment, from a machine tool interest. The remainder is made up of several hundred tons No. 1X from a Connecticut hardware manufacturer, and smaller tonnages, largely for silicon 2.25 to 2.75 and higher, from diversified interests. The largest sale reported this week is 2000 tons eastern Pennsylvania No. 2 plain, No. 2X and No. 1X at $20 furnace base and regular differentials. A Maine melter took 150 tons eastern Pennsylvania No. 1X, nearby shipment, at $21 furnace, and four 100-ton lots, high silicon and special analysis, sold without competition, mostly to Connecticut foundries, at private terms. A small amount of Virginia special analysis iron also figures in the week's sales. French, Belgian, Luxemburg, Lorraine and Sarre Region sand-cast pig iron, most of it high in manganese and sulphur, with silicons ranging from 0.8 to 4 per cent, is offered c.i.f. dock Boston, or ex-dock, duty paid. Eastern Pennsylvania furnaces are holding more firmly to the $20 furnace base, with the tendency upward rather than downward. The report that the Robesonia furnace has offered iron at $19 furnace base is without foundation. The Buffalo market is firm at $19.50 to $20 base, and Southern and Virginia furnaces are not inclined to shade prices. A considerable tonnage on old contracts is being shipped into New England. Further readjustments on such contracts are reported. Delivered pig iron quotations follow:

East. Penn., sil. 2.25 to 2.75	$24.56 to $25.56
East. Penn., sil. 1.75 to 2.25	24.06 to 25.06
Buffalo, sil. 2.25 to 2.75	25.46 to 25.96
Buffalo, sil. 1.75 to 2.25	24.96 to 25.96
Virginia, sil. 2.25 to 2.75	29.08 to 32.08
Virginia, sil. 1.75 to 2.25	28.58 to 31.58
Alabama, sil. 2.25 to 2.75	30.16
Alabama, sil. 1.75 to 2.25	29.66

Coke.—Orders for by-product foundry coke booked the past week involve a larger tonnage than those for the corresponding period last month or for the previous week, but business is by no means active. A few of the largest New England foundries are melting as high as 200 tons daily, but a majority are doing very much less, and the average jobbing foundry is operating on a greatly reduced weekly schedule notwithstanding a general marking down of quotations on castings. Any increased buying of coke, therefore, appears to be based more on a desire to have stock on hand prior to the winter months than to any appreciable betterment in going business. The market for good grade Connellsville foundry coke is firmer at $4 to $4.50 on cars at ovens. Both the New England Coal & Coke Co. and the Providence Gas Co. are quoting on a basis of $10.66 delivered.

Sand.—The market for molding sands is easier, quotations on good grades having been lowered about 25c. per ton, or from $2 to $1.75 on cars shipping point. The demand continues more or less restricted.

Finished Material.—Small structural tonnages are increasing, while large are decreasing. The McClintic-Marshall Co. is awarded 185 tons by Stone & Webster for a New York Steam Corporation plant addition, and the New England Structural Co. 102 tons for a Newton, Mass., theater. Bids are asked on 1500 tons for a First National Bank, Boston, building in Buenos Ayres. Stone & Webster are the engineers and York & Sawyer, New York, the architects. Bids will soon be asked on 500 tons for a Boston office building. The market on structural steel and plates is soft at 1.65c., Pittsburgh. The demand for steel products in general compares favorably with that noted during the latter part of August. The call for galvanized sheets is especially good just now. Warehouses have advanced wire nails 15c. per keg, and barbed wire and wire products in general in proportion. They report a slight improvement in the consumption of iron and steel and are less inclined to shade prices to secure business than heretofore.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Old Material.—Most New England foundries are still able to secure all the machinery cast needed at 65c. to 70c., delivered, from local yards. Yard interests in some instances allow foundries to pick out material wanted and quote one price on shipments extending over several weeks. Old material dealers, nevertheless, report more doing in car lots with the market about 50c. per ton higher on the inside. Stove plate is scarce and in some request, and the market has stiffened about 50c. On the other hand, railroad malleable, pipe, turnings and borings are dull and unchanged in price. Railroad wrought is firmer, due to increased inquiries, and slightly more interest is shown in forged scrap and bundled skeleton. Going business in steel is limited, but the market is firm in anticipation of early buying by Pennsylvania mills.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$17.50 to $20.00
No. 2 machinery cast	15.50 to 16.50
Stove plate	15.50 to 16.50
Railroad malleable	11.50 to 12.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.00 to $6.50
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	2.50
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.50 to 2.75
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	12.50 to 13.50
Rerolling rails	9.00 to 10.00

Cleveland

CLEVELAND, Sept. 19.

Iron Ore.—The several inquiries for small lots of ore ranging from 10,000 to 25,000 tons, which have come out recently, have not resulted in sales and ore men are doubtful whether they will lead to the placing of orders. The inquiries are from furnaces that have plenty of ore suitable for making steel making pig iron, but are considering making foundry iron provided they can buy the grades of ore they need cheap enough to permit them to make a profit with present pig iron prices. While a few small lot ore sales have been made in the past few weeks at concessions from regular prices, the most of these have been of ore classified as off grade, on which there is more or less price irregularity. In fact, it is claimed that only in one case has a price concession been made on standard ore, that being on some ore that had to be moved this season. However, the market has not been tested and a round lot inquiry might bring out considerable price concession. Some resale ore is on the market on which the owners have not set a price, but are asking for offers. Present estimates are that the season's movement will not exceed 21,000,000 tons. A few weeks ago, the estimate was 25,000,000 tons. A falling off in shipments is expected early in October and the shipping season will close very early. Some of the Lake Superior docks will shut down Oct. 31 and one dock has advised that it will not start up its steaming plant, which means that it can be operated only a short time in November, as freezing weather usually necessitates the thawing of ore after about Nov. 10.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—The demand for foundry iron appears to be slowly increasing. Sellers are getting more orders from diversified industries that have worked their stocks down to the point where they must replenish their supply. Sales during the week were fully equal in volume to any of the few previous weeks. Buying is nearly all in small lots and consumers are not contracting for delivery beyond the end of the year. September shipments will probably show some gain over August. There is virtually no change in the price situation. With lake furnaces, $20 is still a common quotation for No. 2 foundry, although producers are making some sales at $20.50 and $21, the higher prices usually being charged when they have the advantage of freight rate. One Valley furnace continues to make sales at $21 and another Valley producer advanced its price from $20 to $21 during the week. A Cleveland furnace made a local sale of 100 tons at $21 Valley, or $21.96 delivered, but $20.50 to $21 at furnace still generally represents the local market on foundry iron. We note the sale of 500 tons of basic iron by a Cleveland interest at $19.25 Valley furnace for shipment from a western Pennsylvania furnace to a nearby consumer, this figuring back to a furnace price of about $19.75. A local furnace sold 300 tons of malleable iron at $20 furnace for shipment to Pittsburgh, or virtually on the basis of $21 Valley furnace. One leading interest reports sales this month aggregating 15,000 tons. Another local interest sold from 6000 to 7000 tons during the week, including a 1000 ton lot of malleable and one 1000 ton lot of foundry iron. The General Electric Co. placed orders during the week for 1500 tons of Nos. 1 and 2 foundry iron for its Erie, Pa., plant. A Pittsburgh sanitary interest placed 400 tons of Southern iron with a Cleveland selling agency at $19 base.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$20.96
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	35.00

Semi-Finished Steel.—An inquiry is pending for 5000 tons of slabs on which $29, Youngstown, was quoted, but as the prospective purchaser did not immediately place the order, this quotation was withdrawn. The general quotation for slabs is $30.

Finished Iron and Steel.—The finished iron and steel market shows a firmer tendency. Low prices were found to do little in increasing sales and mills are inclined to reduce losses by getting somewhat higher prices. The extreme weakness that recently developed in steel bars has evidently disappeared. One mill is credited with the sale of 1000 tons or more at a delivered price, including low cost water haul that figured back close to a 1.50c. Pittsburgh basis, but was understood to have withdrawn that price. The present minimum price on steel bars is evidently 1.60c. for desirable orders with 1.65c. the more common quotation. The minimum quotation on plates and structural material is 1.60c., but some mills are quoting these at 1.65c. to 1.75c. Plate mills in particular are showing more resistance to price concessions. Hard steel reinforcing bars are commonly quoted at 1.60c. The volume of new business during the week was rather light and no local inquiries for round tonnages came out. However, recent orders for

wire rods and products brought out some good specifications, including one for 1500 tons of wire rods. In Detroit the Ford Motor Co. took quotations on round lots of steel bars and sheets for October requirements. Increased activity is noted in the building field. The Republic Structural Iron Works Co. has taken the Glenville High School, Cleveland, requiring 150 tons of steel, and the Forest City Steel & Iron Co. has taken the Free Building, requiring 100 tons. Bids have been received for the Guarantee Security Discount Co. building, Akron, requiring 1000 tons, a bridge at West Palm Beach, Fla., requiring 1000 tons and the John Adams High School Building, Cleveland, requiring 300 tons. New bids have been received for the Masonic Temple, Detroit, requiring 7000 tons, but there is some uncertainty as to whether this steel will be placed immediately.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—Most independent mills have advanced sheet prices $5 a ton to 3c. for black, 4c. for galvanized and 2.50c. for blue annealed. However, the advance on blue annealed sheets applies only to the lighter gages, as most mills are still quoting No. 12 gage and heavier at 2.25c. The advance brought out considerable business that consumers were given an opportunity to place before the new prices became effective. Automobile body sheets have been irregular for some time and several mills have reduced prices on these by cutting the differential from 2.10c. to 1.50c., making the present price for No. 22 gage 4.35c., based on a 3c. black sheet price. This compares with a recent 4.70c. price for automobile sheets.

Warehouse Business.—Jobbers have decided that for the present they will make no advance in warehouse prices on sheets, as they were able to replenish their stocks at the prices that prevailed before the advance.

Old Material.—The market is fairly active and firm with price advances on a few grades. Mills in the Valley district have made additional purchases of scrap and there is considerable demand from dealers for material to cover on these contracts. There is also a demand for scrap for Weirton and Canton delivery. The grades that are most active are compressed steel, borings and turnings. Sales of compressed steel are reported at $10.85 for Youngstown and $11.85 for Weirton delivery. Dealers are offering $8 to $8.25 for machine shop turnings for Valley shipment. Locally the demand continues very light, although one Cleveland mill is buying heavy melting steel to lay down in its yard, for which it is paying $12.50, or possibly higher, and dealers are offering $12.25 for this grade. Owing to some demand from the Youngstown district, flashings have advanced.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.25 to $12.75
Steel rails under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.50 to 7.50
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.25 to 8.50
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	6.75 to 7.00
Drop forge flashings, under 10 in.	6.75 to 7.00
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Coke.—The demand for foundry coke has increased to a considerable extent owing to the fact that many foundries are placing stock orders for small lots for winter requirements. The market is firm and several producers have advanced prices 25c. per ton. Quotations on best grades of standard Connellsville coke range from $4.50 to $4.75 per net ton at oven. We note the sale of 800 tons of Virginia foundry coke at $6.

Bolts, Nuts and Rivets.—The improvement in the demand for bolts and nuts previously noted continues and prices appear a little firmer. While sales are mostly in quite small lots, some of the manufacturers are getting a better volume of car lot orders. Plant operations have been increased somewhat. The demand for rivets continues very dull and prices are weak, with 2.25c. for structural and 2.35c. for boiler rivets the minimum quotations in this market.

Cincinnati

CINCINNATI, Sept. 20.

Pig Iron.—While there are no spectacular features, the market showed more activity during the past week, some fair-sized sales being reported. Some of these were made in cities outside of the Ohio River district, giving rise to the belief that industrial conditions in those cities are on the upgrade. One of these sales was for 1200 tons, and another for 500, both Southern iron, at $19, base, Birmingham. In the Cincinnati district, the activity was not so pronounced, though we note a sale of 500 tons of malleable, and several 100-ton orders. A few inquiries are being figured on, one from the Louisville & Nashville Railroad being for 300 tons of Southern iron, and one from a Dayton melter for 150 tons. The price situation is stronger, and on the sale of malleable reported above, $21.50, Ironton, was done. Foundry iron is held at $21, and basic at $20. The minimum in the South is $19. Some interest is being shown in iron for first quarter, but furnaces are not quoting for other than immediate shipment. Tuscaloosa furnace in the South blew in to-day and Etna stack at Ironton Thursday last. The Alabama Co. will blow in one stack on Oct. 10.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil.	30.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Finished Material.—The feature of the market during the week was the heavy booking of sheets. Local sales agents report that they were literally swamped with business and that orders were received from all sources. A particularly gratifying feature of the situation was the number of orders received from the Southern district. This is taken to indicate a big improvement in the general condition in the South. The reason for the heavy increase in business is probably the fact that the independent mills announced an advance of $5 per ton on sheet prices, but allowed their customers to cover for 30 days' requirements at the old prices. Several offers to buy 1000 tons of sheets are reported, but the mills generally are only booking business for delivery six weeks ahead. Other lines of finished material are quiet and prices are, if anything, softer. On plates it is said that 1.65c. can be done even on moderate tonnages. Bars are being held at 1.70c. for carload lots. On reinforcing bars, however, 1.50c., Pittsburgh, is being quoted by some re-rolling mills, and it is said that this price has also been made on new billet stock. Bookings of wire products slowed down somewhat during the week as most of the jobbers and manufacturers placed their orders before the price advances went into effect on Sept. 10. The only structural letting reported during the week was the Kellogg Avenue bridge at Cincinnati, involving 900 tons, which went to E. M. Sculley, Columbus, Ohio, at his bid of $108,000. The only new project to come up was a 20-room schoolhouse with an auditorium for the Board of Education at Richmond, Ky. Bids for this school will close with C. C. & E. A. Weber, architects, Cincinnati, on Oct. 5.

Warehouse Business.—Local jobbers are greatly encouraged as the result of an increased number of orders during the past week. Small lots for immediate shipment continue as the prevailing activity, but the number of orders received is much greater and the tonnages heavier. Jobbers in wire products continue to report good orders. Prices on nails will be advanced during the week to $3.40 per keg, base, and on plain wire to 3.10c. per lb. In the lighter gages of blue annealed

sheets, an advance of $2 per ton has been made. This applies to No. 14 and No. 16, No. 10 and No. 12 remaining the same as previously quoted.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.25c. under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.40 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—The coke market is showing some activity, and while orders are confined to one and two car lots, the aggregate is fairly heavy. We note a sale of 100 cars of furnace coke, and 1300 tons of foundry outside this immediate district. Prices are stiffening, Connellsville coke being from 25c. to 50c. higher than last week. Wise County and New River coke are unchanged.

Tool Steel.—The market continues dull, although some improvement was noticed during the past couple of weeks. Prices show no change, high speed steel being quoted at from 85c. to 90c. per lb.

Old Material.—The United States Cast Iron Pipe & Foundry Co., Addyston, Ohio, is in the market for a heavy tonnage of cast scrap, and it is said will buy as much as 5000 tons if the price is right. Dealers report a scarcity of cast scrap and some of them have marked the price up another dollar per ton. A West Virginia steel plant is inquiring for borings and turnings. Local foundries, however, are not showing much interest in the market, although one of them has made an offer on 1000 tons of cast scrap which was turned down by the local dealers on account of the price being out of line.

We quote dealers' buying prices:

	Per Gross Ton	
Bundled sheets	$4.00 to	$5.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.50 to	11.50
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
	Per Net Ton	
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.50 to	3.00
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	7.50 to	8.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	5.00

St. Louis

ST. LOUIS, Sept. 13.

Pig Iron.—Inquiries for pig iron are said to have slowed up a bit, following the recent advances, but the market is firm. Orders are being placed for immediate delivery, and buyers are insistent upon this, demanding car numbers as soon as possible. Buyers have been waiting as long as they could, and their stocks have run down to a low point. A local steel manufacturer took 600 to 800 tons of basic, and a nearby Illinois melter purchased 600 to 800 tons of foundry iron for prompt shipment. A Western consumer bought 500 tons. Negotiations are on for an order of 1500 to 1800 tons for shipment over the next 60 days. The recent advances in Northern irons have put them on a par in this market with Southern foundry, the market price being $24.88, St. Louis, for the former, as against $24.91 for the Southern product. So far there has been no buying of consequence of Southern foundry. Business among the stove manufacturers is increasing. There are inquiries out for a car each of ferromanganese and spiegeleisen.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—St. Louis fabricators received with satisfaction the word from Washington that the lowest bidder on the airship hangar to be built at Belleville, Ill., by the Government was a St. Louis concern, the W. M. Sutherland Construction Co. About 3500 tons of structural steel is involved. The Scottish Rite Cathedral contract, involving 3000 tons of structural steel, has been let to the John Hill Construction Co. Local fabricators were disappointed at the letting to Jones & Laughlin, Pittsburgh, of 600 tons for the Standard Underground Cable Co. plant at St. Louis. This order was reported in Chicago as having gone to the Decatur Bridge Co. Railroad requirements for the week were only a few carload orders. The Pennsylvania placed an order here for several hundred pounds of tool steel. Some weakness is reported in structural shapes and plates and bars, and some sales are being made at less than the market prices. There is a growing demand for sheets, especially on the part of local jobbers. Warehouse prices are unchanged.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—The coke market is showing more strength, and standard Connellsville foundry coke is now quoted at $5 per net ton at ovens. Orders for immediate shipment are increasing, and the situation generally is improved. In the last week 7500 tons of Granite City furnace coke was sold for shipment over the next 60 days. Business among the stove plants in the St. Louis industrial district is improving.

Old Material.—A few purchases of small tonnage were made during the week, but the market is comparatively quiet as far as demand for consumption is concerned. There is, however, considerable demand for No. 1 railroad cast scrap and stove plate. The mills still refuse to consider the recent advances in prices of heavy metaling steel as permanent, and brokers are unwilling to make any concessions at present. The high-priced old material recently bought by the dealers from the railroads is now being shipped, and if the mills remain adamant, there probably will be a scramble among the dealers to unload at a loss. The following railroad lists are before the market this week: Chicago, Rock Island & Pacific, 3151 tons; Mobile & Ohio, 715 tons; Nashville, Chattanooga & St. Louis, 400 tons; Kansas City Southern, 150 tons; Wabash, 150 tons, and a list issued by the Southern Railway aggregating 9500 tons, very little of which will move in this market.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

	Per Gross Ton	
Iron rails	$13.00 to	$13.50
Steel rails, rerolling	12.00 to	12.50
Steel rails, less than 3 ft	11.00 to	11.50
Relaying rails, standard section	29.00 to	30.00
Cast iron car wheels	12.50 to	13.00
No. 1 heavy railroad melting steel	11.00 to	11.50
No. 1 heavy shoveling steel	9.50 to	10.00
Ordinary shoveling steel	9.00 to	9.50
Frogs, switches and guards, cut apart	11.00 to	11.50
Ordinary bundle sheet	4.00 to	4.50
	Per Net Ton	
Heavy axle and tire turnings	6.00 to	6.50
Iron angle bars	11.00 to	11.50
Steel angle bars	9.00 to	9.50
Iron car axles	16.50 to	17.00
Steel car axles	12.50 to	13.00
Wrought iron arch bars and transoms	13.00 to	13.50
No. 1 railroad wrought	10.50 to	11.00
No. 2 railroad wrought	10.00 to	10.50
Railroad springs	10.50 to	11.00
Steel couplers and knuckles	10.50 to	11.00
Locomotive tire, 42 in. and over, smooth inside	9.00 to	9.50
No. 1 dealer's forge	6.00 to	6.50
Cast iron borings	5.50 to	6.00
No. 1 busheling	9.50 to	10.00
No. 1 boilers cut in sheets and rings	6.00 to	6.50
No. 1 railroad cast	13.50 to	14.00
Stove plate and light cast	11.50 to	12.00
Railroad malleable	10.00 to	10.50
Agricultural malleable	9.00 to	9.50
Pipes and flues	7.50 to	8.00
Heavy railroad sheet and tank	6.00 to	6.50
Light railroad sheet	3.50 to	4.00
Railroad grate bars	8.50 to	9.00
Machine shop turnings	4.50 to	5.00
Country mixed iron	7.00 to	7.50
Uncut railroad mixed	8.00 to	8.50
Horseshoes	10.50 to	11.00
Railroad brake shoes	8.50 to	9.00

Buffalo

BUFFALO, Sept. 20.

Pig Iron.—A decided falling off in inquiry and sales has affected producers in this district, and unless extraordinary tonnages are booked before the end of the month, September business will show a smaller movement of iron than the preceding month. There is evidence that a number of foundries are operating in a limited way, but their pig iron requirements are not up to expectations. This is attributed to the greater use of old material. Furnace operation has not changed. One producer is known to have stored almost 100,000 tons of iron. Its sales are limited and certainly not equal to the present production. Total inquiry in the hands of one interest for a week is less than 3000 tons —in contrast with the situation a week prior, when it was engaged with more than 20,000 tons. A producer sold about 1500 tons at $20 base. Another sold nothing and notices a falling off in the small inquiry which has been fairly steady. An agency which demanded a price of $21 base has sold but a few carloads.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.75
No. 2X foundry, 2.25 to 2.75 sil.	20.75
No. 2 plain, 1.75 to 2.25 sil.	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	33.75

Finished Iron and Steel.—Business in pipe, on which prices have been reduced, has been unusually good. Improvement in the demand for bars has been definite and the lowest price now quoted is 1.60c. A mill is now quoting 1.65c. on its regular run of inquiries for small lots. Two attractive inquiries for reinforcing bars are out and both involve about 500 tons. Some desirable orders from jobbers have been placed with a bar mill, but the usual trend of business is for carload lots and less. Some increase in bar mill operation is pending. An interest having two bar mills in operation may put in a third within a few days. Wire business is quiet since the announcement of advances in price was made and most tonnages are booked on a 30-day basis. One interest has made some desirable sales for October delivery in this material. Structural activity is limited to small lots and nothing of attractive size is within sight.

Warehouse Business.—The only departure from the ordinary run of warehouse business has been an unusual demand for bands. Two orders calling for sizable tonnages in this material have engaged one warehouse and on one, to fill the demand, sheets cut to size were utilized. While figures on these tonnages are lacking, the orders are regarded as unusual "warehouse" orders. Bar and shape business continues fair, not with particular reference to the size of individual orders, but bearing more on an increase in the number. Advance in wire prices is expected to have a healthful effect on the market in that it indicates to buyers that a turn has developed and that price cutting has terminated.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.30c.; galvanized steel sheets, No. 28, 5c.; black sheets, No. 28, 4c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 4.05c.

Old Material.—There is difficulty in filling orders for cast scrap and a gross price of $15.75 is now the rule. Consumers have not indicated a desire to pay $13.50 for steel after several sales at that figure were completed. The market is a trifle weaker in this commodity. Generally the same optimistic feeling is prevalent, but no large movements have been made.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

San Francisco

SAN FRANCISCO, Sept. 14.

Pig Iron.—The past week or ten days has not witnessed any perceptible revival in actual business on the Coast, judging from the volume of sales reported. Few, if any, transactions are conspicuous by the tonnage involved; in fact, it appears that buyers have been refraining from extensive participation, confining their interest almost entirely to immediate needs, which at this time are rather light. There is no apparent change in prices, which, however, are nominal only.

Coke.—The sale of 500 tons of domestic coke to the Southern Pacific Co. a few days ago was the largest single transaction reported of recent date. While the actual figure has not been disclosed, it is understood to be considerably below the current market price. The inactivity of foundries continues greatly to curtail the demand for coke in this district. Some rather cheaper foreign coke has been offering.

Cast Iron Pipe.—Although actual business has not been particularly large of late, the market is considered in good condition, and operators expect considerable activity in municipal work, especially in southern California, in the succeeding weeks. Private corporation business still is light. Redwood City, Cal., will ask for bids on Sept. 19 for 65 tons of 4 and 8-in. pipe, and Madera will be in the market for 17,900 ft. of 4, 6, 8 and 10-in. pipe, which will be used for extending the present water works.

Finished Iron and Steel.—Little more than a continuation of the better inquiry for materials, which was recorded in the last report, has developed in this market recently. The interest in structural steel continues, and considerable buying in small lots is being done, but as yet there appears to be no manifest tendency to proceed with new large jobs. Jobbers report a good movement of stocks and steady replenishment buying. In the last week, certain jobbers have been purchasing freely, Belgian bars, which were offered at $1.95, f.o.b. docks, duty paid, a price below that of domestic bars. Tank plates of foreign fabrication also have been available at the attractive price of $2.15, f.o.b. docks, duty paid. The South continues to be a steady taker of sheets. One of the few sizable inquiries is for about 2200 tons of tank material for an oil company. Steel operators on the Coast point to the present freight rates as disadvantageous to the expansion of business here, and say that the new rate of $5.70 a net ton on steel shipments moving from Pittsburgh to New York en route to the Orient threatens to divert the movement of steel from this port. Against the current rate of $19.20 for transcontinental shipment from Pittsburgh to San Francisco and thence to the Far East is $17.31, the charge via New York and the Canal.

Old Material.—The general limitation of activity by iron and steel interests makes unnecessary much purchasing of scrap, even if most foundries were not well supplied already; in fact, the large stocks held by railroads, dealers and producers in the country seem to preclude the possibility of a greatly increased consumption in the near future. The largest single sale of scrap reported involved 500 tons of steel plate punchings for ballast, on the basis of $15 a net ton, f.o.b cars, San Francisco. Cast iron scrap and heavy melting steel continue nominal at practically unchanged prices, while turnings and borings are offered at about $5 gross ton, delivered.

The snow problem in cities is the subject of a meeting to be held at the Engineering Societies Building, New York, on the evening of Friday, Sept. 23, by the Metropolitan section of the American Society of Mechanical Engineers. Henry L. Doherty is to present the leading paper, and a number of engineers have been invited to participate in the discussion.

The Biggam Trailer Co., 425 East Water Street, Milwaukee, has recently increased its capital stock to $250,000 preferred and 15,000 shares of common stock without par value.

Philadelphia

PHILADELPHIA, Sept. 20.

Steel prices continue very weak, though there is some indication of resistance on the part of a few companies whose losses at present selling prices are said to be greater than if their mills were allowed to remain idle. There is a feeling of hopefulness, however, because of a belief that consumers must soon realize that prices have actually reached bottom or very close to it. Within the past week prices of plates, shapes and bars have become definitely established at 1.60c., Pittsburgh, with reports of quotations as low as 1.50c., Pittsburgh, on plates and bars. The advance of $5 a ton on sheets first announced by a Youngstown maker has not become general, and, in fact, some quotations, particularly on the heavier gages of blue annealed, have reached the lowest point since the decline, namely 2c. to 2.10c., Pittsburgh. Such low prices are not general, but have been made in a few instances. The reduction of about $10 a ton on steel pipes and steel tubes by the leading interest has been quite generally followed by its competitors.

In pig iron there is a slightly firmer tendency, some makers having advanced their prices 50c. a ton on foundry grades.

Pig Iron.—Foundry iron has been advanced 50c. a ton by some of the makers in this district, the advance being due partly to the better position furnace order books are in as a result of recent buying and partly to the growing determination of operators to cut down their losses. A further advance of 50c. a ton is predicted and may take place within the week. This places No. 2 plain iron on the basis of $20, No. 2X at $20.50 and No. 1X at $21.50, all f.o.b. furnace, though at least one seller with freight rates averaging more than $1.50 a ton is still quoting on the basis of $19.50. Pig iron business in this district is showing no marked expansion, but a fairly satisfactory volume is being booked, mostly in lots of a few hundred tons, and furnaces are selling and shipping more than they are making. For example, one furnace has sold 11,000 tons so far this month, which is more than its monthly output. Consumers are usually anxious to cover for the remainder of the year, and in some instances are inquiring for first quarter of next year. One or two sales for January-February shipment have been made, but generally sellers are unwilling to make commitments beyond Jan. 1. The firmer tendency in the coke market leaves furnace operators in doubt as to what their production costs may be next year. Furnace coke is available for shipment over the remainder of this year at $3.50, Connellsville, but quotations have not been made beyond that period. A 100-ton sale of basic iron was made at $19.50, furnace, but there is no inquiry for larger tonnages. Low phosphorus iron is dull with prices unchanged. The Princess furnace will go out of blast within a week, thus putting the entire Virginia iron-making industry on the inactive list. The Robesonia furnace, which blew in several weeks ago to make copper-bearing low phosphorus and foundry iron, will go out of blast this week and may require some lining repairs. A quantity of iron sufficient to take care of expected wants of its customers has been piled.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying frm 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$20.84 to $21.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.34 to 21.76
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	19.25 to 20.75
Gray forge	20.00 to 21.00
Malleable	22.00 to 23.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Coke.—Furnace coke for delivery over the remainder of the year is now available at $3.50, Connellsville. Foundry coke is quoted at $4.25 to $4.75, Connellsville.

Ferroalloys.—Domestic producers of ferromanganese are meeting the prices named by agents of the British producers, namely $58.35, Atlantic seaboard. Demand has improved, one maker having booked 1000 tons in small lots during the past week. Spiegeleisen is nominally quoted at $26 and $27, furnace.

Semi-Finished Steel.—While there is virtually no demand for billets, producers have no difficulty in getting $30 for rerolling quality and $35 for forging quality, Pittsburgh, on such small orders as they are booking.

Plates.—The plate market continues decidedly weak, and while there is no confirmation of reports of quotations as low as 1.50c., Pittsburgh, it is definitely established that the market is at least on a 1.60c. basis. Small orders have been taken at the latter price. Some makers are showing more resistance toward the low prices. An Eastern company has, for example, set its price at 1.65c., and may decide to quote 1.75c., Pittsburg, with a determination to let its mills remain idle rather than to continue taking business at such a heavy loss. Eastern car builders are figuring on 1000 steel hopper cars for the Delaware, Lackawanna & Western and 1000 steel car bodies for the Baltimore & Ohio.

Structural Material.—Shapes are now obtainable at 1.60c., Pittsburgh, on ordinary lots, and it is intimated that fabricators, figuring on particularly desirable work, have been given protection at a shade under this price. In this immediate locality considerable work is being held up on which action had been expected at an earlier date. The Chestnut Street pier work, requiring about 1000 tons, may be awarded this week. Other important enterprises on which no decision has been reached include the addition to Haddon Hall, Atlantic City, and a new Stanley theater. A high school for Pottstown, Pa., will require 350 tons of steel and a school building at Kearney, N. J., 275 tons. Figures are being obtained for an office building to be erected at Fifteenth and Locust streets, Philadelphia.

Bars.—Though quotations as low as 1.50c., Pittsburgh, on steel bars are commonly reported, it is stated that such prices have applied only to sizable tonnages of reinforcing bars. For example, 800 tons of reinforcing bars for the Western Maryland Railroad elevator at Baltimore were bought from an Eastern mill at less than 1.50c., Pittsburgh. The price generally quoted on merchant steel bars is 1.60c., Pittsburgh. A fair volume of business is being booked, but mill operations are not noticeably increasing. Bar iron is quoted at 1.60c. to 1.65c., Pittsburgh.

Sheets.—A Youngstown maker of sheets advanced prices last week $5 a ton, but other makers have not generally followed this advance, though some still have the matter under consideration. Coincident with the advance, some mills made the lowest prices which have yet been quoted. For example, heavy gages of blue annealed sheets have sold from 2c. to 2.10c., Pittsburgh, and there have also been concessions on black and galvanized.

Warehouse Business.—A fair gain in sales of steel out of stock is reported.

Old Material.—The market continues quiet with prices virtually unchanged. However, there is a firm undertone. We quote for shipment to consuming points in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.00 to 15.50
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	12.50 to 13.50
Stove plate (for steel plant use)	12.50 to 13.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

British Iron and Steel Market

Makers' Position Improves with Stiffening of Continental Prices—Activity Still Retarded by Fuel Prices

(By Cable)

LONDON, ENGLAND, Sept. 20.

Cleveland iron is again stagnant. Sellers quote No. 3 foundry at £6 ($22.32) for October delivery, but consumers show no anxiety to purchase. Coke prices are keeping up, and hindering the re-starting of more furnaces. Iron-masters state that they are now running at a loss.

Hematite is more active. Nine Northeastern furnaces are now blowing. Makers are so anxious for orders that they are cutting shipment prices. The home demand is quiet. Bilbao Rubio ore is quoted at £1 8s. ($5.21) and upward, c.i.f., Tees.

British steel makers are securing more export orders by cutting quotations, but home trade buying is still in abeyance. Guest, Keen & Nettlefolds, Ltd., are partly reopening their plants, to enable their workers to tide over the present crisis.

Continental competition is less keen, as prices from across the Channel are advancing. French merchant bars have been sold at £8 7½s. (1.39c. per lb.) f.o.b., but £8 12½s. (1.43c. per lb.) f.o.b., is now asked. Belgian merchant bars are quoted up to £9 (1.49c. per lb.) f.o.b., for shipment in 6 to 8 weeks. German merchant bars also are held at £9 f.o.b. for December and January shipment.

German plates 3/16 in. thick and under are quoted at £9 f.o.b. for shipment in 6 weeks. German wire nail makers refused 23s. ($4.28) c.i.f. for Japanese specifications. British wire rods are obtainable below £11 10s. ($42.78) f.o.b.

Tin plates are more active, especially for home consumers, and fair business is being done in odd sizes. The Far East is still buying. More mills have started, and the Welsh output is now about 30 per cent of capacity. It is anticipated that it will reach 45 per cent before long.

Galvanized sheets are weak, business being done at £19 10s. (3.24c. per lb.) f.o.b. for No. 24 gage, and at £28 5s. (4.69c. per lb.) f.o.b. for Shanghai specifications. There is more inquiry, and more mills are running. Belgium is quoting on No. 15 gage black sheets at £10 10s. (1.74c. per lb.) f.o.b.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.72 per £1 as follows:

Durham coke, delivered	£1 15	$6.51
Cleveland basic	7 7½ & £7 10*	27.45 & $27.90
Cleveland No. 1 foundry	7 0	26.04
Cleveland No. 3 foundry	6 5	23.25
Cleveland No. 4 foundry	5 19	22.13
Cleveland No. 4 forge	5 17½	21 85
Hematite	7 0*	26.04
East Coast mixed	7 0 & 6 15*	26.04 & 25.11
Ferromanganese	18 0 & 14 10*	66.96 & 53.94
Rails, 60 lb. and up	10 0 to 14 0	37.20 to 52.08
Billets	7 10 to 8 0	27.90 to 29.76
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.70 to 31.62
Tin plate base box	1 1 to 1 2½	3.90 to 4.18
		C. per Lb.
Ship plates	12 10 to 14 0	2.08 to 2.32
Boiler plates	18 0 to 19 0	2.99 to 3.16
Tees	12 10 to 14 10	2.08 to 2.41
Channels	11 15 to 13 15	1.95 to 2.28
Beams	11 10 to 13 10	1.91 to 2.24
Round bars, ¾ to 3 in.	12 0 to 12 10	1.99 to 2.08
Galvanized sheets, 24 g.	19 0	3.15
Black sheets	16 0	2.66
Steel hoops	14 5 & 14 0*	2.37 & 2.32
Cold rolled steel strip, 20 g.	26 10	4.40

*Export price.

High Fuel Cost Hampers Pig Iron Output—Semi-Finished Steel Lower

LONDON, ENGLAND, Sept. 7.—Business in the iron and steel trades still hangs fire. The main reason is the high cost of production which is everywhere preventing manufacturers from reopening their works and producing at a normal rate. Each day sees further collieries forced to shut down owing to the high wages they have to pay, which in turn prevents them from reducing the selling price of their products. Only recently the Stavely Coal & Iron Co., shut down one of its collieries on this account. Until the miners are willing to accept a reasonable wage for their work, costs cannot come down. The iron and steel trade in the meantime is waiting on cheaper fuel.

In the Cleveland district there are now 14 blast furnaces blowing and, though the demand for foundry iron has certainly increased, makers cannot see their way to relight their furnaces on a wholesale scale. There is practically no foundry iron available except No. 4, for which 125s. is asked for both home and export. No. 3 G. M. B. is quoted at 135s. In the hematite trade business is a little more brisk, but makers had to cut the prices to get the orders and, because there was business to be done, reduced the home trade quotation to the level of that for shipment material; East Coast mixed numbers are now quoted at 140s. for both home and foreign consumption.

A welcome feature in the finished and semi-finished steel markets is the fact that continental makers are now out of the running for semi-finished steel and, British makers being inclined to cut their prices, have at last secured some good sized orders. In finished steel, however, prices here are still far above those at which material can be supplied by the continental makers, with the result that business does not show any marked improvement. Home quotations were recently reduced by 20s. a ton, but the drop has not proved sufficiently attractive to buyers.

Here and there one hears of improvements in employment such as the reopening of the Ebbw Vale Steel & Iron Co., works, and Palmer's Steel Works, both of which have been idle for six months or more, but this really only means that the works have got together a sufficiency of orders to justify them making a start, and are going through that program. An instance of the depression in the trade in Sheffield is shown in the reports of the Sheffield Bankers' clearings which up to Aug. 20 were more than £16,000,000 below the aggregate of the same period last year. For the week ended Aug. 20 the turnover totalled £841,561, a fall of over half a million pounds compared with the same week a year before.

Union Steel Casting Co. Absorbed

The fixed assets and inventories of the Union Steel Casting Co., 53 Gerard Street, Roxbury, Boston, have been purchased by the Roxbury Steel Casting Co., a Massachusetts corporation, capitalized for $50,000. Isaac E. Sexton, Winchester, is president of the new company, and Perley C. Rogers, Quincy, treasurer and general manager. These two gentlemen and George A. Sexton constitute the board of directors.

J. T. Phelps remains as superintendent of the Roxbury Steel Casting Co. and the foundry organization will be as heretofore. R. L. Adams continues in charge of the laboratory. The new company has rebuilt the open-hearth furnace, which now has 15-ton capacity, and has made minor changes to facilitate production of open-hearth castings ranging in size from 1 lb. to 12 tons, and to handle any specification castings required. The new management expects to resume operations this week. It plans to maintain a normal working force of 220, but will begin operations with a somewhat reduced number.

The New York Central Railroad, Grand Central Terminal, New York, will receive bids until 12 o'clock noon, Sept. 29, for immediate requirements for shop and operating equipment, including rolled steel gears, wire fence, track bolts, volt cables and parts, manganese frogs and bottom plates for crossing frogs, as per specifications on file at the office of W. C. Bower, purchasing agent.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia	$0.35	St. Paul	$0.665
Baltimore	0.335	Omaha	0.815
New York	0.38	Omaha (pipe)	0.77
Boston	0.415	Denver	1.35
Buffalo	0.295	Denver (wire products)	1.415
Cleveland	0.24	Pacific Coast	1.665
Cincinnati	0.325	Pacific Coast, ship plates	1.335
Indianapolis	0.345	Birmingham	0.765
Chicago	0.38	Jacksonville, all rail	0.555
St. Louis	0.475	Jacksonville, rail and water	0.46
Kansas City	0.815	New Orleans	0.515
Kansas City (pipe)	0.77		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.60c. to 1.70c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.20 to $2.50
Large boiler rivets.....2.35 to 2.60
Small rivets.....70, 10 and 10 per cent off list
Machine bolts, small, rolled threads, 70, 10 and 7½ per cent off list
Machine bolts, small, cut threads, 65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer, 65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
  Smaller and shorter rolled threads..70 and 5 per cent off list
  Cut threads.....65 and 10 per cent off list
  Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts.....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
  Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
  Smaller and shorter.....60, 10 and 5 per cent off list
  Larger and longer sizes.....60 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped.....4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped, 4.25 to 4.75 off list
Semi-finished hex. nuts:
  ¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
  Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
  ⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....3.50c. to 3.75c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $41; chain rods, $41; screw stock rods, $46; rivet and bolt rods and other rods of that character, $41; high carbon rods, $49 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.40 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.65 to $2.75 base; 5/16-in., $2.65 to $2.75 base. Boat and barge spikes, $2.65 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.50 to $3.75 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

¼	50½	33	¼ to ⅜	+ 4½	+37½
⅜ to ⅝	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1¾ in.	26½	1½ in.	List
2 to 2¼ in.	41	1¾ to 1⅞ in.	10
2½ to 3 in.	52	2 to 2¼ in.	20
3¼ to 13 in.	57	2½ to 3 in.	25
		3¼ to 4½ in.	27

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb		Cents per Lb.	
No. 8 and heavier	2.20–2.45	Nos. 11 and 12	2.30–2.55
Nos. 9 and 10 (base)	2.25–2.50	Nos. 13 and 14	2.35–2.60
		Nos. 15 and 16	2.45–2.70

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 22 to 24	2.60–2.85	No. 29	2.85–3.10
Nos. 25 and 26	2.65–2.90	No. 30	2.95–3.20
No. 27	2.70–2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	2.75–3.00	Nos. 25 and 26	3.45–3.70
Nos. 12 to 14	2.85–3.10	No. 27	3.60–3.85
Nos. 15 and 16	3.00–3.25	No. 28 (base)	3.75–4.00
Nos. 17 to 21	3.15–3.40	No. 29	4.00–4.25
Nos. 22 to 24	3.30–3.55	No. 30	4.25–4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.55–2.80	No. 28 (base)	2.75–3.00
Nos. 17 to 21	2.60–2.85	No. 29	2.80–3.05
Nos. 22 to 24	2.65–2.90	No. 30	2.80–3.05
Nos. 25 to 27	2.70–2.95	Nos. 30½ and 31	2.85–3.10

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York			Lead		Zinc	
Sept.	Lake	Electrolytic	Tin New York	New York	St. Louis	New York	St. Louis
14	12.25	12.00	26.50	4.60	4.40	4.70	4.20
15	12.25	12.00	26.25	4.60	4.40	4.70	4.20
16	12.25	12.12½	26.00	4.60	4.40	4.70	4.20
17	12.25	12.12½	....	4.60	4.40	4.70	4.20
19	12.25	12.12½	26.37½	4.60	4.40	4.67½	4.17½
20	12.25	12.12½	26.50	4.65	4.45	4.67½	4.17½

New York

NEW YORK, Sept. 20.

Some metals have shown improvement and some are unchanged both as to buying and prices. Demand for copper continues very light but prices are firm. There is moderate buying of tin, with steadiness as to value. Lead is the most active of the metals and prices have advanced again. With no improvement in the demand for zinc, the market is easier.

Copper.—This market presents the rather unusual spectacle of prices advancing in the last few weeks, but without the increase in buying usually seen in such circumstances. The situation is a distinct disappointment to sellers, both inquiry and buying being very light. An appraisal of values is difficult under the circumstances, but on electrolytic copper, where quotations are at all obtainable, 12.12½c., New York, is generally named, or 12.37½c., delivered, on early shipment. It is possible that 12.25c., delivered, could be done, but there has been no real test of the market. Lake copper is quiet and nominal at 12.25c. to 12.37½c., delivered. The explanation of the small demand is that consumers are not having an active demand for their finished products, although sentiment in that part of the trade is better than for some time. There is also the opinion that the advance in price of copper was not justified and that the metal will be obtainable on a lower basis later. The estimate of the U. S. Geological Survey that stocks of refined copper in the country are from 750,000,000 to 1,250,000,000 lb., while it represents a wide "spread," is not generally accepted by the trade, the outside figure being considered high.

Tin.—The moderately active demand for Straits tin which has been the feature of the market for most of the last few weeks continues, and sales for the week this report covers have probably totaled 500 tons of future shipment metal at prices ranging from 26.25c. last Friday to 26.62½c. last Wednesday. Probably 200 tons was sold on Sept. 14 and 200 to 300 tons on Sept. 15, with light sales on Sept. 16. Business for October-November shipment from the East was done in small lots yesterday at 26.37½c., while 26.50c. was bid at the close. On some of the days consumers and dealers were equal participants in the business and inquiry from consumers has been fair most of the time. Spot Straits tin, New York, is quoted to-day at 26.50c., and quotations in the London market are as follows: Spot standard, £155 10s.; future standard, £157 15s.; spot Straits, £156 5s., or about £1 per ton lower than a week ago. Arrivals thus far this month have been 2225 tons and 3050 tons is reported afloat.

Lead.—Another advance was made late to-day by the American Smelting & Refining Co. from 4.60c. to 4.65c., New York and St. Louis. Quotations of independents are largely nominal at 4.65c., New York, or 4.40c. to 4.45c., St. Louis, but few of these producers are quoting in this market, the present demand being largely satisfied by the leading interest. Buying is reported good, with some consumers heard from for the first time in a long period.

Zinc.—This market continues featureless and slightly easier, prime Western for early delivery being available as low as 4.17½c., St. Louis, or 4.67½c., New York. Unconfirmed reports are that one or two sellers have offered as low as 4.15c., St. Louis. Buying by galvanizers and others is spasmodic and generally for small lots, but there is more inquiry for forward delivery.

Antimony.—The market is nominally unchanged at 4.45c., New York, duty paid, for wholesale lots for early delivery.

Aluminum.—The leading domestic producer continues to quote virgin metal, 98 to 99 per cent pure, at 24.50c., f.o.b. plant, in wholesale lots for early delivery, while the same grade from importers is obtainable at 19c. to 20c., New York, duty paid.

Old Metals.—The market is fairly firm and is marking time awaiting developments in the new metal market. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.00
Lead, heavy	4.00
Zinc	3.00
Lead, tea	3.00

Chicago

Sept. 20.—Trading has been exceedingly dull in all the metals and slight declines are noted in tin and zinc, the former being now quoted at 28c. and the latter at from 4.25c. to 4.30c. Old metal prices are unchanged. We quote in carload lots: Lake copper, 12.50c. to 12.75c.; tin, 28c.; lead, 4.50c.; spelter, 4.25c. to 4.30c. in less than carload lots; antimony, 7c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

ST. LOUIS, Sept. 20.—The lead market is quiet and unchanged while slab zinc is dull and lower. We quote lead at 4.40c. carlots and zinc at 4.17½c. We quote Lake copper at 12.98½c., carlots; tin, 27.36c.; and antimony, 5.23½c. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

The General Alloys Co., New York and Chicago, announces a new heat resisting alloy at a base price of 20c. per lb. This alloy, it is claimed, has about four times the life of steel and retains its shape at high temperatures. It is covered by a patent recently issued. It will be sold under the trade name of X-ite and is the fourth material to be sold under the Q-alloy trade name.

Production of Portland cement in August amounted to 10,244,000 bbl., a gain of 15 per cent over the average August of the past four years. Each month of the year has seen a consistent increase in production over its predecessor, but stocks have fallen sharply, due to excess of shipments (12,340,000 bbl. in August) over production every month since April.

Ground has been broken for an addition to the plant of the Wyckoff Drawn Steel Co., Ambridge, Pa., which, when completed, will put under cover more than half an acre of manufacturing space. The American Bridge Co., will fabricate the steel, amounting to about 100 tons, and it is expected to have the new portion of the plant in operation early in 1922.

PERSONAL

Paul Boulanger, a director of Thyssen & Co., Mulheim, Ruhr Region, Germany, is now visiting the United States on a tour of inspection of heavy material handling appliances in use here. Mr. Boulanger recently visited the Farrell Steel Works of the Carnegie Steel Co., at Farrell, Pa. and has also investigated the ore handling machinery at Duluth. His headquarters while in this country are with F. A. Borgemeister, 50 Church Street, New York.

Charles B. Tamm, for several years chief purchasing agent LeRoi Co., Milwaukee, manufacturer of automobile and tractor engines, has resigned to become assistant general manager of the Hydro-Hoist Co., a subsidiary of the Heil Co., Milwaukee, manufacturer of steel dump bodies, compartment truck tanks, hydraulic hoists, etc.

C. C. Hanch, Indianapolis, vice-president National Automobile Chamber of Commerce, is to become executive vice-president of the United States Automotive Corporation. The subsidiaries of the corporation are the Lexington Motor Co., the Ansted Engineering Co., the Ansted Spring & Axle Co., the Connersville Foundry Corporation, the Fayette Trimming & Painting Co., and the Teetor-Hartley Motor Corporation. Frank B. Ansted is president of the corporation. Mr. Hanch will have headquarters at Connersville, Ind., home office of the United States Automotive Corporation. Mr. Hanch had long been connected with the Nordyke & Marmon Co., Indianapolis, and with the Studebaker Corporation, South Bend, Ind. During the war he was chief of the automotive products section of the War Industries Board. After the war he went to Europe as trade commissioner for the Department of Commerce.

The American Steel Export Co. has closed its branch office at Rio de Janeiro, Brazil, and J. D. W. Snowden, general representative in charge, has returned to the United States. His present address is 5228 Laurens Street, Germantown, Philadelphia.

W. G. Jones has been elected vice-president and treasurer of the W. A. Jones Foundry & Machine Co., Chicago, and will continue to serve as general manager.

Stuart F. Brown, formerly production engineer with the Whitin Machine Works, Whitinsville, Mass., manufacturer of textile machinery, is now manager of the Whitinsville Spinning Ring Co.

J. C. Holt, president Antrim Iron Co., Grand Rapids, Mich., has returned from a four months' trip through Europe.

J. M. Meany, formerly Western manager Clyde Iron Works, Duluth, Minn., has become president of the Ball Engineering Co., Portland, Ore.

P. S. Van Wyck has joined the Mesabi Iron Co., Babbitt, Minn., having resigned from the Great Western Railroad.

Edward Flad has resigned as a member of the Missouri Public Service Commission and will return to St. Louis to follow his profession as a consulting engineer.

John D. Hurley, president Independent Pneumatic Tool Co., 600 West Jackson Boulevard, Chicago, manufacturer of air and electric tools, arrived in New York on the New Amsterdam Sept. 9 and reached the home office in Chicago, Sept. 15. Accompanied by Mrs. Hurley, he has just completed a six weeks' trip abroad, visiting all the principal points of Continental Europe.

A. F. Soben, formerly assistant chief engineer American Machine & Mfg. Co., Atlanta, Ga., has opened offices in Los Angeles, Cal., as consulting engineer and designer of special and automatic machinery.

I. N. Zavarine, formerly metallographist Winchester Repeating Arms Co., New Haven, Conn., has been appointed assistant in the mechanical engineering department of the Massachusetts Institute of Technology, Boston.

S. E. Allen, engineer Stevens-Duryea Co., Chicopee Falls, Mass., automobile manufacturer, has resigned to accept a position on the Pacific Coast. E. E. Nichols, superintendent, has resigned, but has made no plans for the immediate future.

J. M. Lloyd has resigned as superintendent of the Lowellville, Ohio, plant of the Sharon Steel Hoop Co., Sharon Pa., effective Oct. 1, after serving two and a half years.

L. R. Samuels, formerly assistant sales manager William Jessop & Sons, Inc., New York, high-speed steel, has returned to that company after a year's absence. He will make his headquarters in New York.

N. W. Elmer, formerly engineer for the Harry M. Hope Engineering Co., Boston, has opened an office in Quincy, Mass., as consulting engineer in conveying and mechanical handling.

Chester C. Jackman, formerly factory manager Victor Saw Works, Springfield, Mass., has been made vice-president and treasurer of the Dolman Mfg. Co., Springfield.

John M. Smith, formerly designer for the Hooven, Owens, Rentschler Co., is now in the engineering department of the Gardner Governor Co., Quincy, Ill.

Earl F. Heimpel, M. E., formerly chief engineer of the Edison Portland Cement Co., Stewartsville, N. J., has resigned to join the sales force of the M. J. Dougherty Co., piping fabricator and engineers, Philadelphia. He is a graduate of Lehigh University, has had a wide experience in the engineering field and will be located in the home office.

James A. Brakes, Jr., has become structural engineer for the Chateaugay Ore & Iron Co., Lyon Mountain, N. Y., having resigned his position as head of the department of mechanical engineering at Ohio Northern University, Ada, Ohio.

Robert L. Crane, for 28 years Western New York manager Henry Prentiss & Co., Inc., has terminated his connections with that company and will continue in the same line of business under the name of Crane Machinery Co., with offices at 501 D. S. Morgan Building, Buffalo. He is now establishing selling connections with a view of having in the near future branch offices in Rochester, Syracuse and Albany.

Parker M. Robinson has been transferred from the marine engineering department of the Westinghouse Electric & Mfg. Co. to the power sales department of the same company and has been sent to Los Angeles, Cal., as a specialist in steam power apparatus.

M. C. Gillett has become manager of the plant of the Standard Heater Co., Williamsport, Pa., having been transferred from the management of the Philadelphia branch office.

D. T. Farnham, formerly consulting industrial engineer, St. Louis, has become vice-president of C. E. Knoeppel & Co., Inc., New York.

W. L. Conrad, for many years manager of the office of the late H. L. Gantt, assisting in the introduction of industrial management methods, has opened an office in New York for consulting practice along the same lines.

Boyd Fisher, formerly with the Tabor Mfg. Co., Philadelphia, as industrial engineer, is now with Lockwood, Greene & Co., Boston.

Edmund L. Barto and Harry J. Phillips, formerly sales engineer and chief engineer, respectively, of the New York office of the Austin Co., have formed the Barto-Phillips Co., engineer and builder, with offices at 280 Madison Avenue, New York, to engage in the engineering design, construction and exportation of all classes of industrial buildings, including power house and equipment requirements.

ACTIVE BUYING BY JAPAN

A 4000-Ton Rail Contract—Hydroelectric Project Including 1800 Transmission Towers

NEW YORK, Sept. 20.—Japanese buying and pending contracts for large projects continue to hold first place in exports of iron and steel. In all foreign markets there is evidence of lessening competition from Germany, due to the filled-up condition of the German mills, coupled with the more or less hand-to-mouth buying that now prevails in practically all markets. One of the recent large inquiries was for 4000 tons of 60-lb. rails for the Imperial Japanese railroads. These have been placed with Suzuki & Co. at a reported price of $49.98 per ton delivered Japanese port. A contract for 660 tons of structural steel for a Japanese bridge has been awarded to Takata & Co., and an order for 850 tons of bridge material for erection in the vicinity of Tokio is pending. Probably the largest business pending in the Far East at present is that represented by the pipe, plates and transmission towers required for the hydroelectric project on the island of Formosa. The contract will probably be awarded this month and will include six lines of pipe 1137 ft. long, about 1400 tons of tank plates to be bent for riveted pipe, and 225 miles of steel transmission towers, which at eight to the mile would number in the neighborhood of 1800.

Renewed activity is also reported from Chinese sources, particularly Hong Kong and Shanghai. Tin plate continues fairly active in the Orient, one New York exporter having recently booked an order for about 1000 base boxes of tin plate for a Japanese consumer. Black sheets of light gage still represent a large portion of the export business with Japan. One reason for the continued sheet demand is that dealers in Japan have received numerous lots of sheets of unsuitable quality, in some cases from Continental sources, in others from sources in the United States, and have had instructions from their customers to cancel unless satisfactory material can be delivered without delay. This has led to numerous orders of sheets for early delivery. The orders are chiefly for black sheets and in many cases these are galvanized in Japan.

For International Co-operation of Engineering Societies

Calvin W. Rice, secretary American Society of Mechanical Engineers, is chairman of a committee which is arranging for a dinner of engineers in New York, Oct. 10, in the interest of a new movement for international co-operation among engineering societies. The dinner is to mark also the return of the mission of 13 representatives of American engineering societies sent abroad to confer the John Fritz medal upon Sir Robert Hadfield and Eugene Schneider. Sir Robert Hadfield has sent a message to this country in aid of the movement which will be launched on Oct. 10. He advocates a world engineering council of Anglo-Saxons. Voicing, he says, the opinion of British engineers, Sir Robert is confident that the engineers of Great Britain and the United States are going to pull together. He has recently advocated the federation of engineering societies of the entire British Empire through an executive council similar to the American Engineering Council of the Federated American Engineering Societies.

The celebration referred to above, which will be at the Engineers' Club in New York, will be attended by engineers representing the Allied nations. Invitations have been extended to many men prominent in public life on both sides of the Atlantic.

Another Reduction Expected

Owing to wage reductions by independent competing interests, another cut is contemplated by independent iron and steel makers in the Mahoning and Shenango Valleys. Going rate for day labor in the Youngstown district is 30c. per hr., as compared with 25c. east of the Alleghenies, and 27c. paid by southern Ohio interests. When action is taken, the common labor rate in the valleys will be reduced to 27c. and rates for semi-skilled and skilled workers proportionately readjusted.

Successful generation of electric power at more than 1,000,000 volts at commercial frequencies has just been accomplished at the high voltage engineering laboratory of the Pittsfield, Mass., works of the General Electric Co. The laws of corona were checked at similar potentials and found to hold. A short transmission line was tested for corona conditions and results indicated that a line using 4-in. diameter conductors or larger would be necessary at 1,000,000 volts.

A certificate of incorporation of the Builders' Steel Co., Windsor Street, Hartford, Conn., has been filed with Connecticut authorities. The company is composed of Harry Ogens, A. Azier and S. Rome, and will engage in the structural steel business.

An agreement of the creditors to accept stock in the Mutual Truck Co., Sullivan, Ind., in exchange for their claims against the company, opens possibilities of the plant resuming operations.

Pittsburgh Iron and Steel Market

(*Continued from page* 761)

Available supplies are so limited that only a moderate demand is sufficient to stiffen prices. Dealers' stocks average too high to be offered at current prices and there is a marked tendency on the part of producers to hold for higher prices. The Ford Motor Co., which is reported to have 100,000 tons of scrap piled up at its works in Detroit, is said to have rejected an offer of $150,000 for 35,000 tons of turnings, included in the stocks. This is almost $4.50 a ton, Detroit, and equal to about $9.50 delivered, Pittsburgh common freight points. Some consumers in this district still are trying to buy trimmings at $8, but only stray cars which have to be moved can be bought at less than $8.50 and on tonnages $9 is minimum. We note sales of compressed sheets at $11.50, bundled sheets sides and ends at $10 and short shoveling turnings at $10. Heavy melting steel is not available at less than $14, at which price there was one sale of 5000 tons. Foundry grades are firm, but rerolling rails are easier, because demand for rerolled bars and light rails is so light that rerolling mills are more cautious buyers.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00
No. 1 cast cupola size	$17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.00 to 11.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.50 to 10.00
Railroad knuckles and couplers	14.50 to 15.25
Railroad coil and leaf springs	14.50 to 15.25
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.50 to 18.00
Railroad malleable	13.00 to 13.50
Iron car axles	20.00 to 21.00
Locomotive axles, steel	19.50 to 20.00
Steel car axles	15.00 to 15.50
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	8.75 to 9.00
Sheet bar crop ends at origin	13.00 to 13.50
Heavy steel axle turnings	10.50 to 11.00
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	12.00 to 12.50

Resumes on Open Shop Basis

The plant of the Whitaker-Glessner Co., Portsmouth, Ohio, which in common with all plants of the company has been down for the past two months on account of a dispute with the Amalgamated Association of Iron, Steel and Tin Workers, over the question of the open or closed shop, resumed operations last week on an open-shop basis. A portion of the open-hearth department and several finishing mills are in operation.

SHEET PRICES ADVANCED

Tonnages Accepted at Previous Levels Before Announcement—Low Bar Prices

YOUNGSTOWN, OHIO, Sept. 20.—All Valley independent interests have followed the lead of the Brier Hill Steel Co. in advancing prices on all grades of sheets. The new quotations are $2.50 per 100 lb. for No. 10 blue annealed; $3 for No. 28 gage black and $4 for No. 28 gage galvanized. The Republic Iron & Steel Co. and Youngstown Sheet & Tube Co. have reduced prices of standard steel pipe $8 per ton on all butt weld sizes, $10 on 2 to 8-in. lap weld and $8 on 9-in. and larger lap weld, and are otherwise following the new quotations of the National Tube Co.

The Newton Steel Co., the principal district independent producer of full-finished sheets, has reduced the price of No. 22-gage auto body stock from $4.70 to $4.35, the new quotation being based on $3 black sheets. Independents in this district are generally adhering to the advanced prices on wire and nails. Where prices have been advanced, makers accepted tonnage at the previous levels to meet requirements of their customers over a period of 30 days and in some cases longer. This accounts for acceleration of sheet mill schedules to approximately 65 per cent of normal, perhaps the best productive rate at any time this year.

In other directions, prices have been firmer and there is a pronounced tendency among independent makers to stabilize the market. Still further advances in sheet prices are looked for and intimation is made that another $5 increase may be made, especially in view of firmer prices on pig iron, heavy melting scrap and semi-finished materials.

In announcing the advanced prices of sheets, an official of the Brier Hill Co., which operates 28 sheet mills and ranks as one of the largest independent sheet makers in the country, said: "We were compelled to advance our prices because we could not manufacture sheets at the prices we were receiving. We are restoring prices to a point where there is a chance to break even."

Light Steel Products

Makers generally report a firmer demand for the lighter steel products, though the improvement is not shared by the heavier materials. It is pointed out that the market as a whole is firmer, notwithstanding the reductions in some products which had been relatively higher than others and so distinctly out of line. The whole movement is held to be in the line of stabilization, with further adjustments likely.

New business is developing in all parts of the country, report makers of metal lath, fireproofing materials, sash and products entering into both road and building construction. In most instances, buyers demand speedy shipment, ordering against immediate requirements. A large fabricator catering to building construction states that Pittsburgh, Detroit and Boston are the most active buying centers. Another district interest is figuring on two large contracts for metal furniture, one involving $95,000, including interior metal work.

Sheet buying has progressed since the middle of August and carload business has replaced to some extent the small orders which characterized the market most of the summer, ranging down to bundled lots. While some auto makers who did not reduce prices have trimmed their sheet specifications, the effect has not been noticeable in operations. The Ford Motor Car Co. has been a consistent buyer of sheets and strip steel, and is still taking large tonnages, though its strip requirements have shown a moderating tendency. As a result, strip departments of the principal independent makers have been curtailed within the past two weeks, some mills suspending several days each week.

What effect the price reduction in pipe may have is problematic, as makers have not looked for tonnages of lap weld in any volume until next year, due to inactivity of oil drilling groups. Makers believe that butt weld buying, which has largely sustained production the past month, will be stimulated to some extent and that jobbers may enter the market more actively.

Rolling for Export

Several large interests report that they are now rolling more steel for export than at any time in five or six months.

The Youngstown Sheet & Tube Co. has started its 9-in. merchant bar mill on an accumulation of orders, the demand being largely for reinforcing bars and similar requirements. Very little of the tonnage is for automobile makers. The nominal price range on bars is 1.60c. to 1.65c. though business has been accepted within the past two weeks at a price which figured back to 1.50c. mill.

Increased buying of tin plate has strengthened the going price of $5.25 on production plate, which has been consistently upheld by the principal maker in this territory. That stock plate has sold considerably lower, ranging down to $4.75 per base box, is indicated by the bimonthly examination of sales sheets of mid-Western union mills, which disclosed an average price of $5.

Firmer pig iron and scrap prices will result in stronger prices on semi-finished material, say makers, who predict an early advance on open-hearth sheet bars from $30 to $32. Heavy melting scrap is held from $13 to $13.50, though dealers say the range is up to $14. Run-of-mine coal is quoted at $3.25, while blast furnace coke is selling at $3 in the spot market and is firm at that price.

Exports Still Declining

WASHINGTON, Sept. 10.—Exports of iron and steel for August continued to show a decline, the total for 23 of the chief products being only 73,792 tons, the lowest since January, 1909, when they amounted to approximately 68,000 tons. Radiators, scrap and horseshoes are not included in the August compilation, taken from advance figures of the Division of Statistics, Bureau of Foreign and Domestic Commerce. The exports of these products in July were: scrap, 1524 tons; horseshoes, 12; radiators, 238. Exports for August, 1920, including all of the principal products, totaled 431,484 tons, while for July, 1921, they were 86,523 tons.

Higher French Duty on Tin Plates

The London Association of Tin Plate Merchants, in a circular letter issued recently, draws attention to the serious effect the new French tariff will have upon the Welsh tin plate trade, and points out, according to the *Metal Bulletin*, London, that the French pre-war import duty was 13 francs per 100 kg., net weight, whereas the latest tariff imposed by the French authorities is 39 francs per 100 kg. gross weight plus 1.1 per cent, of the total value of the plates. As the association points out, this duty represents approximately £10 per ton on tin plates imported into France, which is at least £2 10s. per ton more than the value of French steel bars sent into Great Britain. The association urges upon the government the seriousness of the position and suggests that manufacturers protest to the departments concerned and press for better terms. The new rates make the French duties on tin plates and black plates as follows:

Tin plates—39.00 francs per 100 kg. gross weight, plus 1.10 per cent on the total value of goods.

Black plates	Rects.	Circles
Up to 0.4 mm.....	15.40	16.80 francs per 100 kg.
0.41 to 0.6.....	14.00	15.40 francs per 100 kg.
0.61 to 1.0.....	12.60	14.90 francs per 100 kg.
1.1 mm. and thicker....	10.50	11.90 francs per 100 kg.

Plus 1.10 per cent surcharge on total value.

The French Government is protesting against the Safeguarding of Industries Act, recently passed by Great Britain on the ground that French export trade would be seriously affected by it. The new French tariff, it is believed, will have a serious effect upon South Wales, and the matter will probably be taken up by the Welsh Tin Plate Manufacturers' Association.

IRON AND INDUSTRIAL STOCKS

Further Net Gains Appear to Be Based on Something Constructive

Still further net gains were made the past week in going market values of iron and industrial stocks. The upswing was less pronounced than during the previous week, however, and was marked by more irregularity. Less than three months ago, United States Steel common was approximately $9 a share cheaper than it is to-day, and values of a large number of other important securities have advanced as much or more. The irregularity of prices the past week might be expected under the circumstances. The success of the recent Government financing with its tremendous oversubscription is a clear indication of the growing confidence in the country's future. Evidence is at hand daily of a greater consumption of staple commodities. It is reasonable to assume that prices for such commodities will improve with consumption. The major upward movement of security values therefore appears to be based on something constructive. The volume of daily turnover in securities denotes a slightly broadening tendency of investment buying, yet it cannot be said it is general. Public investment buying at the moment appears to be attracted more to bonds and notes yielding 6 per cent or better than to common and preferred stocks.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	32¾ - 34½	Int. Har. com.....	77½ - 82
Allis-Chalm. pf...	— - 75	Lackawanna Steel.	40 - 43
Am. Can com.....	27 - 28⅜	Midvale Steel.....	24⅞ - 26½
Am. Can pf.....	— - 82	Nat. Acme.....	15 - 15½
Am. C. & F. com.	126¾ - 131¾	Nat. E. & S. com.	34¾ - 37¼
Am. C. & F. pf...	108 - 111	N. Y. Air Brake..	55¾ - 58½
Am. Loco. com...	89¾ - 93	Nova Scotia Steel.	24¼ - 25
Am. Loco. pf.....	— - 104¼	Press. Steel com..	59 - 60
Am. Radiator com.	— - 68⅛	Ry. Stl. Spg. com.	84 - 87
Am. Steel F. com.	24½ - 25¼	Replogle Steel....	24½ - 26
Am. Steel F. pf...	— - 84	Republic com.....	49⅜ - 54⅞
Bald. Loco. com..	87¾ - 91¾	Republic pf.....	85 - 85¾
Bald. Loco. pf....	— - 98	Sloss com.....	36½ - 39⅜
Beth. Steel com..	51⅞ - 52½	Sloss pf.....	— - 71
Beth. Stl., Cl. B..	54¼ - 57⅝	Superior Steel....	31 - 33½
Beth. Stl., 8% pf..	99¼ - 100½	Transue-Williams.	— - 34½
Chic. Pneu. Tool..	50 - 52½	Un. Alloy Steel...	24 - 25
Colorado Fuel.....	24½ - 25	U. S. Pipe com...	15¼ - 15¾
Cruc. Steel com...	61 - 65⅛	U. S. Steel com...	77⅜ - 79⅞
Cruc. Steel pf.....	82 - 84	U. S. Steel pf.....	109⅛ - 109⅝
General Electric..	125 - 127¾	Vanadium Steel...	32¼ - 35
Gt. No. Ore Cert..	28 - 29¾	Va. I. C. & Coke..	67 - 70
Gulf States Steel.	38½ - 42¼	Westingh'se Elec.	44 - 45¼

Industrial Finance

The Laconia Car Co., Laconia, N. H., has anticipated $200,000 8 per cent serial notes, maturing Jan. 1, 1922.

Directors of the Youngstown Sheet & Tube Co., Youngstown, Ohio, have declared a dividend of 50c. per share on the 800,000 shares of non-par value common stock outstanding, and the regular dividend of $1.75 on preferred stock, both payable Oct. 1 to holders of record Sept. 20. It is announced that the common dividend was not earned during the third quarter and will be paid from surplus. The common payment is the same as was distributed July 1 for the second quarter.

Directors of the Brier Hill Steel Co., Youngstown, Ohio, have declared the regular preferred dividend of $1.75 per share, payable Oct. 1 to stock of record Sept. 20. The common dividend was omitted.

Directors of the Newton Steel Co., Youngstown, Ohio, have authorized the regular preferred dividend of $1.75 per share for the third quarter, payable Oct. 1 to stock of record Sept. 20.

The National Cash Register Co., Dayton, Ohio, has increased its capitalization from $15,000,000 to $30,000,000. The increase was made in the company's second preferred stock, which was raised from $5,000,000 to $20,000,000. Stock will be offered to present holders of second and third preferred stock, as an exchange issue. Officials of the company state that the issue is not to provide for extensions to the Dayton plant, as none are contemplated at the present time. There will be, however, approximately $10,000,000 of the new issue left that will be available for expansion if such a course is ultimately decided upon.

J. T. Joyce, who was appointed receiver of the U. S. Auto Gear Shift Co., Eau Claire, Wis., upon filing of a voluntary petition in bankruptcy, has been elected trustee, under bond of $10,000. Creditors will meet Oct. 1 to consider disposition of the property. Assets of $749,258 and liabilities of $278,424 are reported in schedules officially filed.

Office and Trade Changes

William Jessop & Sons, Inc., New York, high-speed steel, have recently opened their new office and warehouse at 112-118 North May Street, Chicago. This branch is under the management of C. V. Luin.

The Standard Steel Works has completed its new works and general offices at North Kansas City, Mo., and has removed to that city from Kansas City, Mo., its executive headquarters and present plant. This with its additional floor space, more than trebles present capacity for the manufacture of Standard steel products.

Ernest E. Lee, 115 South Dearborn Street, Chicago, has been appointed district representatives for the boiler feed regulators and pump governors of the Northern Equipment Co., Erie, Pa.

Henry Bryant & Co., Inc., 85 Oneida Street, Milwaukee, dealer in iron and steel products and waste materials, scrap metal, etc., has filed amendments to its articles, changing the corporate style to Waukesha Steel Products Co., and increasing the capital stock from $25,000 to $50,000. Officers of the company are: President, Henry Bryant, Waukesha, Wis.; vice-president, C. H. Doty; secretary, Helen Israel.

The Henry & Wright Mfg. Co., Hartford, Conn., machine tools, recently was reorganized with Charles J. Sorrells, C. S. Sorrells & Co., New York, president; Jonas O. Hoover, Chicago, vice-president and chairman of executive committee; Tom B. Owens, T. B. Owens & Co., New York and Ft. Worth, Texas, treasurer; Mrs. Daniel M. Wright, secretary; and Frank M. Rogers, Chicago, general manager and assistant treasurer. William G. Allen, Hartford, is superintendent and plant manager.

The T. & A. Engineering Corporation, New York, has been incorporated with a capital of $100,000 by S. and M. Thompson, and L. Aghamalian, to manufacture automobile equipment and mechanical specialties. It is represented by C. S. Aronstam, 100 Broadway.

The Rex File Co. and the Vixen Tool Co., Newark, N. J., have been consolidated with the Heller Brothers Co., Newark, N. J., and will continue the production of files, rasps, tools and steels. Walter D. Craft, who has been secretary-treasurer of the Vixen Tool Co., will act as domestic sales manager of the consolidated companies.

The Flynn & Emrich Co., manufacturer of iron castings, Baltimore, is anxious to secure representatives in Raleigh, N. C.; Charlotte, N. C.; Columbia, S. C.; Charleston, S. C.; Knoxville, Tenn.; Indianapolis, Ind.; Little Rock, Ark.; Wichita, Kan.; Des Moines, Iowa; Memphis, Tenn., and Cincinnati.

Inquiries made of 4586 concerns in the devastated districts, according to the *Bulletin* of the French Ministry of Labor, showed that 1020 of those operating in 1914 had not re-opened by March 1, 1921; 2817 were operating partially; 749, or 16.3 per cent, had been completely restored. Compared with the force of 818,104 employees in 1914, only 381,453 were at work in 1921, a loss of 53.4 per cent.

The Massachusetts State Free Employment Office, Boston, reports that in August the number of orders from employers was 15 per cent greater than in July, but 36 per cent less than in August, 1920. The number of positions filled increased 9. The average attendance of applicants for employment was 1611, an increase of 16 per cent as compared with July. The greatest demand for labor comes from the building and wood working industries.

In addition to the pamphlets prepared by the various committees of chemists of the United States Steel Corporation, reference to which was made on page 588 in THE IRON AGE of Sept. 8, the second edition of "Sampling and Analysis of Alloy Steels" is off the press and copies may be secured in the same way and at the same charge as the other pamphlets.

At the Fore River Works, Bethlehem Shipbuilding Corporation, Ltd., Quincy, Mass., all employees, including the office force, have gone on an 8-hr. day basis with an additional 10 per cent reduction in pay. The plant for some time has been operated on a five-hr. day, five-day week schedule. No reduction in the number of employees has been made recently.

Machinery Markets and News of the Works

CONDITIONS ARE SPOTTY

Improvement in Some Markets Offset by Extreme Dullness in Others

Prospects Are Somewhat Brighter in All Sections, However, and There Are More Live Inquiries

Although more inquiries for machine tools are noted there is as yet no well-defined turn for the better in sales. In some markets, however, a fair amount of business has been done in the past week or two compared with the inactivity of recent months.

Contrasted with encouraging reports from some sections are reports of extreme dullness in others, notably New York and Chicago. The expectations of a trade revival to begin in September have not materialized so far as these market centers are concerned and the first half of this month has shown little if any improvement over August.

Municipal projects seem to offer the best prospect of early buying. Bids were opened at Philadelphia on Sept. 16 on 35 tools for a repair shop for the water works department. Camden, N. J., took bids recently on about 40 tools for its public schools, but has taken no action yet. The Federal Government is considering the purchase of about 55 tools for the schools of Washington, D. C., but may not buy for a few months. Bids for about 25 tools for the manual training school of Canton, Ohio, were opened Sept. 16 and it is expected that the orders will be placed soon. The Board of Prison Inspectors of Pittsburgh is asking for prices on 15 tools to replace those destroyed in a fire and riot recently. The list includes lathes, milling machines, drill presses, pipe cutting machines and some woodworking machinery.

Very little new railroad business is developing. The Virginian Railroad is in the market for six tools and the Chesapeake & Ohio has received prices on eight machines. The New York Central is expected to purchase soon a large planer and a large lathe for which it inquired some weeks ago.

Among the sales of more than ordinary importance reported are six oil country lathes for shipment to Venezuela; a car wheel lathe to the Connecticut Co.; four tools to the National Safe & Lock Co., Cleveland. A report that a Western railroad had bought $80,000 worth of tools is not confirmed.

New York

NEW YORK, Sept. 20.

The machine-tool business is still dull, there having been no improvement this month worthy of note. There are few inquiries for tools and those who do come into the market are looking for "bargains," and usually buy used machines. The New York Central Railroad is expected to close shortly on a large planer and a large lathe for which it inquired some weeks ago. The Connecticut Co., operator of street railroads, has purchased a car wheel lathe. Among recent export orders is one from an oil company for six oil country lathes to be shipped to Venezuela.

Don A. Carpenter & Co., El Paso, Tex., are in the market for two hydraulic wheel presses of 100 and 200 tons' capacity, respectively.

The market in cranes continues dull with few new inquiries of any size. The situation in hand-power cranes and hoists is much better. Among current inquiries is one from the Austin Co., Philadelphia, which was awarded the building contract by F. W. Tunell & Co., Philadelphia, glue and fertilizer. A bucket crane of about 5-tons capacity, 69-ft. span for handling a 2 to 2½-cu. yd. bucket is included in the contract. The American Sugar Refining Co., 117 Wall Street, New York, is in the market for nine motor-driven winches. The Gallup-American Coal Co., 25 Broad Street, New York, which recently inquired for a 10-ton hand-power crane, has obtained one from an associated company. Among recent sales are a 20-ton chain hoist and a 20-ton tandem trolley with I-beam sold by the Chisholm-Moore Mfg. Co. to the Lyman Stone Co., Hamburg, N. J. The 3-ton, 16-ft. span hand-power crane recently purchased by the Mayer Coating Machine Co., Rochester, N. Y., was sold by the Roeper Crane & Hoist Works.

H. F. Holbrook, Inc., West End Avenue and Sixty-seventh Street, New York, manufacturer of automobile bodies, has negotiations under way for the purchase of a one-story plant in the New York district, totaling about 120,000 sq. ft. of floor area, for the establishment of new works. It is proposed to enlarge the building to provide facilities for an annual production of about 1500 automobile bodies. H. F. Holbrook is president.

Newport Motors, Inc., New York, has been incorporated with a capital of $500,000 by G. H. Hinman, A. Adamson and E. J. Keegan, to manufacture automobiles and parts. It is represented by W. W. Gage, 1819 Broadway.

The New York Steam Co., 280 Madison Avenue, New York, has awarded a contract to Stone & Webster, Inc., 120 Broadway, for a new power house at Fifty-ninth Street and the East River, estimated to cost about $400,000 with equipment.

The Inwood Consumers' Ice Mfg. Corporation, New York, has been incorporated with a capital of $220,000 by S. C. Murray, E. Marks and N. F. Schmidt, 220 Broadway, to construct an ice-manufacturing and refrigerating plant.

The International Spectacle Corporation, New York, has been incorporated with a capital of $50,000 by D. Hines, L. McCormick and J. L. Gorman, to manufacture electric lighting equipment and fixtures, and other electrical devices. It is represented by C. M. Rubanks, 50 Pine Street.

The Fulton Ice Co., 18 East Forty-first Street, New York, will build a new two-story plant, 50 x 207 ft., at 138-40 Cherry Street, estimated to cost about $100,000 with machinery.

The Mohican Brass & Copper Works, New York, has been chartered under State laws to manufacture brass, aluminum, copper and other metal products. The incorporators are E. P. McIntire, E. G. Michaels and J. J. Devitt. It is represented by C. S. Lorentzen, 68 Broad Street.

The Paige-Detroit Service Co., 514 West Fifty-seventh Street, New York, hase leased the building at 529 West Fifty-fifth Street for the establishment of a new automobile service and repair works.

The T. & A. Engineering Corporation, New York, has been incorporated with a capital of $100,000 to manufacture automobile parts and equipment. M. Thompson, 189 Montague Street, Brooklyn, is the principal incorporator.

The Mason Tire & Rubber Co., 233 West Fifty-eighth Street, New York, is planning for the enlargement of its works at Kent, Ohio, to double the present capacity.

The Guy Disc Valve Motor Corporation, New York, has been incorporated under Delaware laws with capital of $1,500,000 to manufacture automobile engines, parts, etc. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Archer Automobile Development Co., Saratoga Springs, N. Y., has been incorporated with a capital of $150,000 to manufacture automobile equipment, parts, etc. S. B. Archer, Saratoga Springs, is the principal incorporator.

The Hamlin Hygrostat Corporation, New York, has been incorporated with a capital of $20,000 by J. A. Hamlin, E. Bernstein and J. T. Mulligan, to manufacture air condition-

ing equipment and other devices for atmospheric regulation. Adolph Bangser, 30 Broad Street, represents the company.

The Safety Blade Holder Co., New York, has been incorporated with a capital of $50,000 by C. B. and J. B. Cahn, and C. Stern, to manufacture metal holders and similar products. It is represented by Harold Flatto, 261 Broadway.

The Richelieu Motor Co., Asbury Park, N. J., manufacturer of automobiles and parts, has acquired property on Asbury Avenue as a site for a new plant. Initial buildings will be devoted to the manufacture of motors of the Duesenberg type and for assembling work. Robert G. Poole is treasurer.

The Borough Council, Essex Fells, N. J., has approved a bond issue of $30,000, the proceeds to be used for the installation of new pumping equipment and other machinery at the municipal waterworks.

The Joseph Toye Co., 353 Bank Street, Bridgeton, N. J., has awarded a contract to the H. H. Hankins & Brothers Co., Bridgeton, for a new one-story foundry 40 x 80 ft., estimated to cost about $14,000. The W. P. Cameron Engineering Co., Witherspoon Building, Philadelphia, is engineer and architect.

Fire, Sept. 11, destroyed a portion of the machine repair shops and engine house of the Erie Railroad, Jersey City, N. J., with loss estimated at close to $500,000, including equipment and rolling stock. Headquarters of the company are at 50 Church Street, New York.

The Wilcox-Durand Glass Co., Newfield, N. J., has completed plans and is taking bids for a new one-story machine shop, 31 x 100 ft., for general machinery construction and repairs.

The Automatic Safety Davit Co., Highlands, N. J., has been incorporated with a capital of $60,000 by William Fehlhaber and Harry N. Johnson, 141 Bay Avenue, Highlands, to manufacture marine equipment.

The Theodore Smith & Sons's Co., Iron Works, 76 Montgomery Street, Jersey City, N. J., manufacturer of boilers, dredging buckets, etc., has filed plans for a new two-story building at 197 Van Vorst Avenue, to cost about $10,000.

The Florence Foundry Co., Florence, N. J., is considering the erection of a new one-story foundry, 40 x 100 ft. C. L. Reeves is superintendent.

The Bureau of Yards and Docks, Navy Department, Washington, will receive bids until Sept. 28 for extensions to the power plant at Lake Denmark, N. J., comprising boiler, air compressor, pumping machinery, electrical equipment, etc. C. W. Parks is chief of the bureau.

The Piano Hammer Joint Improvement Co., Newark, has been incorporated with a capital of $125,000 by Jules Morel, Rudolph Strand and Joseph H. Weiser to manufacture piano mechanism equipment, piano movement joints, etc. The company is represented by Joseph Steiner, 790 Broad Street.

George C. Bergen, county purchasing agent, Room 252 Court House, Market Street, Newark, N. J., will receive bids until 11 a. m., Oct. 7, for the construction of a coal conveyor and coal storage equipment at the Essex County Hospital, Overbrook, N. J., and for the construction of an ash conveyor and ash storage tank at the Essex County Hospital for Contagious Diseases, Belleville, N. J. Runyon & Carey, 843 Broad Street, Newark, are engineers.

The Tiffany Mfg. Co., Newark, has been incorporated with a capital of $50,000 by S. E. and Carlos W. Curtiss, and Paul J. Landemare, 784 Broad Street, to manufacture automobile equipment and supplies.

The Hewes & Phillips Iron Works, Newark, has filed notice of dissolution under State laws.

The Cortland Tire & Rubber Co., 344 Cortland Street, Belleville, N. J., manufacturer of automobile tires, has filed notice of dissolution under State laws.

The Mulberry Metal Stamping Works, 352 Mulberry Street, Newark, has filed notice of organization to manufacture metal products. William Hichman heads the company.

Philadelphia

PHILADELPHIA, Sept. 19.

Municipal projects afford the chief activity in this district. The most interest was manifested in a list of about 35 machines, bids for which were opened by the Department of Public Works, city of Philadelphia, at noon, Sept. 16. The tools are for a new repair works of the water department at Twenty-ninth and Cambria streets. From six to 10 machine tool houses bid on each machine and a wide range of prices prevailed. For instance, on a group of eight lathes the bids ranged from $8,799 to $19,464, though in the case of some of the lower bids the machines were not according to specifications asked, 12 speeds having been demanded of lathes, whereas bids were turned in on lathes with but eight speeds. No purchasing has been made yet of the 40 tools demanded by the manual training schools of Camden, N. J., bids of which were opened two weeks ago. The Federal Government is testing prices with a view towards buying about 55 machines for the schools at Washington in a few months. The schools of Williamsport, Pa., opened revised bids Sept. 15 for a list of tools. School business is not popular with many houses because specifications call for the installation of machines sold as well as strict provisions incident thereto.

Two Southern railroads gave out lists. The Chesapeake & Ohio asks for eight machines "for estimating purposes only," including one 20-in. lathe, three 18-in. lathes, a bolt cutter and a pipe threader. The Virginian Railway wants about six tools, including lathes, radial drills, a bolt cutter and bushing press.

The increase in inquiries the past two weeks has changed the tone of the market from pessimism to optimism.

The following is the range of prices bid on the principal machines for the city of Philadelphia: One 30-in. x 11¼ ft. centers, geared head engine lathe, single pulley drive, $2,964 to $5,165; eight 20-in. x 9½ ft. centers, geared head lathes, $8,799 to $19,464 for the group; one 2¼-in. geared head turret lathe, $2,244 to $3,679; one 15-in. brass lathe, $835 to $1,390; one 5-ft. plain radial and one 2-ft. plain radial, $3,400 to $5,474 for both; one 30-in. vertical sliding head drill press, single pulley drive, $636 to $1,640; one horizontal boring machine, 3½-in. bar, $6,430 to $7,755; one 24-in. and one 16-in. back geared crank shaper, $1,685 to $2,990 for both; one No. 2 universal geared head milling machine, $1,418 to $2,823; one 30 in. x 30 in. x 7 ft. planer, belted motor drive, with three heads, $3,505 to $4,860; one 34-in. vertical boring mill with turret head, $2,580 to $3,730; one single head bolt threading machine, 2 in. capacity, belt drive, $1,098 to $1,180; one 40-ton hydraulic press, $935 to $1,824; one 2-in. drill grinder, $135 to $1,350; one No. 2 Knight combined milling and drilling machine, $665 to $1,300; one ⅝-in. capacity sensitive drill press, $180 to $350; two air hammers, equivalent to No. 4 B and No. 1 B, Nazel, $2,104 to $3,450 for both; one 15-ton crane, $4,672 to $5,850.

Specifications for two 20-ton cranes for the transit department of the city of Philadelphia were made public today.

The Haverford Cycle Co., 503 Market Street, Philadelphia, manufacturer of bicycles and parts, has acquired the property of the Ace Motor Corporation, Erie Avenue and Sepviva Street, manufacturer of similar products, from the receivers for $500,000. The plant and assets of the Ace company will be used by the new owner for general expansion.. Max M. Sladkin is president.

The Collins Carriage Co., Philadelphia, has leased the building at 158-62 North Twenty-second Street, for the establishment of a new body building plant.

The Bureau of Water, City Hall, Philadelphia, has commenced excavations for its new one-story machine and repair shop, 160x200 ft., to cost about $115,000, including machinery. C. E. Davis is director of the department.

Fire, Sept. 14, destroyed a portion of the Point Breeze plant of the Atlantic Refining Co., Passyunk Avenue, Philadelphia, with loss reported at about $100,000, including oil equipment, etc.

L. M. Davis, 1616-18 Chancelor Street, Philadelphia, will build a two and three-story addition to his automobile service and repair plant, 60x60 ft., estimated to cost about $80,000. Plans have been prepared.

The Mercer Motors Co., Trenton, N. J., manufacturer of automobiles, has disposed of a note issue of $2,000,000 and bonds in the amount of $500,000, the proceeds to be used for general operations and expansion. Following the recent separation from Hares' Motors, Inc., the company has perfected arrangements for immediate production. Theodore E. A. Barthel has been elected vice-president and treasurer, and George L. Catlin, assistant treasurer and secretary. J. W. MacMorris is general plant superintendent.

The Corweg Shuttle Valve Motors Co., Atlantic City, N. J., has plans under way for new works for automobile assembling, repairs and testing. It will be three stories, 100x200 ft., and is estimated to cost about $200,000. Harry M. Veix, 738 Broad Street, Newark, N. J., is architect.

Fire, Sept. 10, destroyed the plant of the Lackawanna Cutlery Co., Nicholson, Pa., manufacturer of knives and other cutlery, with loss estimated at $75,000.

The Lehigh Valley Railroad Co., Wilkes-Barre, Pa., is planning to replace present steam power equipment with electrical machinery at its frog shops at Weatherly, Pa.

The Warren Light & Power Co., Scranton, Pa., has arranged for a bond issue of $212,500 and stock issue of $30,000, the proceeds to be used for general operations and extensions.

Fire, Sept. 9, destroyed the electric pumping plant of the Berwick Water Co., Berwick, Pa., with loss estimated at about $100,000, including pumps, motors and other equipment. It will be rebuilt.

The Blair Ice & Cold Storage Co., of Hollidaysburg, Pa., recently organized with a capital of $100,000, is arranging for the erection of a new four-story plant. G. B. Miller, 1112 Allegheny Avenue, is president.

J. F. Richards, Nanticoke, Pa., will commence the immediate erection of a new machine shop and foundry, estimated to cost about $100,000, including equipment.

The Sayre Electric Co., Sayre, Pa., has arranged for a stock issue of $311,000, the proceeds to be used for extensions and general operations.

The Electric Manganese Steel Co., Reading, Pa., has been incorporated with a capital of $75,000 to manufacture steel products. Ray A. Houck, 117 West Windsor Street, is treasurer.

The Vulcweld Rubber Co., Pottstown, Pa., has plans under way for rebuilding its tire manufacturing plant, destroyed by fire several months ago. Recently it has been manufacturing its tires and tubes at a plant at Armstrong, N. J.

The Carbon Battery & Electric Co., Lansford, Pa., has been chartered under State laws to manufacture electrical equipment. Milton Kleckner, Lansford, is treasurer.

New England

BOSTON, Sept. 19.

Sales of machine tools the past week include a new 800-lb. special designed drop hammer to a Massachusetts textile machinery maker; a large used Baush multiple drill to a maker of pipe fittings for a Canadian subsidiary; new Whitcomb planer to William Hardy & Sons, Fitchburg, Mass., brass screw plates, this firm not having covered on its full machine tool requirements; four new hand milling machines to a New Hampshire maker of textile machinery accessories which recently closed on special profiling equipment; one 18 in. x 8 ft. and one 14 in. x 6 ft. used engine lathes to two local concerns; a used 14-in. lathe and a disk grinder to a Massachusetts street railroad company; new riveting machinery and a used Barnes geared drill to two Boston firms; small drilling equipment to a Lynn, Mass., manufacturer, and truck equipment for handling ladles to the Gilbert & Barker Mfg. Co., West Springfield, Mass.

While the range of tools involved is fairly wide and companies purchasing represent diversified interests, business was not as good as generally expected. Dealers, especially those handling used as well as new machinery, have been unable to close on numerous prospective orders, and indications are that some of these will not be purchased in the near future, due to the inability of purchasing agents to obtain appropriations. On the other hand, buyers have signified their intention of covering on some needed equipment before long. Two of the largest machine tool interests, having closed on prospects the past two or three weeks, report little indication of new business.

The Maine Central Railroad has definitely decided to abandon inquiries on three fairly large machines for one of its repair shops, having substituted machinery heretofore used elsewhere. It is reported the General Electric Co. also has transferred equipment from subsidiary plants to its West Lynn, Mass., works rather than purchase new tools at this time. The Boston & Albany Railroad has done nothing toward purchasing a 2500-lb. single frame steam hammer needed at West Springfield shops. The city of Boston has not covered on its gear driven universal milling machine. The lowest bid submitted was $1,400. The Power Construction Co., Worcester, Mass., has postponed purchasing crane requirements, but it is anticipated Stone & Webster will close on the Ford, Green Island, cranes in the near future.

The National Acme Co., automatic screw machines and products, is to have an exhibit at the Eastern States Fair to be held this month at Springfield, Mass.

Isaac E. Sexton, Winchester, Mass., is president and Perley C. Rogers, 53 Gerard Street, Roxbury, Mass., treasurer of the Roxbury Steel Casting Co., Boston, capitalized for $50,000, recently granted a Massachusetts charter.

The Richard French Iron Works, formerly of Worcester, Mass., recently was reorganized with a capital of $70,000. It will erect a one-story plant, 65x150 ft., in Millbury, Mass., at a cost of $25,000. Raymond Tracy is president; George C. Bell, vice-president, and Alexander V. Campbell, treasurer.

The Rex Top & Body Co., 388 Newbury Street, Boston, manufacturer of automobile bodies, etc., has been acquired by Paul L. Pryor and James F. Malone. It will be continued in operation with Mr. Pryor as president, and Mr. Malone, treasurer.

The Providence Radiator & Electric Heating Corporation, Providence, R. I., has been incorporated under Delaware laws with capital of $2,000,000 to manufacture electrical and mechanical products. The incorporators are Daniel Owen, P. S. Howland and M. A. Colter, Boston. It is represented by the Delaware Registration Trust Co., 900 Market Street, Wilmington, Del.

The Hampden Tool Co., Springfield, Mass., has awarded contract for a new one-story factory on St. James Avenue, 40x100 ft., estimated to cost $12,000. Plans have been filed.

The Builders' Steel Co., Hartford, Conn., has been incorporated with a capital of $50,000 by Samuel Rome, Abram Azia and Harry Ogens, 172 Belden Street, to manufacture iron and steel products.

The K. B. Noble Co., 249 Pearl Street, Hartford, Conn., manufacturer of contractors' machinery, has filed plans for an addition, estimated to cost about $30,000.

The Wopeco Machine Co., New Haven, Conn., has been incorporated with a capital of $60,000 by W. S. Perry, J. W. Commerford and G. H. Woodruff, 902 Chapel street, to manufacture shear grinding machines, can-opening machinery, parts, etc.

The Middlesex Machine Co., Middletown, Conn., is arranging for the early operation of its new plant at 686 Windsor Street, for the manufacture of grinding machinery, parts, etc., following its recent acquisition by the New Haven Sherardizing Co., Hartford, Conn. In the future, the company will be known as the Middlesex Machine Division of the New Haven Sherardizing Co. Plans are being perfected for increased production. F. A. Brassill is chief engineer in charge.

The Hartford Grinding Co., 236 Albany Avenue, Hartford, has filed notice of organization to manufacture grinding equipment. Maurice Millard, 25 Seyms Street, heads the company.

W. L. Hayes, Hartford, Conn., has filed plans for a new one-story forge shop on Albany Avenue.

The United Illuminating Co., Bridgeport, Conn., will install a machine shop in connection with its new generating plant, now in course of erection at the foot of East Main Street. It will be equipped for electric machinery repairs, parts manufacture, etc.

Buffalo

BUFFALO, Sept. 19.

The Niagara Falls Felt & Paper Co., Niagara Falls, N. Y., a subsidiary of the Niagara Falls Power Co., Canal Basin, has awarded contract to the Read & Coddington Engineering Co., 238 Portage Road, for a new plant on Sugar Street, estimated to cost about $300,000 with machinery.

The Standard Thermometer Co., Cleveland, N. Y., has been incorporated with a capital of $25,000 by W. G. Hamilton, J. Happle and J. G. Boyd, to manufacture thermometers and other measuring instruments. Jacob G. Smith, First National Bank Building, Syracuse, N. Y., represents the company.

The Corning Foundry Co., Corning, N. Y., has filed notice of dissolution under State laws.

The New York Central Railroad Co., Grand Central Terminal, New York, will build a new coaling plant at Wayneport, N. Y.

The Syracuse Lighting Co., Syracuse, N. Y., has arranged for an increase in capital stock from $4,000,000 to $5,000,000, the proceeds to be used for extensions and general operations, etc.

The W. & J. Carson Co., Buffalo, has been chartered under State laws to manufacture automobile equipment and accessories. The incorporators are W. J. and J. C. Carson, and L. R. Anthony. It is represented by Kent, Cummings & Means, Dun Building.

Cleveland

CLEVELAND, Sept. 19.

The improvement in the machine-tool market that many manufacturers and dealers looked for this month has as yet failed to materialize. Dealers continue to book a few orders, mostly for single machines. Buyers as a rule are the smaller machine shops. Some machine tool builders report a fair amount of orders in prospect from companies which will need additional machine tools as soon as their business picks up. New bids for about 25 machines for the manual training department of the McKinley School, Canton, were opened Sept. 16, and it is expected that this business will be placed shortly. Orders for two machines, a horizontal boring mill and a milling machine, have been placed by the National Safe & Lock Co., Cleveland.

The Kelley Island Lime & Transportation Co. has placed an order with the Cleveland Crane & Engineering Co. for a 10-ton crane with a 40-ton bridge and a 5-ton auxiliary. This inquiry had been pending for some time.

Operating conditions in Ohio foundries show little improvement. The last reports received by the Ohio State Foundrymen's Association indicate that average operations were 16.6 per cent of capacity and September is not expected to show much gain.

The Columbia Metal Stamping Co., 1538 East Forty-ninth Street, Cleveland, has been reorganized and its name has been changed to the Columbia Metal Stamping & Die Co. No change will be made in the line of products. The new officers are F. C. Koch, president; A. E. Koch, vice-president, and Frances Koch, secretary.

The Ohio Steel Castings Co., Cleveland, has been organized to take over the local plant of the Aetna Steel Castings Co., 2284 Scranton Road, which went into bankruptcy some time ago. The new company has been incorporated with a capital of 1000 shares of no par common stock. John W. Thompson is president and treasurer; C. S. Fenton, vice-president; Harry Greshen, general manager, and John A. Elden, secretary.

The Zerk Lubricator Corporation, recently organized, has acquired a portion of the plant formerly occupied by the Richard Automobile Co., 7800 Finney Avenue, South-east, Cleveland, and is placing it in operation for the manufacture of lubricating systems for automobiles and machine tools. Some new equipment has been purchased.

The Twin Dry Cell Battery Co., Cleveland, has purchased the plant of the Guide Motor Lamp Co., 11400 Madison Avenue, Cleveland. It is being remodeled and some new equipment installed.

The City Council, Ashtabula, Ohio, has plans nearing completion for its new municipal electric power plant, estimated to cost about $400,000. Stone & Webster, 147 Milk Street, Boston, are engineers. M. H. Turner is city manager.

The Willys-Overland Co., Toledo, Ohio, is arranging for a bond issue of $20,000,000, the proceeds to be used for general operations and financing, plant extensions and improvements for increased automobile production.

Chicago

CHICAGO, Sept. 19.

Most dealers report that business is as quiet as at any time this year. The tendency toward a revival in interest on the part of the buyers which seemed to be developing in August, is no longer in evidence and the first half of September has been decidedly dull. Although there are signs of improved operations among some machine tool users, there is as yet no well-defined turn for the better. Here and there are shops which are fairly busy on automotive or railroad work, but there are as many which have little or nothing to do. The chief present interest in machine tools is in used equipment, but even this is not moving fast. Prospective buyers of used tools are discovered only after a careful canvass by sales forces and even when found they are hard to sell.

At a recent auction sale of the equipment of the Sundstrom Mfg. Co., Chicago, machines were sold at about one-third of list and, in some cases, for less. Purchases by users were in the minority and the lack of active competition in the bids was evident in the prices obtained. For example, a relatively new Lodge & Shipley 24 in. x 14 ft. geared head motor-driven engine lathe with 10-hp. motor, sold for $925. A No. 2½ Rockford universal milling machine brought $900 and a No. 70 Heald internal grinding machine with extra internal spindle was bought at $600.

Building permits in Chicago for the week ended Sept. 15 numbered 251 as compared with 109 for the same week in 1920. The frontage covered by the 1921 permits was 6895 ft. as against 3006 ft. for the corresponding period a year ago. Construction activity is confined principally to dwelling houses, there being little industrial building.

The W. H. Schroff Fuel Oil Burner Co., 5076 Lincoln Avenue, Chicago, has been incorporated with $2,500 capital stock by C. V. Kellogg, Fred B. Fiz and William H. Schroff to manufacture small industrial and residential oil burners.

Breeze & Bettle, 112 West Adams Street, Chicago, have been incorporated with $20,000 capital stock by C. J. Levey, Griscom Bettle and J. L. Breeze, Jr., to manufacture small boilers for household use, particularly adapted to oil burning. For the present the boilers are being built by the National Machine Co. Griscom Bettle is president and J. A. Murray, secretary.

The Great Western Stamping Works, Sioux Falls, S. D., was recently incorporated by local business men to manufacture novelties, such as paring knives and lamps. C. F. Hoffman is the inventor of a number of articles which will be made in the new plant.

The Decatur Furnace & Foundry Co., manufacturer of the "Wonder" domestic heating furnace, Decatur, Ill., has taken over the foundry of the McLaughlin company, in East Cerro Gordo Street, and will expand its output.

The Chicago Store & Office Fixture Co., 818 South Clinton Street, Chicago, has purchased the block bounded by Grand, Trumbull, Augusta and Homan avenues, and will erect a three-story plant to cost $150,000.

Henry Yerkey, Viola, Ill., has begun excavating for a new machine shop, 30x40 ft., to be erected adjacent to his garage.

The Knox Engineering Co., Roanoke, Ind., manufacturer of governors for Fordson tractors, will move to a 7-acre tract in Columbia City, south of the Columbia Iron Works, where it will erect a machine shop. The first unit will be 50x150 ft.

Fire recently did $8,000 damage to the plant of the Rogers Foundry & Mfg. Co., Eleventh Street and Pearl Avenue, Joplin, Mo.

Spingold & Son, 750 Taylor Street, Chicago, are receiving bids through A. V. Capraro, architect, 105 North Clark Street, on a two-story garage, 75x120 ft., 1918 South Morgan Street, to cost $50,000.

Chalmers & Williams, Inc., 208 South La Salle Street, Chicago, has started construction on a one-story addition to its plant at Chicago Heights, Ill., to cost $50,000. It manufactures mining machinery.

The Sheffield Foundry Co., 2020 Herndon Street, Chicago, will make extensions and improvements in its one-story plant to cost about $12,000. Carl O. Kuehne, 1572 North Halsted Street, is architect.

The North American Car Co., 328 South La Salle Street, Chicago, is completing plans for a new one-story car erection shop, 80x120 ft., at 135th Street and California Avenue, Blue Island, Ill., estimated to cost about $40,000. Bids will be taken soon.

The Chicago & Northwestern Railway Co., 226 West Jackson Boulevard, Chicago, is considering the erection of new repair shops at Winona, Minn., estimated to cost about $200,000, including yard improvements.

The Great Western Auto. Co., 22 East Michigan Street, Duluth, Minn., has awarded a contract to Jacobson Brothers, Columbia Building, for a new two-story service, repair and parts manufacturing plant, 100x140 ft., at 2533 Superior Street, estimated to cost about $115,000. Carl E. Nystrom, Palladie Building, is architect.

Detroit

DETROIT, Sept. 19.

The Detroit Trailer Co. has a contract for 50 four-wheel 5-ton trailers for Brazil. The Mansfield Steel Corporation, Detroit, has the order for 97 steel combination bodies for the trucks and trailers.

The Northern Engineering Works, Detroit, reports the sale of two 5-ton type "E," electric traveling cranes of about 30-ft. span to the Philadelphia Rapid Transit Co. These cranes are of the double hook type and were sold through the company's Philadelphia office.

Construction of a sawtooth manufacturing building, 240x300 ft., has been started by the Oakland Motor Car Co., Pontiac, Mich., a subsidiary of the General Motors Corporation.

The Wales Co., Kalamazoo, Mich., has leased the plant of Dewing & Son, on the Michigan Central Railroad, for larger quarters and better shipping facilities. It manufactures gas heating appliances.

The New-Way Motor Co. Lansing, Mich., has received an order from the Portable Machinery Co., Passaic, N. J., for the immediate delivery of 80 stationary engines at $275 each.

The Self-Lock Nut Co., Constantine, Mich., has been incorporated with a capital of $25,000 by A. E. Trachsel, Constantine, and E. L. Trachsel, Ann Harbor, Mich., to manufacture special lock-nuts and other mechanical devices.

The Rickenbacker Motor Co., 1551 Harper avenue, Detroit, recently organized to manufacture automobiles, has preliminary plans under way for a one and two-story plant for initial production. H. L. Cunningham is in charge.

The Parcol Industries, Inc., Alpena, Mich., has been incorporated with a capital of $50,000 by H. H. Campbell, George K. Parsons, Alpena, and H. J. Collins, Pontiac, Mich., to manufacture electrical appliances and equipment.

The B. B. M. Ice & Refrigerating Machine Co., incorporated under Delaware laws with capital of $225,000, has filed notice of organization to operate a plant at De-

troit for its machinery manufacture. Henry J. Berry, 702 St. Antoine Street, Detroit, is vice-president.

The Northern Auto Co., Petoskey, Mich., has plans under way for a new two-story works, 120x204 ft., estimated to cost about $80,000. Smith, Hinckman & Grylls, Washington Arcade Building, Detroit, are architects.

Cincinnati

CINCINNATI, Sept. 19.

An improvement is reported in the demand for used equipment the past week, but orders for new tools still are light. No new lists have been issued and inquiries are confined to single machines. A report was current that a Western railroad had bought approximately $80,000 worth of tools from a local manufacturer, but this has not been confirmed. Several propositions are before the trade which call for a number of tools, but as these have been hanging fire for some time it is not expected that they will develop into orders within the next few weeks. A Chicago dealer in new and second-hand machinery is said to have bought a number of used tools from local manufacturers the past week. The same dealer is also reported to have placed a sizable order for new tools with an Indiana manufacturer. Sentiment in the trade is vastly improved and while manufacturers admit that order books are not showing great improvement, they are very optimistic regarding the future.

The Buckeye Body Co., Columbus, Ohio, has taken over the property of the Immel Co., automobile and body manufacturer. The new company is composed of former stockholders of the Immel Co., who purchased the plant at a receiver's sale. J. W. Dinsmore is president.

The Miami Iron & Steel Co., Dayton, Ohio, has taken over the property of the S. T. & G. A. Gebhart Co., which has been in the hands of a receiver for some time. The new company is capitalized at $50,000. John A. Thiele is president and treasurer.

The Dayton Aluminum Mfg. Co., Dayton, has increased its capitalization from $10,000 to $50,000. It was recently amalgamated with the Consolidated Mfg. Co., and operations will be carried on in the plant of the latter company at 28 North Canal Street. The company plans an expansion of its business of manufacturing aluminum cooking utensils.

The Central Cold Storage & Warehouse Co., Cincinnati, has acquired an existing building on Elm Street for a new cold storage plant. It will be remodeled and equipped at a cost of $200,000.

The Star Ice & Storage Co., Zanesville, Ohio, is completing plans for a new one-story cold storage and refrigerating plant on Fountain Alley, estimated to cost about $50,000. The George B. Bright Co., 103 Marquette Building, Detroit, is architect and engineer.

Pittsburgh

PITTSBURGH, Sept. 19.

Although actual business is still of small proportions, inquiries are increasing and it is expected that orders soon will materialize. The Board of Prison Inspectors has asked for bids on 15 tools to replace those destroyed in the riot and fire several weeks ago at the Western Penitentiary, Pittsburgh, N. S. The list includes one 20-in. lathe, one 30-in. planer, 24-in. shaper, 31-in. drill, 20-in. drill, 16-in. grinder, 10-in. grinder, one No. 3 universal miller, double end punch and shear, one ripping and cutoff saw, one matcher and molder, band saw, 30-in. pattern making lathe, motor-driven electric blower and one 6-in. power pipe machine. Bids should be directed to the Board of Prison Inspectors and marked attention of E. D. Wheeler, purchasing agent. Machine-tool dealers report the sale of a fair number of machines out of stock and an occasional order which has to be supplied by the makers. Among the latter was a 48-in. roll lathe. Business in cranes still is better in the prospective than in the actual. One company is figuring on 34 semi-portable cargo handling cranes for the city of New York, to be rented to and installed at the docks of the Pan-American Terminal Co. Formal specifications have been issued and an award is expected by Oct. 1. In electrical equipment is noted the purchase from the Crocker-Wheeler Co., Ampere, N. J., by the Universal Steel Co., Bridgeville, Pa., of one 600-hp. 250 volt, direct current mill motor and one 750-hp. alternating current mill motor.

The National Mining Co., Monongahela, Pa., has been granted permission to build a new tipple at its Star mine. Plans will be prepared at once.

Property of the Pittsburgh Metal Spinning & Stamping Co., 821-23 Locust Street, Pittsburgh, will be offered for sale by the receiver for the company, the Potter Title & Trust Co., on Sept. 30. It consists of a three-story building, fully equipped for the manufacture of metal products.

The Condon Bearing & Supply Co., Pittsburgh, is being organized by B. J. Condon, C. B. Williams and P. B. Riale, to manufacture machine bearings and operate a general machine repair works. Application for a State charter will be made on Oct. 11. The company is represented by Dalzell, Fisher & Dalzell, 450 Fourth Avenue.

The West Penn Power Co., Pittsburgh, has arranged for a bond issue of $3,022,000, for extensions and improvements.

Fire, Sept. 14, destroyed a portion of the plant of the Carnegie Cooperage Co., Second Avenue and First Street, Carnegie, Pa., with loss estimated at $75,000, including machinery.

The Sanitary Collapsible Barrel Co., Apollo, Pa., has broken ground for its proposed new plant, 50x160 ft., to cost about $42,000.

The Star Glass Co., Morgantown, W. Va., has completed plans for a new plant, estimated to cost about $225,000 with machinery, to replace its former works, destroyed by fire. The main factory will be 45x500 ft., supplemented with two one-story buildings, each 50x150 ft., and other structures, including machine shop, cooper shop, power house and office building. Louis Kauffield is manager.

The Appalachian Power Co., Bluefield, W. Va., has arranged for a bond issue of $2,500,000, the proceeds to be used for extensions, improvements, etc. C. N. Mason is vice-president.

The Kentucky & West Virginia Power Co., 30 Church Street, New York, has awarded a contract to the Foundation Co., 120 Liberty street, for the buildings to be erected at its generating plant at Logan, W. Va., estimated to cost about $1,500,000. The work will consist of an addition to the turbine department; boiler department, with installation of new underfeed stokers; switching station, etc. Francis R. Weller, 408 Hibbs Building, Washington, is engineer.

The E. P. Bailey Co., Nitro, W. Va., has completed plans for a new one-story foundry and machine shop, estimated to cost $100,000 with equipment.

The Waugh Foundry & Machine Works, Inc., Williamson, W. Va., has been incorporated with a capital of $50,000 by C. S. Waugh, W. P. T. Varney and J. T. Johnson, Williamson, to manufacture machinery, castings, etc.

Baltimore

BALTIMORE, Sept. 19.

The Chapman Self Locking Nut Co., 721 Equitable Building, Baltimore, is being organized to manufacture a self-locking nut for use on railroad tracks, etc., patented by H. D. Chapman. It is planned to capitalize at $1,000,000 and establish local works.

The Miners' Coal Co., Steyer, Md., recently organized with a capital of $500,000, is planning for the installation of electrical and mechanical equipment at its properties. A power house and pumping plant will also be erected. G. J. Lee is president, and M. C. Walker, secretary.

The Phillipp-Kell Co., Inc., Holliday and Centre streets, Baltimore, manufacturer of sheet metal products, will soon commence the erection of a new plant estimated to cost about $50,000.

The Lee Silver Mfg. Co., 223-25 North Holliday street, Baltimore, has been chartered under State laws to manufacture iron castings, tools, implements, etc. The incorporators are Lee Silver, S. Hyatt and I. William Schimmel.

The Bureau of Yards and Docks, Navy Department, Washington, will take bids until Sept. 28, for extensions and improvements in the power plant at Annapolis, Md.

Conveying equipment, transmission apparatus, electric motors, etc., will be installed in the new plant to be constructed by the Western Maryland Dairy Co., Linden Avenue and Dolphin Street, Baltimore. Bids will be asked about Oct. 1.

The Brooklyn Cooperage Co., Baltimore, a subsidiary of the American Sugar Refining Co., has plans under way for a new plant in the Brooklyn district to cost about $300,000, including machinery.

The Norfolk & Western Railway Co., Roanoke, Va., will commence the immediate erection of a new repair shop and engine house at East Radford, Va.

The Insulation & Specialty Corporation of America, Wilmington, Del., recently organized with a capital of $500,000, has leased offices at 3154 duPont Building, and is selecting a site for the erection of a plant to manufacture fiber products. Paul C. Hennig, head of the new company, formerly connected with the Continental Fibre Co., Newark, Del., and the American Vulcanizer Fiber Co., Wilmington.

Heaters & Freezers, Inc., Wilmington, has been incorporated with a capital of $40,000 to manufacture heating equipment, refrigerating apparatus, etc. It is represented by the Corporation Trust Co. of America, duPont Building.

The Vacumeter Mfg. Corporation, Columbus, Ga., has been incorporated with a capital of $500,000 by B. Crawford Jenkins, James H. Farish and J. J. Albright, Columbus, to manufacture measuring instruments and other precision equipment.

To carry out the details of its proposed new steel and iron works at Hancock, Md., the Hancock Steel Co., Martinsburg, W. Va., has arranged for an increase in capital from $500,000 to $3,500,000. It has about 20 acres and will soon commence the erection of the initial units, estimated to cost about $200,000. The ultimate plant will give employment to about 1500. Ernest McGeorge, 1900 Euclid Building, Cleveland, is engineer; F. Vernon Aken heads the company.

Fire, Sept. 10, destroyed a portion of the steel fabricating plant of the Virginia Bridge Corporation, Alexandria, Va. and included property of the Dominion Glass Works and the Mutual Ice Co., with total loss estimated at $350,000.

The Board of Directors, Southwestern State Hospital, Marion, Va., has plans under way for the erection of a new power house. Eubank & Caldwell, Express Building, Roanoke, Va., are architects.

The Holt Power-Light Co., Wilmington, Del., has been incorporated with a capital of $2,000,000 to manufacture isolated electric lighting plants. It is represented by the Delaware Registration Trust Co., 900 Market Street.

The Texas Co., Houston, Tex., and 17 Battery Place, New York, is considering the erection of a new oil refinery at Portsmouth, Va.

Milwaukee

MILWAUKEE, Sept. 19.

While machine-tool sales the first half of September were hardly of an extent justifying the word volume, nevertheless more real business developed than for the same periods of July and August. Current inquiry is fairly active, but offers nothing notable in the size of prospective purchases. Demand is limited to one or two tools which usually are wanted immediately. Production of tools in Milwaukee and vicinity has not yet been resumed on an appreciable scale.

The Smith Engineering Works, Milwaukee, manufacturer of ore, rock and gravel handling machinery, has broken ground for a one-story brick and steel addition at Thirty-second and Locust streets, 75 x 100 ft., to cost about $45,000 equipped. The general contract has been placed with the Worden-Allen Co. Charles F. Smith is president and treasurer.

The Gauger-Johnson Mfg. Co., Milwaukee, has been incorporated with a capital stock of $25,000 to manufacture machinery. The principals are F. A. Gauger, H. W. Landwehr and R. W. Johnson, 733 Thirty-first Street.

The Electric Welding & Mfg. Co., 145 Clinton Street, Milwaukee, has changed its name to the Welded Products Mfg. Co., to better designate the nature of its business. The principal officers are Oscar Greulich, president, and George F. Luehring, secretary and treasurer.

The Milwaukee department of public works will take bids about Oct. 1 for a brick and steel building, 50 x 125 ft., one story and basement, at Clinton and Florida streets, to be used for cast iron pipe storage. Some power and hand crane equipment will be required, but details are not yet available. C. E. L. Malig, City Hall, is engineer in charge.

The Five Ball Spark Plug Co., Milwaukee, has been incorporated with a capital stock of $100,000 and will lease or build a plant for the production of patented spark plugs for internal combustion engines. The incorporators are Louis Neeb, A. J. Schneider and E. C. Kahn, 4129 Highland Boulevard, Milwaukee.

The Van Buren Garage Co., 174 Ogden Avenue, Milwaukee, has let the general contract to the Robert L. Reisinger Co., 464 Oakland Avenue, local, for a brick, steel and concrete garage and machine shop, 60 x 130 ft., two stories and part basement, at Martin and Van Buren streets, to cost about $40,000 with equipment. T. M. Ackerman is president.

The Board of Education, Cudahy, Wis., has decided to purchase a site and secure plans and specifications for a new high school with vocational training facilities to cost approximately $150,000. An architect has not yet been selected. F. H. Williamson, 505 Van Norman Avenue, Cudahy, is president of the board.

Thor Rosten, 613 Williamson Street, Madison, Wis., manufacturer of special tools, dies, fixtures, jigs, etc., will build a new shop, 40 x 90 ft., to cost about $15,000. Work will begin immediately.

The Kiel Woodenware Co., Kiel, Wis., which serves the city and industrial and domestic consumers with electric current, will build an addition to the power plant and is in the market for additional generating transformer and other equipment.

The Northwest Engineering Co., Green Bay, Wis., which is building industrial, logging and yard cranes mounted on tank type tractor chassis, has incorporated with a capital stock of $400,000 preferred and 1000 shares of common stock without par value. The incorporators are Victor Minahan, Sr., Joseph Z. Finzel, and Victor I. Minahan, Jr., all of Green Bay.

The Standard Unit Parts Corporation of Chicago, an Illinois corporation capitalized at $100,000, has been granted a charter to operate in Wisconsin. Branch offices and shop are to be established in Milwaukee, with an investment of $15,000. It manufactures metal specialties, particularly for motor vehicles.

The Foster Construction Co., 114 Grand Avenue, Milwaukee, has taken the general contract for the erection of a new high school costing $300,000 for the city of Munising, Mich., to contain a manual training department. The architect is John D. Chubb, 109 North Dearborn Street, Chicago.

Brunett's Heating System, Inc., of Minneapolis, organized in Minnesota several months ago with $1,200,000 capital stock to manufacture heating devices, especially for farms and isolated places, has acquired a site at Rice Lake, Wis., and started work Sept. 15 on the erection of a plant to cost about $75,000 for the initial unit. The principals are D. A. Brunett and H. A. Swenson, Minneapolis, and A. F. Thelander, Rice Lake.

The Peterson Estate, Soldiers Grove, Wis., will rebuild its power dam and hydroelectric generating plant on the Kickapoo River at a cost of approximately $50,000 and has engaged E. E. Dillion, Washington Building, Madison, Wis., as consulting and contracting engineer. Clarence Peterson is manager of the estate.

The F. Rosenberg Elevator Co., 174 Reed Street, Milwaukee, has awarded the general contract to the Raulf Co., 53 Patton Building, local, for its new plant at Franklin and Becker streets and the Chicago, Milwaukee and St. Paul Railroad tracks. It will be of brick and steel, one story, 120 x 233 ft., and with equipment will cost about $100,000. The architects are Martin Tullgren & Sons, 425 East Water Street.

The Central South

ST. LOUIS, Sept. 19.

The Missouri Pacific Railroad Co., Railway Exchange Building, St. Louis, has completed plans for six new locomotive repair shops at different points. The largest structure will be one-story, 45 x 400 ft., and the five other shops, 44 x 240 ft. E. A. Hadley is chief engineer.

The Banner Fork Coal Co., Kentenia, Ky., is planning the construction of a new power house at its properties, with the installation of new electric haulage and operating equipment at the mines.

The Riverside Brick & Tile Co., Knoxville, Tenn., has been incorporated with a capital of $40,000 by R. P. Black, B. C. Ogle and J. W. Dooly, Knoxville, to manufacture brick, tile, etc.

The Klanke Machine Co., Muskogee, Okla., has been chartered under State laws to manufacture machinery and parts. The incorporators are E. E. Klanke, James E. Whiteside and Glenn Alcorn, all of Muskogee.

The Buick Motor Co., Flint, Mich., is having plans prepared for a new service and repair building at Memphis, Tenn., two stories, 100 x 225 ft., estimated to cost close to $90,000. W. C. Lester, 636 News-Scimitar Building, Memphis, is architect.

The Hillman Syndicate, Bowling Green, Ky., is planning for the construction of a new oil refinery on a local site.

The Eagle Saw Works, Chattanooga, Tenn., recently organized, has acquired a local plant and will install equipment for the manufacture of saws. It is headed by F. L. Underwood and J. E. Harris.

The Thompson-Case Oil & Rubber Co., Chattanooga, Tenn., has filed notice of change in name to the Thompson-Case Rubber Co., at the same time increasing its capital to $50,000 for extensions in its plant to manufacture tires.

The Blue Diamond Mining Co., Centertown, Ky., is planning for the installation of new equipment at its properties, including air compressors and other power apparatus. Robert A. Bridges is vice-president.

W. H. Eason, receiver for the Harvey Steel Products Corporation, Jackson, Tenn., will offer the company's property at a sale on Sept. 28. It is three stories, totaling about 125,000 sq. ft. in floor space.

The Knoxville Fertilizer Co., Knoxville, Tenn., is completing plans for a new plant to cost about $350,000, including machinery, and will consist of two one-story buildings, 160 x 350 ft., and 100 x 300 ft., respectively. James W. Dean is secretary and treasurer.

The Super-Service Motor Association, Colorado Building, Denver, Colo., has plans under way for the new three-story repair plant and parts manufacturing works, 125 x 250 ft., at Speer Boulevard and Bancock Street, estimated to cost about $250,000. H. W. J. Edbrooke, Tabor Opera House Building, is architect.

The General Iron Works Co., 1720 California Street, Denver, Colo., has preliminary plans under way for a new brick and steel foundry at Blake and Thirty-third streets, estimated to cost in excess of $200,000 with equipment.

Seattle

SEATTLE, Sept. 13.

The surplus shipyard stocks have reached in a competitive way into the machine-tool trade, including both heavy-duty and light machines, which constantly get in the way of new sales. Jobbers are asked to make estimates on new machinery, with the discovery later that the business has gone to the shipyard stocks. These surplus stocks, however, are dwindling, and it is becoming increasingly difficult for buyers to get suitable sizes and dimensions.

The sale of manual training machinery for the high schools of the State, which promised last summer to amount to millions of dollars, has been greatly reduced owing to the State-wide demand for tax reductions, and as a consequence the budgets in every high school have been cut.

Among the sales of the week by Seattle jobbers was a complete garage outfit, including an 18-in. Economy Rockford lathe and a No. 3 Toledo press. The demand for machinery has been almost exclusively for garages. The demand for electric drills has exceeded that of any fall season in the past three years. Lathes and small tools are moving into Oriental export.

The Barde Industrial company is preparing to move its offices, warehouse and storage yards to First Avenue, South, and Lander Street. The new warehouse is 114 x 330 ft., one story.

The Gulf States

BIRMINGHAM, Sept. 19.

The Southwestern Portland Cement Co., Los Angeles, Cal., and El Paso, Tex., has acquired about 250 acres at Waco, Tex., and plans the establishment of a new works estimated to cost about $1,000,000, including machinery. Carl Leonardt is president.

The El Paso Electric Co., El Paso, Tex., has arranged for a note issue of $750,000, the proceeds to be used for extensions and betterments.

The Plains Lubricating Co., Amarillo, Tex., recently organized, has acquired a local building for the establishment of a plant to manufacture lubricating oils. Equipment will be installed at once. L. S. Lahm is president, and M. E. Lahm, secretary.

Loading and unloading machinery, conveying equipment, etc., will be installed at the new municipal water terminal to be constructed by the City Commission, Tampa, Fla. W. D. Hall, city manager, has submitted plans for the project, calling for an expenditure of $945,000. A bond issue to total $1,000,000 is being arranged.

The Christian & Brough Co., Vicksburg, Miss., is completing plans for rebuilding its machine shop, to replace the structure recently destroyed by fire with loss in excess of $50,000. It will be one-story, 85 x 100 ft. W. A. Stanton, Vicksburg, is architect.

The Cisco Clay & Coal Co., Cisco, Tex., will expend close to $150,000 for equipment for installation at its new brick manufacturing plant, designed for a daily output of about 50,000 brick. C. B. Bush is president.

The Maryland Refining Co., New Orleans, has acquired a site and will commence the immediate erection of a new oil refinery, estimated to cost in excess of $500,000 with machinery.

The Common Council, Harlingen, Tex., has approved a bond issue of $32,000 for the installation of a municipal electric lighting plant. Plans will be prepared at once.

The Treasury Department, Washington, is taking bids up to Oct. 4, for the installation of a new refrigerating plant at the United States Marine Hospital, Key West, Fla. J. A. Wetmore is acting supervising architect.

California

LOS ANGELES, Sept. 13.

The Superior Machine Co., Glendale, Cal., has awarded contract to the Roy L. Kent Co., 130 South Grand Boulevard, for a new one-story plant, 75 x 175 ft., at Colorado Street and San Fernando Road, estimated to cost about $25,000. Charles B. Morton is manager.

The International Signal Co., Los Angeles, has been incorporated with a capital of $100,000 by James D. Alcorn, L. C. McAdams and C. O. Baker, to manufacture signal equipment and devices. It is represented by Carl B. Sturzenacker, 227 H. W. Hellman Building.

The Bowman Carriage Co., Sacramento, Cal., has awarded a contract to A. W. Norris, Sacramento, for a one-story machine and repair shop at Twelfth and D streets, estimated to cost about $25,000.

The Pacific Pipe Co., 201 Howard Street, San Francisco, manufacturer of iron pipe, has plans under way for a new one-story factory at Cypress and Twentieth streets, Oakland, Cal. Construction will be handled by the company under day work.

The Severin Motor Co., Oakland, Cal., formerly of Kansas City, Mo., will soon take bids for the first unit of its new plant at East Fourteenth Street and Fifty-fourth Avenue, one-story, 60 x 450 ft., and estimated to cost about $100,000. It will be followed by other units in the near future, bringing the cost up to about $400,000. M. I. Diggs, Easton Building, Oakland, is architect.

The Durant Motor Co. of California, Oakland, Cal., has awarded a contract to the P. J. Walker Co., Monadnock Building, San Francisco, for its new plant at the end of East Fourteenth Street, at the city limits. It will consist of a two-story, reinforced-concrete building, with four wings, totaling 800 x 800 ft., and is estimated to cost about $750,000. Construction will commence in about 30 days.

The Southern California Edison Co., Los Angeles, has made application to the State Railroad Commission for permission to build a new hydroelectric power plant in the Big Creek section. It will have an initial generating capacity of 70,000-hp., and ultimate capacity of 400,000 hp., and is estimated to cost in excess of $5,000,000.

The Crystal Ice Co., Long Beach, Cal., has acquired property, 75 x 100 ft., on American Avenue, as a site for a new plant, estimated to cost about $45,000. C. H. Taylor heads the company.

Canada

TORONTO, Sept. 19.

Dealers report a better demand for machinery. Big lists, however, are still absent, but users are appearing in larger numbers for single tools and equipment for replacement purposes. The equipping of new industrial plants is not being done at present, although there are several announcements of companies preparing to go ahead with the construction of factories, and it is expected that these will be a big factor in a better demand early next year. Users of small tools are buying only what is required for immediate needs, but dealers state that business is all that could be expected under existing conditions. Some reductions in prices have recently been made in machinery and tools ranging from 5 to 15 per cent.

The International Harvester Co., Chatham, Ont., has secured a local building for the manufacture of motor trucks, etc.

The Canadian Gary Motor Truck Co. has secured a building on Atlantic Avenue, Toronto, and will install equipment at once for the manufacture of trucks, etc.

The Sapco Spring Co., Ltd., Cherry and Front Streets, Toronto, will extend its plant and increase the capacity for the manufacture of truck springs, etc.

The Watkins Mfg. Co. of Canada, Ltd., Kingston, Ont., has been incorporated with a capital stock of $15,000 by James McK. Hughes, William McA. Nickle and others to manufacture machinery, metals and to rebabbitt automobiles, marine, traction and other mechanical parts, etc.

The City Council, Montreal, will install new boilers in pumping station on Craig Street, cost $15,000. Bids will also be called shortly for four new pumps costing $15,000 for the Rielle street pumping station.

The Universal Cement Casket Co., Dunnville, Ont., is having plans prepared by Barber, Wynne-Roberts & Seymour, 40 Jarvis Street, Toronto, for a factory.

The William Rogers Co., River Street, Niagara Falls, Ont., will build a boiler house to cost $13,000.

The Kingston General Hospital and Queen's University, Kingston, Ont., will build a power plant.

BOOK REVIEWS

America and the New Era. A Symposium of Social Reconstruction, edited by Elisha M. Friedman. Pages xxx + 500; 5½ by 8 in. Published by E. P. Dutton & Co., New York.

This publication is a grouping together under five general headings of various articles which have appeared from time to time since the armistice and constitutes a sequel to a previous publication entitled "American Problems of Reconstruction, a Symposium on the Economic and Financial Aspects." Altogether it contains twenty-eight articles, two by Mr. Friedman under the head of "Perspectives, Social and Political." The remaining 26 are each from an authoritative source, depending on its nature. There is also a foreword by Secretary of Commerce Herbert Hoover.

Under the head of "Social Progress versus Cycles of Change" five articles are grouped, each with some phase of war as its base, and with discussions on the possibility of lasting peace, including consideration of the "League of Nations." Under the head of "Some Economic Aspects of Social Problems," four articles are grouped dealing with land ownership, overpopulation of the cities at the expense of agriculture, immigration and that development of war which is here termed "Women in Industry."

The remaining articles are grouped, six under the head of "The New Nationalism" and eleven under the head of "The Conservation of Human Resources." This last group is very interesting, since it is largely based on findings made in the handling of the various armies employed in the war. Vocational guidance, industrial hygiene, health conservation, nervous strain and mental hygiene are among the subjects intelligently discussed.

The editing of all this wealth of material and the supplying of brief notes as to the authors are well done. There is an analytical table of contents, a bibliography and an index. E. C. R.

A Record of Ships Built. Under this title the New York Shipbuilding Corporation has issued a beautifully illustrated 64-page brochure, 9 x 12 in., picturing and briefly describing many of the outstanding naval and merchant vessels built at its yard in Camden, N. J., during the past 20 years. In a summary of 265 ships built and now building, the aggregate overall length is given as 88,001 ft., or 16 2/3 miles, and the total power as 1,982,835 hp., a figure raised above 2,000,000 by engines of 19,200 hp. built for hulls constructed in other yards. Prominent in the description are the new Shipping Board passenger liners, designed during the war as transports and changed over after the armistice. The frontispiece shows the superdreadnought Idaho passing up the East River towards the Brooklyn navy yard.

Training Industrial Workers. By Roy Willmarth Kelly. Pages, xxl + 437, 5¾ by 8½ in.; forms and illustrations, 71. Published by Ronald Press Co., New York.

The need of education by those who constitute the rank and file of industry and the necessity of vocational guidance seem to be the reasons which have led to the writing of this book. For, as John M. Brewer, Ph.D., associate professor of education, Howard University, says in an introduction for the book, the question, "Why not try education?" must occur to those who study the human problems of industry.

Setting forth an educational creed for industry and in condensed form covering the complexity of industry, as the kinds of industry, types employed, geographical location, seasonal fluctuations and financial resources, a comprehensive sketch of the earlier forms of apprenticeship is given. The beginnings in modern industrial education and national and state aid for vocational training, together with the development of the possibilities of schools and classes in vocational training, are described.

Thus leading up to the rapid developments in recent years of what is termed a new profession, viz: employment management, a heterogeneous mass of information is given, collected from many of the outstanding industries which have specialized in one or more phases of industrial training. Some mention of plans of factory management and labor management is made, and the fixing of the responsibility for what is termed the "new program" is described.

There are several appendices giving an educational survey of technical schools and classes, the training plans in detail of representative organizations such as the General Electric Co., Westinghouse Electric & Mfg. Co. and others, a classification of industrial schools and training methods and a very complete bibliography. The entire text of the book is conveniently sub-headed, which, together with the index, makes it a very ready reference work. E. C. R.

Quin's Metal Trades Directory of the United Kingdom. Pages 291, 5¼ x 8½ in. Published by the Metal Information Bureau, Ltd., 7 East India Avenue, London, E.C.3.

This directory represents the first effort to compile a classified list of the non-ferrous metals interests of Great Britain, and the showing is surprising of the number of firms engaged in one or more branches of that trade. Lines represented include, in addition to non-ferrous metals, tin plates, galvanized sheets and a number of iron and steel products. Following the alphabetical section which gives the names and addresses of the various firms is a classified section in which dealers in metals and other products are listed under their respective headings.

New Books Received

Petroleum Laws of All America. By J. W. Thompson. Pages, vii + 645, 6 x 9 in., paper covered. Published by Bureau of Mines, Department of the Interior and obtainable at 40c. per copy from the Superintendent of Documents, Government Printing Office, Washington, D. C.

Railroad Shop Practice. By Frank A. Stanley. Pages, xii + 331, 6 x 9 in.; illustrations, 391. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Drawing Room Practice. By Frank A. Stanley. Pages, x + 253, 6 x 9 in.; illustrations, 487. Published by the McGraw-Hill Book Co., 370 Seventh Avenue, New York.

Analytical Mechanics for Engineers. By Fred B. Seely and Newton E. Ensign. Pages, xiv +486, 6 x 9 in.; 454 illustrations. Published by John Wiley & Sons, Inc., 432 Fourth Avenue, New York.

Bituminous coal produced up to Sept. 10 is estimated by the United States Geological Survey at 271,716,000 net tons, compared with 365,081,000 tons for the same period last year. Weekly output has been lower, every week since the middle of February, than the output for the corresponding week of 1920, 1919, 1918 or 1917.

Directors of the Youngstown Sheet & Tube Co., Sept. 13, declared a dividend of 50c. a share on the common stock, and the regular dividend of $1.75 on preferred, both payable Oct. 1 to holders of record Sept. 20. Officials announced that the dividends would be paid out of surplus.

Notices have been posted at the plants of American Sheet & Tin Plate Co. of a cut in wages of skilled workmen of 12 per cent in hot mill workmen and 7 per cent in tin house workmen. This reduction merely is in keeping with the recent revision made in union mills, based upon the bi-monthly sales average and upon which the American Sheet & Tin Plate Co. wage scales are based.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers or shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	10.00c. to 10.50c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per Lb.
No. 14	3.90c. to 4.10c.
No. 16	4.05c. to 4.25c.
Nos. 18 and 20	4.15c. to 4.40c.
Nos. 22 and 24	4.30c. to 4.55c.
No. 26	4.45c. to 4.70c.
No. 27	4.60c. to 4.85c.
No. 28	4.75c. to 5.00c.
No. 30	5.25c. to 5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½ in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
7-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¼c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	19½c. to 21¾c.

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80	$6.55
		90 lb...	6.90	6.65
		100 lb...	7.00	6.75
IC..	$10.60	$9.50	IC...	7.20	6.95
IX..	11.80	10.75	IX...	8.10	7.85
IXX..	13.60	12.25	IXX...	9.10	8.85
IXXX..	15.60	14.25	IXXX...	10.50	10.25
IXXXX..	17.20	16.00	IXXXX...	11.50	11.25

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits pig	28c.
Bar	34c. to 35c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5½c. to 6c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	20¼c.
No. 1 solder	18½c.
Refined solder	15¾c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6c. to 6½c.

Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

The market is firmer with a tendency toward higher prices. Dealers' buying prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.00
Copper, heavy and wire	9.00
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	3.75
Lead, tea	2.50
Zinc	2.50

THE IRON AGE

New York, September 29, 1921

ESTABLISHED 1855 VOL. 108: No. 13

New Ford Foundry Plant at River Rouge

Laid Out for Quantity Production—Uses Direct Blast Furnace Metal Mixed with Cupola Metal in Definite Proportions as Required—Conveyor Systems Highly Developed

BY L. B. BREEDLOVE*

NOTEWORTHY for its especially developed equipment, the new foundry of the Ford Motor Co. at the River Rouge plant has various features which represent decided departures from previous practice. The mechanical equipment for large volume production of small castings is perhaps the most complete in existence, and requires a very small number of skilled men. This foundry represents the results of the development work and experience of the company over the last ten years. Its daily output when completed with be all the castings necessary for the production of 5000 cars and 2000 tractors, or approximately 2500 tons of castings.

The first unit of four cupolas has been in operation for approximately six months, while at the same time construction work on the remaining five units, making 24 cupolas in all, is being pushed. The foundry buildings consist of two main groups—the cupola buildings and foundry building—joined together under one roof. The three cupola buildings are each 264 ft. long, 44 ft. wide, 78 ft. 6 in. high, spaced 132 ft. apart and attached to the west side of the foundry building. To the east of the cupola buildings a continuous crane runway of 41 ft. 6 in. span is provided at 34 ft. above ground level.

At the cupola buildings and 12 ft. below this runway, on the charging floor level, are the bottoms of the storage bins, and below these the blowing equipment is housed. The walls are of brick at the first floor and stucco above, with continuous mechanically operated steel sash windows, which represent in area of glass 40 per cent of the total wall surface.

The foundry building consists of 18 bays, each bay 66 ft. wide, giving outside measurements of 1188 ft. long by 595 ft. wide, or a floor space of about 16 acres. The steel trusses are especially designed, each bay having a monitor the full length, 32 ft. wide at its base and 30 ft. high. The lower chord of the trusses is 28 ft. 6 in. above the floor line. Both north and south sides of each monitor are equipped with continuous mechanically operated ventilating steel sash windows for a height of 26 ft., which provides excellent ventilation and daylight conditions.

Below the wall sash the walls are of brick, those above are of stucco, and the roofs tile. The glass surface in the side walls represents in area of glass nearly 60 per cent of the total surface. The weight of the structural steel work contained is: Foundry building 8,000 tons, cupola buildings 9,000 tons, walkways, bins, conveyor supports, etc., 8,000 tons, or a total of 25,000 tons. All floors are of reinforced concrete construction.

Use of Direct Metal

While the making of castings directly from the furnace has been practiced more or less since the discovery of reducing iron from the ore, this foundry is probably the first to adopt the use of direct metal on a large scale. Close uniformity in the composition of the metal coming from the furnace is essential to the

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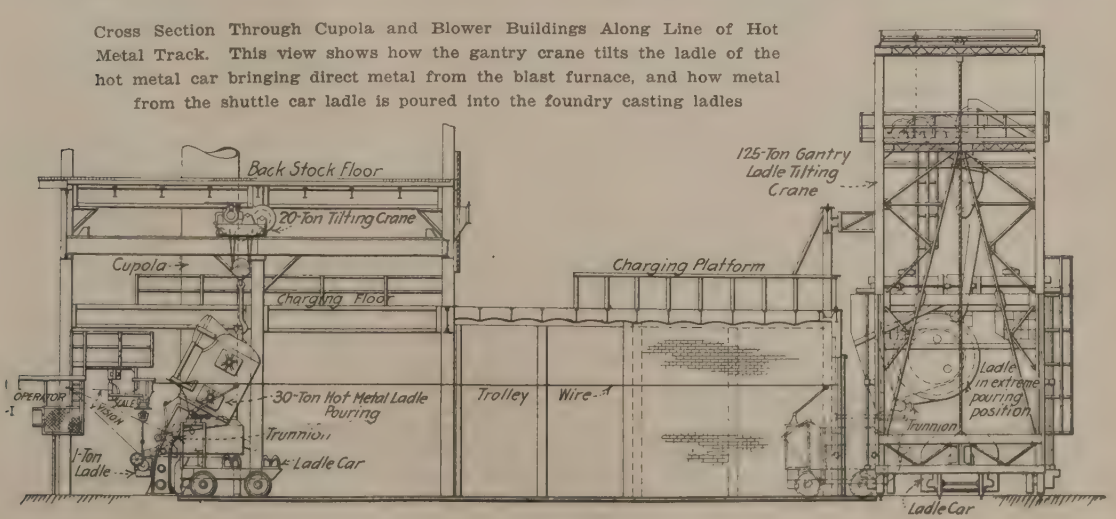
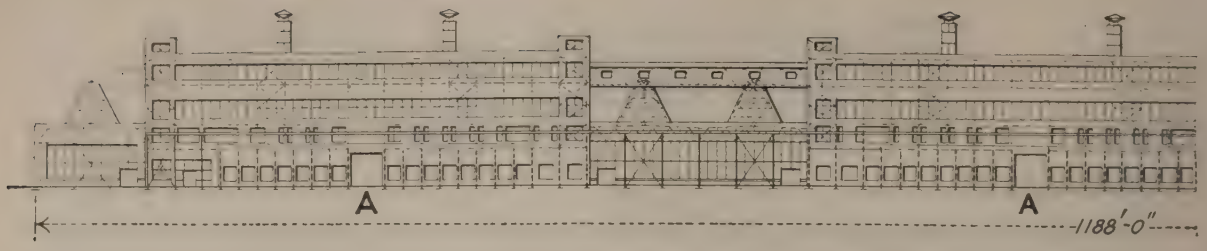
Cross Section Through Cupola and Blower Buildings Along Line of Hot Metal Track. This view shows how the gantry crane tilts the ladle of the hot metal car bringing direct metal from the blast furnace, and how metal from the shuttle car ladle is poured into the foundry casting ladles





West Elevation of the Plant, Showing the Three Cupola Buildings, Each 264 Ft. Long, with the Less Lofty Foundry Structure Beyond, Four of the 18 Foundry Monitors Appearing Between the Cupola Buildings.

use of direct metal; in the past the variation in the furnace product has hindered its use. The Ford blast furnaces are producing foundry iron, remarkably uniform in analysis, from Hanna and Carpenter ores. The following table taken from all analyses for one month shows in a general way the uniformity of product.

	Average Cast Analysis	Average Daily Range	Maximum Variations
Silicon	3.04	2.72 to 3.32	2.44 to 3.54
Sulphur	0.027	0.024 to 0.032	0.021 to 0.040
Phosphorus	0.50	0.48 to 0.60	0.46 to 0.60
Manganese	0.71	0.65 to 0.71	0.58 to 0.78
Total carbon	3.80	3.75 to 3.90	3.72 to 3.94

As the foundry at Highland Park is not yet using direct metal, the blast furnaces produce for it one or two casts each day, with 3.50 per cent or over in silicon. This accounts for the range in the maximum variations shown above. The desired analysis of the castings from the foundry is practically constant for any particular part, however, and all castings for cars and tractors will fall within the following ranges:

Silicon	2.25 to 2.50 per cent
Sulphur	0.060 to 0.095 per cent
Phosphorus	0.45 to 0.50 per cent
Manganese	0.65 to 0.80 per cent
Total carbon	3.40 to 3.50 per cent
Brinnell test	187 to 212

The percentage of direct metal used with the cupola product varies with the particular castings to be made. In the case of the cylinder blocks for Ford cars—for which all castings are designated as "T" parts—the ratio is practically 40 per cent direct metal to 60 per cent cupola metal, while for other "T" parts a 50 to 50 per cent mixture is used, and in some instances a 60 to 40 per cent mixture. For castings of the Fordson tractor similar mixtures are used. In some of the large castings 80 per cent direct to 20 per cent cupola metal has been used with success, but in general the intention is to use a 50 to 50 per cent mixture, at least for the immediate future.

Operations are so arranged that the variation in the composition of the particular cast from the furnace may be cared for by varying the cupola mixture correspondingly, to give the desired composition for the castings being made. It might be pointed out that the principal part of the scrap charged comes in the nature of back stock from previous casts of known constituents, thereby removing much uncertainty. The remaining part is composed of scrap from the various departments of the company, and is in general excellently balanced. Experience here has shown that a mixture containing 50 per cent or less of direct metal gives the most satisfactory results in the work of casting and in the castings.

Operation has shown that the influence of the silicon in imparting fluidity to the iron is greater than past experiments have indicated and that the relation of temperature to fluidity is probably of less importance than former practice has shown. The temperature of the mixture is lower at the time of casting, hence sand burning has been lessened considerably, and at the same time castings produced having clear and smooth surfaces. At this lower temperature the influence of silicon in producing desirable qualities in the castings is apparently slightly increased.

Furnace iron, after standing 6 hr. in the furnace ladle, has been successfully used in the lower mixtures; however, under ordinary operation the furnace iron is not allowed to stand over 4 hr. in the foundry mixer type ladles. At the end of that time the iron in the mixer ladle is either mixed with fresh hot metal from the furnaces or is sent to the small pig casting machine provided near the center of the foundry. At the end of the day's pouring the hot metal remaining is also sent to the pig casting machine. Direct metal is also used in the jobbing castings.

Cupola Arrangement Symmetrical

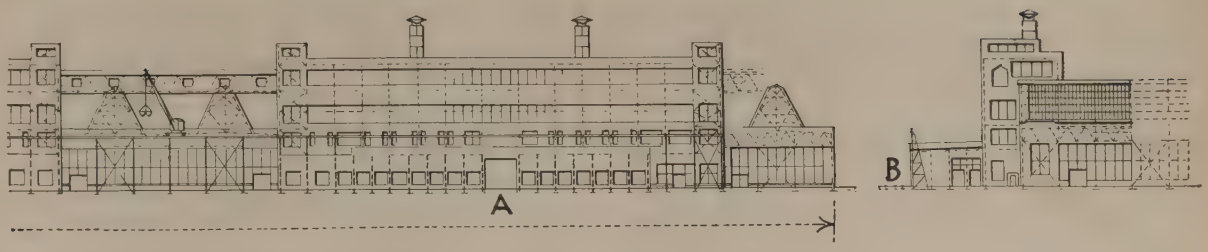
Twenty-four cupolas are arranged on a center line 224 ft. from the north-and-south center line connecting the two blast furnaces. Eight of these cupolas are placed symmetrically about the east-and-west center line of Furnace A, thereby bringing the south end of the foundry group in line with the end of the stove platform along the main driveway into the plant. The other two groups of cupolas are located with center lines 396 ft. and 792 ft. north of this south group. The cupolas are 78 in. in diameter, having drop bottom and outside air chamber of Whiting Foundry Co. design. There are eight cupolas in each of the three cupola buildings, four being uniformily spaced in a group each side of the building center line.

The shafts of the cupolas pass up through the main charging floor and the back stock floor into a brick-lined breeching supported on the conveyor floor. This breeching is rectangular in shape with circular top increasing in height toward the stack. One 8-ft. stack, centrally located, is provided for each four cupolas. The top of this stack is 95 ft. above the tuyeres and has a double cone discharge top. The cupola shafts extend into the breeching about 4 ft.

The bottom of the breeching is bricked in such a manner that the cinders and dust particles thrown down by the change of direction and velocity of the gases is conducted to bins suspended under the floor, and thence by chutes to industrial cars on the lower floor. Apparently a negligible amount of cinders and dust is deposited on the building roof, while in the bins 1/3 cu. yd. of cinders per cupola is collected in 8 hrs. of operation.

At the level of the main charging floor, 22 ft. above the foundry floor line, and above the blower rooms and the slag tracks and exposed to the weather, are the storage bins for yard scrap, etc. This storage platform, 44 ft. wide, is continuous over the hot metal tracks and blower rooms, or for the length of each of the cupola buildings. A crane runway, 12 ft. above this platform, has the same space. This runway is continuous for the length of the foundry and serves the full length of the three cupola buildings. On it is mounted a 5-ton, electric driven locomotive crane with 50-ft. boom, arranged to use grab bucket or lifting magnet.

Directly below this storage platform and on each side of the hot metal tracks are the blower rooms, each of which houses four No. 11 Sturtevant high-pressure



and One at Each End. At *A* are the three entrances for hot metal, direct from the blast furnaces. At *B*, in the partial south elevation, is the location for the hot metal ladle car and the gantry crane

rotary blowers, driven by direct current motors. The blast piping is so arranged that each blower is individually connected to one cupola, and collectively to any cupola in the group of four. Underneath the storage platforms, and between the blower room and cupola building, two passageways are provided for traffic, one being north bound and the other south bound. Between the cupolas and the east wall of the cupola building slag tracks are installed.

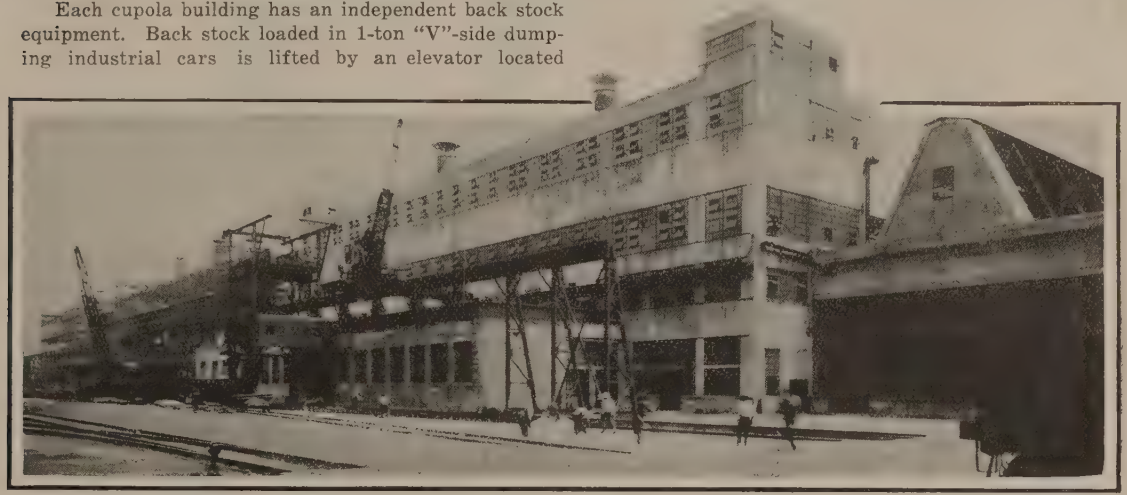
Handling Back Stock

Each cupola building has an independent back stock equipment. Back stock loaded in 1-ton "V"-side dumping industrial cars is lifted by an elevator located beyond the knock-out platforms and the tumbler equipment to a 12-ft. gallery. These galleries are located above the roof between two monitors on the center line of the cupola buildings, and at the same level as the back stock floor of the cupola building.

These cars are pushed by trucks back to the cupola building, weighed on special track scales and switched to the tracks running parallel to the cupola line. The cargo of these cars is dumped into chutes leading from that floor into the sides of the cupola shaft, slightly above the pig charging door. Two chutes for each cupola are provided, and the opening of each is controlled by a hand-lever operated flap gate. These chutes are designed so as to give uniform distribution of the charge on the shaft. The cars are returned on another track through the same gallery.

A 40-ton bin, suspended from the conveyor floor, for coke or limestone, is provided for each cupola. Each bin has two chutes arranged to discharge into "V"-side dumping 1-ton industrial cars running parallel to the cupolas. The cars, after being weighed on special track scales, are discharged as needed into the charging chutes feeding the cupolas. These bins are fed by a system of 30-in. belt conveyors running in overhead galleries, which transport the coke from the coke screening building in the coke and by-product group, a distance of 1500 ft. from the foundry. Limestone is unloaded near the coke screening building into a large track hopper, and is transported by the same conveyor system.

This system of conveyors, passing through the coal pulverizing building, supplies it with coal, which in turn supplies the main power plant with pulverized coal. About 3 to 5 hrs. operation of this system will be necessary to supply the cupola buildings with limestone and coke, and about 14 hrs. for the coal requirements of the pulverizing building. This system of conveyors will be subject to an interlocking electrical control, and after each change of cargo the belts will be automatically swept by revolving brushes.



One Cupola Building Was Finished, and the Two Others Under Construction, When This View Was Taken. At the right appears the end of one of the eighteen long, high monitors spanning the foundry proper. The traveling boom crane for handling stock appears over the blowing engine house, with the 125-ton hot-metal dumping gantry crane immediately adjacent

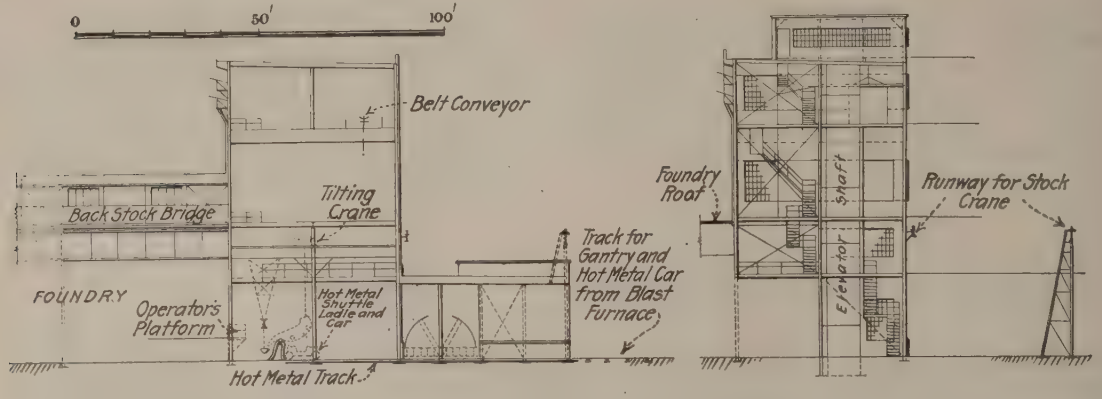
How the Direct Metal Is Handled

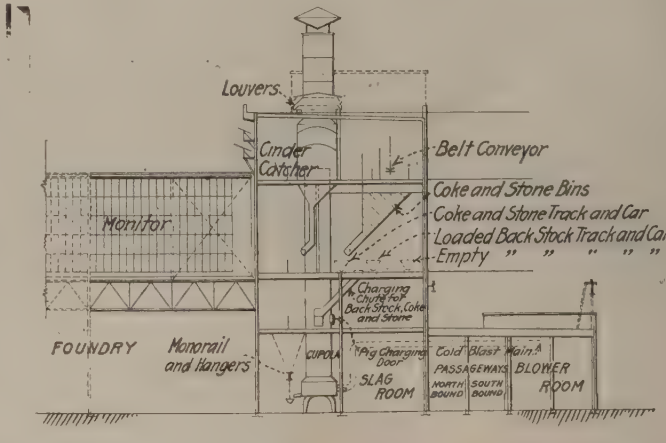
Hot metal is transported from the furnaces in 75-ton Pollock ladle cars. After being weighed on the track scales near the pig casting house, the cars are switched to the foundry track and spotted at the cupola hot metal tracks. Spanning this foundry track is a 125-ton Wellman-Seaver-Morgan gantry ladle tipping crane, which is self propelled and serves the three cupola buildings. The hot metal is discharged into a 30-ton top inlet, end outlet, Treadwell mixer-type ladle, mounted on a track at right angles. This track, on the center line of the cupola building, extends from the outside hot metal track to the line of the pouring spouts of the cupola line. Transfer arrangement is provided so that an empty ladle can be moved to one side while a loaded ladle is brought in.

These mixer-type ladle cars, electrically driven, are controlled by an operator located in a balcony in full view of all operations. This operator also controls the 20-ton Pawling & Harnischfeger tipping crane, by which the hot metal is discharged into the 1-ton foun-

dry ladles. Monorail overhead tracks, with a liberal number of crossovers, are provided in front of the line of cupola pouring spouts, on which the 1-ton foundry ladles are conveyed. The crossovers are operated from the floor somewhat ahead of the progress of the 4-wheel pivot carriages. Large dial automatic scales are provided at each cupola, and at the direct metal ladle position. From the cupolas the 1-ton ladles are conveyed to the pouring positions along the mold conveyors.

Eight systems of three conveyors each, of approximately 270-ft. run, are provided for the pouring of the larger castings. The three platform conveyors are arranged parallel, with the return cooling conveyor in the middle. The mold conveyors move at a rate of 10 ft. per min. while the return cooling conveyor travels





Three Partial Cross Sections of the Plant, All Running East and West

Above, at Left, Section at Hot Metal Track, Looking South, Showing Arrangement of Ladle-Tilting Trolley, Tracks for Gantry Crane and Hot Metal Car, Back Stock Bridge and Operator's Location

Above, at Right, Section Looking South Toward Elevator and Stairs, and Showing Crane Runway Over the Stock Yard

At Right, Below, Section Looking South, Showing Arrangement of Cupolas, Bins, Conveyors, Traffic Passageways, Etc.

24 ft. per min. The 70 ft. of the mold conveyor run nearest the cupola is used for the pouring stations, while the remaining 200 ft. serves as the mold assembly line.

During this distance of travel the molds are assembled in the following manner, each operation being done by different workmen; the iron bottom board and the rammed iron drag are placed, the cores, wires and supports are inserted, the iron cope put on and clamped, the risers and gates are covered with paper to protect the mold from dirt. Metal is poured into the moving molds in the pouring range, the ladle being supported on overhead monorails and moved by hand to correspond to the speed of the molds.

Cores are made, mostly by hand, in metal core boxes away from the heat of the ovens. The cores after being made are placed on the trays of spring mounted pendulum type conveyors, power driven, on overhead tracks, which carry them to the spray tables at the core ovens. Sixteen core ovens, approximately 15 ft. by 60 ft. outside, are provided. Steel open-side cabinets about 4 ft. square by 6 ft. high, having shelves of various heights and mounted on overhead carriages, carry the cores through the oven. The speed of this conveyor is about 2 ft. per min., and the distance traveled approximately 120 ft.

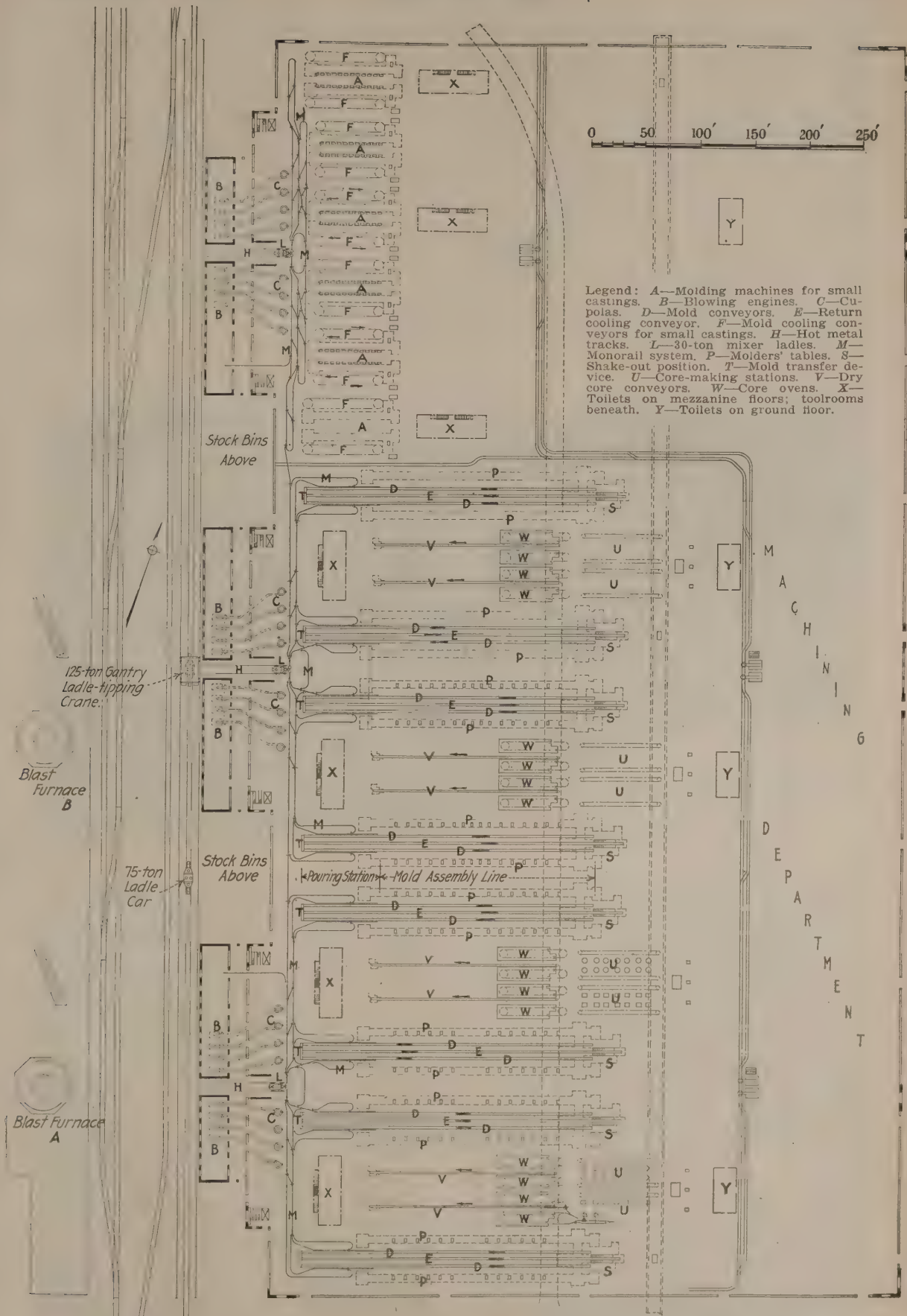
All ovens are fired on both sides by unenriched coke oven gas, produced in the coke plant as a by-product. The gas and the correct amount of air are mixed in a Sellack regulating set, and the mixture supplied to the plain pipe burners under constant pressure. The gases of combustion are exhausted above the roof by a slight fan draft.

The cores are sprayed in the stalls of a revolving four-quadrant shield, each stall having an independently revolving table of convenient height. This shield and the revolving tables were originally power driven, but this drive did not prove as satisfactory as hand operation. The cores are taken from the pendulum conveyors on one side of the revolving spray stalls, sprayed, and removed from the opposite side and loaded onto the cabinet type conveyor within easy reach for passage through the oven.

Baked cores are removed at the loading end from the return side of the oven conveyor, and are placed by hand on the dry core conveyor, which transports them to the rear of the ovens, to storage space. They are then loaded on cabinet type four-wheel trucks and pulled to the desired position along the mold assembly conveyors.

At the west end of the mold conveyors the molds are transferred by means of an overhead compressed air transfer arrangement, which skids them on rails from each conveyor alternately to the central return cooling conveyor. This latter is covered for practically its entire length, thereby forming a smoke tunnel from which the smoke is discharged above the roof by means of a fan.

This conveyor delivers the molds containing the cast-


0 50 100′ 150′ 200′ 250′
Legend: A—Molding machines for small castings. B—Blowing engines. C—Cupolas. D—Mold conveyors. E—Return cooling conveyor. F—Mold cooling conveyors for small castings. H—Hot metal tracks. L—30-ton mixer ladles. M—Monorail system. P—Molders' tables. S—Shake-out position. T—Mold transfer device. U—Core-making stations. V—Dry core conveyors. W—Core ovens. X—Toilets on mezzanine floors; toolrooms beneath. Y—Toilets on ground floor.
Stock Bins Above
125-ton Gantry Ladle-tipping Crane
Blast Furnace B
75-ton Ladle Car
Stock Bins Above
Pouring Station
Mold Assembly Line
Blast Furnace A
MACHINING DEPARTMENT

Plan of the New Foundry Plant, Showing Relation to Existing Blast Furnaces, from Which Direct Metal Will Be Taken, and Indicating How the Transfer of This Metal Is Accomplished, from the Hot Metal Ladle Car to the Shuttle Ladle Car and Thence to the Foundry Pouring Ladles. Arrangements of monorail system, of mold and core conveyors, of blowing systems, etc., are made clear

ings onto the knock-down grating platform, where the clamps and flasks are taken apart by means of hand hooks, the molding sand dropping below and the castings swung, by means of specially designed clamps attached to a monorail carriage, onto a flight conveyor, which carries them up to an overhead cooling balcony.

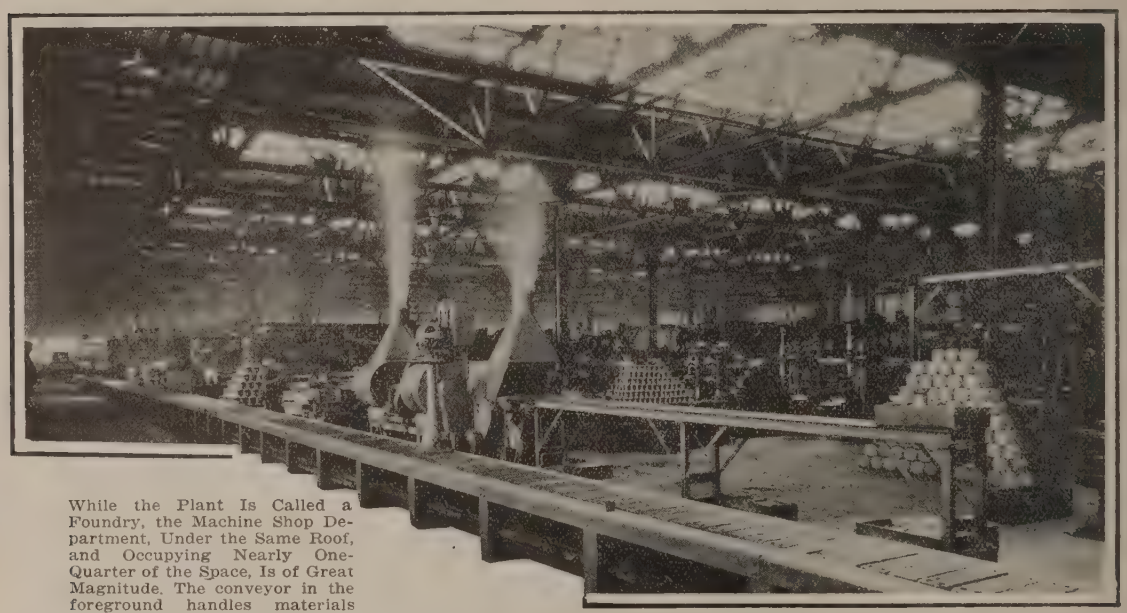
To avoid distribution of dust, a strong down draft is maintained on this knock-down grating. The air, coming from this grating, passes through a settling chamber and is exhausted above the roof. This settling chamber has a 30-ton capacity for recovered sand. At first practically all the bits of charred and burning paper from the molds were forced out of the exhaust stack, but the installation of a series of baffles in the settling chamber prevented this.

The sand falls through the knock-down grating onto a conveyor which elevates it to equipment, supported above the foundry floor, where it is crushed and screened twice and the iron removed by magnets. From this equipment the sand is returned by flight conveyors to the bins above the molders' tables, which are conveniently located along the mold assembly conveyors. The openings of the bins above the molders' tables have specially designed quick opening gates. A small grating, in front of each molder's table, permits the return of sand falling over the tables, by means of a flight conveyor, to the crushing and screening equipment. It was the intention to make this grating quite large in order to avoid any shoveling; but it was found that, with a large grating, much sand was allowed to fall from the tables unnecessarily, while with the smaller opening the workman is more careful in the operation of the bin gates, in order to avoid the shoveling.

After the castings have cooled sufficiently, they are conveyed to the knock-out grating, where the cores are removed by hand. A down draft, maintained over this grating, passes through a settling chamber and is exhausted above the roof. The sand falls through the grating onto a belt conveyor and is put through a crushing, screening, mixing process, the iron is removed, and the sand is delivered back by conveyors to the bins in the core departments ready for use. This system actually recovers 90 per cent of the sand.

From the clean-out, the castings are transported to the tumbler department, thence to the chipping platforms, and from there by trucks to the conveyor leading to the machining department in the foundry building, or to the loading platform for shipment to the Highland Park plant. From 300 to 400 large horizontal back-geared tumblers of special design, driven by belts from overhead shafting, are to be installed. As standard mills on the market have not given satisfactory results in continuous service, these units were built from designs by the Ford organization. In chipping, the air hammer is used whenever possible. For all necessary grinding of fins, gates, spouts, etc., portable emery wheels driven by flexible shafts are employed.

Twelve mold conveyor systems for small castings are provided. These vary in overall centerline lengths from about 60 ft. to approximately 100 ft., according to the type and weight of the particular castings to be made, in order to provide a return run of sufficient length for cooling. These conveyors are of the pendulum type without springs, equipped with one or more bracket trays carried on four-wheel trucks, running on overhead tracks and around 12 ft. diameter sprocket wheels. The traveling speed varies from 8 to 20 ft. per min. Two conveyors are arranged parallel, so that the return sides are about 12 ft. apart. The Pridemore electric jar ram molding machines are located in two lines parallel to the conveyor center lines, between the groups of the conveyors.



While the Plant Is Called a Foundry, the Machine Shop Department, Under the Same Roof, and Occupying Nearly One-Quarter of the Space, Is of Great Magnitude. The conveyor in the foreground handles materials the length of the plant

About twelve molding machines are to be provided for each mold conveyor. This number was determined from the experience of the foundry at the Highland Park plant with much different conveyor equipment. However, with the new equipment, the production has considerably exceeded the expected output. The molds are made up, clamped and placed on the conveyor, travel past the pouring station and are removed by hand to the knock-down gratings located at the end of the return cooling run.

Similar sand conveyor and conditioning process equipment, cooling balconies and the same type of finishing equipment are to be installed, with these mold conveyors, as described in previous paragraphs. Metal patterns are used for all production work, but a few wood patterns are in use in jobbing work. The metal patterns are mostly made hollow and plated and attached to plates.

A jobbing foundry of 40 tons daily capacity is located in the main foundry building. The jobbing cast-

ings cover a wide range in weights and analyses, and are required for replacements, new additions and development work, primarily for the main foundry equipment. In addition, the requirements of the coke plant group, the blast furnace department and the sedan body building departments will be cared for as far as possible. This jobbing foundry is served for its entire length by a 25-ton overhead electric crane of 60 ft. span. A 3-ton electric furnace of the single-phase type, with two electrodes, is now being moved to this jobbing foundry, and in the immediate future a second electric furnace of larger capacity is to be installed. This furnace will probably be of 15 tons capacity, but operations have not yet become extensive enough to forecast the demand on the jobbing foundry.

Each conveyor drive throughout the foundry is equipped with one or more breaking pins, and electrical overload relays, as a protection against overloading and emergencies. A large number of the conveyors are driven by a especially designed Ford gear reduction unit, which has proved very satisfactory.

It is interesting to note that a large amount of the floor and industrial track haulage is done by a so-called "Ginny," which consists of the mechanical equipment of the Ford car, mounted on solid rubber tired wheels having a narrow gage and a 48-in. wheel base. The channel body frames of these units are semi-circular at the ends, so that no coupling is necessary for handling the industrial track cars. The fuel used is motor fuel of 50 per cent benzol and 50 per cent gasoline, which is made at the plant and is, also, retailed to the public from a service station at the coke plant group. These units have proved quite satisfactory for heavy haulage. Storage battery platform trucks are also used extensively.

A portion of the floor space at the east side of the main foundry building, 124 ft. x 1100 ft., is occupied by the machining department. Here all machine work on the cylinder blocks for the cars and tractors, tractor crank cases, housings, etc., or in general the heavier castings, is completed. All the equipment of this department is arranged for large scale quantity production, and consists essentially of specially designed machines, fixtures and jigs for the operations accomplished. The machines are designed in general to use special heads or fixtures holding a number of castings, and are grouped according to the sequence of the operations.

All machines have unit drive. During the progress through this department the castings are carried on power-driven platform conveyors, or pushed by hand on roller type runways, provided to each machine, thereby requiring a minimum of lifting by each machine operator. A power-driven platform conveyor carries the castings, after the machine work is finished, to the loading platform directly to the north of the main foundry building. This department can handle each day the complete daily output of the foundry, in cylinder blocks of both classes, and the heavier type of other castings such as housings, tractor crank cases, etc.

Maintenance and operation of the mechanical equipment will require continuously from 400 to 500 men. Under the maintenance department the following shops will be grouped: blacksmith, tinsmith, structural, machine and electric repair shop. The blacksmith shop has power hammers, and will employ from 15 to 20 men. The tinshop has power machines, and will employ about 25 men. The structural fabricating shop is equipped to handle steel plates up to 72 in. and beams up to 16 in. and will employ about 30 men. The machine shop is fully equipped to handle all operations on material up to 5 ft. diameter and will employ about 50 men. The electrical repair shop will employ about 15 men.

The ventilating and heating system is of the hot blast type, through galvanized iron ducts placed above the lower chord of the trusses. The duct outlets are brought down to approximately head level. Two fans of the multi-blade type, each handling about 60,000 cu. ft. per min., with the necessary heating stacks, are placed overhead in each bay, and feed into independent ducts. The direct heat loss is approximately 70,000,000 B.t.u. per hr., while the air change loss is approximately 140,000,000 B.t.u. per hr.

Two electric traction elevators, 6 ft. x 8 ft., running to the top floor, are provided in each cupola building. Four similar elevators are placed in the main foundry building for elevating the back stock. Ample walkways and stairs are provided around all conveyors and other equipment. Safeguards around all equipment have been very carefully designed. In the foundry and cupola, the connected power in motors will be, when fully complete, approximately 12,000 hp., and in the machine department 2000 hp. The factory demand is around 90 per cent.

Moderate Improvement in Coke Region

UNIONTOWN, PA., Sept. 24.—There are indications that September may definitely mark the turning point in the furnace coke industry in the Fayette county or Connellsville bituminous region. There is a firmer demand and tone to market inquiries and a noticeable increase in coke production this week. Price has been advanced to a minimum of $3.25 and ranges upward by various stages to $3.60. One inquiry for 5000 tons of furnace coke monthly resulted in keen bidding, but so far as is known no one quoted a price which was less than $3.25.

Observers are watching the next step to be made by the H. C. Frick Coke Co. Coal production at the Frick mines is gradually being increased, the big Leisenring No. 1 plant at Connellsville having resumed work in coal output last Monday. It is understood that other Frick superintendents have had orders to prepare for resumption, although official announcement is still lacking. So far the Frick company has put no ovens in operation.

Operations in the region are now on a uniform wage scale, all companies paying the Frick scale, which is that of November, 1917.

Prizes for Employees

The National Cash Register Co., Dayton, Ohio, recently distributed $8,000 to employees who had submitted the most valuable suggestions for improvement of their product during the first six months of this year. The first prize, which consisted of $150 and an educational trip to Cleveland, Dunkirk, Buffalo and Syracuse, was won by two tool makers, their suggestion being the adoption of a ball-bearing parallel in sensitized drilling. Ten of the leading prize winners were also awarded the educational trip. One hundred dollars in prizes was also distributed to the winners of a special suggestion contest for slogans to be used in the company's advertising. A. M. Wise won first prize with the slogan, "National in Name, Universal in Use." The banner given by the company in each contest to the department contributing the most valuable suggestion was presented to the tool supply department. Frederick B. Patterson, the new president of the company, made the distribution.

A protest against House Bill 7456, paragraph 386, wherein a duty of two cents per pound is imposed on pig tin, while tin ore would come into the United States duty free, was passed at the meeting of the metal division of the National Association of Waste Material Dealers, which held quarterly meetings at the Hotel Astor, New York, last week. Members of the association claim that such an arrangement would discourage and destroy those industries devoted to the reclaiming of tin in the United States. No meeting of the iron and steel scrap division was held.

KROM SINTERING SYSTEM

Retaining Walls of Pan Form Motor Driven Ram for Discharging

The method of discharging the product is the novel feature of the Krom sintering system, invented and developed by S. A. Krom, Sintering Engineering Co., 25 Beaver Street, New York. The retaining walls of the cast iron pan holding the charge on the grate form a motor-driven ram for pushing off the finished sinter. The rim or the retaining wall of the pan is mounted on wheels and is provided with a cast steel plow, which travels clear of the grate and rips the sinter cleanly from the grate, at the same time breaking it into desirable sizes. It is claimed that this discharging operation is automatic, fast and positive in its results; that for a very large tonnage but two men are required in the pan room, an operator and helper.

This system of sintering is based on the unit oven principle, such as employed at modern by-product coke ovens. To obtain a material with a certain porosity and strength and with as much sulphur eliminated as possible, the heat treatment period must be under control and independent of all other steps, such as charging, igniting and discharging. Unit charges allow this ideal condition.

The Krom system employs a battery of circular cast iron pans from 12 to 25 ft. in diameter. The bottom or grate portion of the pan is adapted to a cone shaped sheet iron extension, from the apex of which the suction draught is drawn down. It is pointed out that this construction insures an even draught of air through all portions of the sinter charge. A rotary distributor spreads the water-sprayed charge of ore, flue dust, coke or coal, evenly about the circular pan without compression or packing.

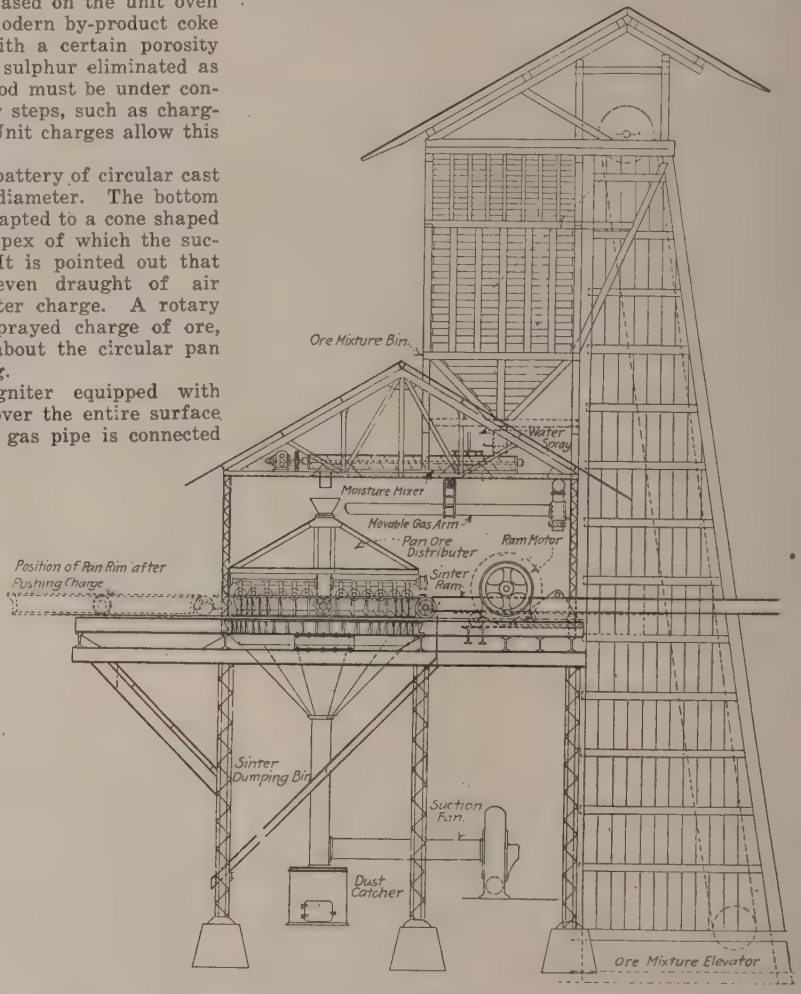
A motor-driven traveling igniter equipped with burners for gas or oil, which cover the entire surface of the pan, is used. A pivoted gas pipe is connected permanently with the traveling igniter. In a two-pan battery the charging distributor and the igniter travel over the pan by motor power on semi-circular tracks; in the case of three or more pan units the tracks are laid in a straight line over the extent of the battery and the igniter receives its gas supply from an automatic valve at each pan location.

Though the sintered material may drop slightly into the openings of the grate, its porosity allows the air to pass through. It is wedged in the openings so lightly that the plow has no difficulty in dislodging and removing. As the rim moves outward in the discharging operation the sinter falls into a hopper and thence into a sheet iron dumping bin where it is immediately quenched to protect the bin.

The 12 ft. diameter pan has a capacity of from 250 to 500 tons per day; the 25 ft. pan, 1000 to 2000 tons, according to the nature of the charge to be treated. Unit additions may be made at rates as low as 10 to 20 tons a day. For the Krom system in use a low repair and labor cost is claimed and no royalty charges are made.

The system was recently installed for the commercial sintering of Clinton hematite ore of the Birmingham, Ala., district at the plant owned by J. D. Lacey, 350 Madison Avenue, New York. The capacity will be increased, results so far having proved satisfactory.

With the Clinton hematite ore about 4 or 5 per cent of coke breeze, or 8 per cent of coal dust is mixed before charging; also 10 to 15 per cent of water.



The Retaining Walls of the Cast-Iron Pan Holding the Charge on the Grate Form a Motor-Driven Ram for Pushing Off the Finished Sinter. The broken lines on the platform (at the left and one-third the distance from the bottom to the top of the illustration) represent this ram's position immediately after a discharge has been made. The sinter has fallen into a hopper underneath, thence has glided down a chute to the dumping bin

An Error Corrected

In the communication of Frank Samuel, Philadelphia, which appeared on page 749 of THE IRON AGE of Sept. 22, a quotation was made from the report of the trial examiner of the Federal Trade Commission in the complaint filed against American importers of ferromanganese from England. By an error of the printer the word "no" was omitted. The sentence should have read: "There was *no* evidence that the importing and selling of ferromanganese by the respondents or their principals into the United States was done with any intent to injure the manufacture of ferromanganese in the United States, and there are no facts and circumstances proved from which such intent can logically or legally be inferred."

"Use a hook to clear away cuttings" enjoins an illustrated poster published by the National Safety Council. "Steel chips curl up and are as sharp as razor blades. You're sure to get cut if you pull them away by hand." The illustration depicts a machinist using the hook.

President Farrell Testifies at Washington

Appears in Rehearing of Application of United States Steel Products Co. to Operate Ships Through Panama Canal—Says Jobs of 30,000 Men Are in Danger

WASHINGTON, Sept. 27.—President James A. Farrell of the United States Steel Corporation appeared yesterday as a witness before Examiner Fuller of the Interstate Commerce Commission in connection with the taking of testimony at a rehearing on the application of the United States Steel Products Co. to operate ships through the Panama Canal. In May, 1920, the commission authorized the Steel Products company, exporting subsidiary of the Steel Corporation, to continue the operation of its ships through the canal. Some months ago, the commission ordered a rehearing on the allegation of shipping interests using the canal that competition between ships passing through the canal and the Elgin, Joliet & Eastern Railroad, operating out of Gary, Ind., to northern Illinois points and the Bessemer & Lake Erie Railroad, operating in Pennsylvania, exists in violation of the Panama Canal Act. Representing counsel for the Steel Products company were three of its most prominent attorneys, R. V. Lindabury, Charles S. MacVeagh and Charles S. Belsterling, while Louis Pfeiff, traffic manager for the Steel Products company submitted statistical exhibits tending to show that the Steel company engaged in coastwise trade through the canal so as to assure service for the parent company at a time when the lines that had been operating through the canal had sent their boats to more profitable business across the Atlantic Ocean. Frank Lyon, counsel for the Luckenbach companies, conducted the cross-examination of Mr. Pfeiff with a view to bringing out the nature of the competition between the Steel Products company line and the lines not affiliated with any large shipper, which he called independent lines.

Reason for the Service.

Mr. Farrell said that the steamship service of the Steel Corporation was established to enable the corporation to meet competition anywhere in the world and so it could send its products to ports to which regular service was not maintained and where facilities for loading or unloading heavy articles might not be available. The steamships of the corporation frequently carry lighters knocked down, to be set up and used where steel is to be delivered. In the same way, they carry facilities for loading and unloading heavy commodities.

"The Luckenbach company entered the Pacific Coast service in 1920," said Mr. Farrell. "It was in the general steamship service long before that, but it did not enter the coast-to-coast service until long after the United States Steel Products Co. had entered it."

It is believed that this testimony was offered with the impression that the Luckenbach company was raising the question whether the commission should allow the Steel Products company to operate ships through the canal. No evidence was given that the Luckenbach company was opposing a continuance of that permission other than the fact that Mr. Lyon was present to cross-examine witnesses introduced by the Steel Products company to show that there had been no substantial change in conditions since the commission issued its permission other than a reduction in the amount of business to be done.

Mr. Farrell Amused.

Amusement was expressed by Mr. Farrell at the idea that there is or could be such competition between the railroads operated by the United States Steel Corporation or its subsidiaries as to bring the operations of the Steel Products line within the provision intended to keep ralroad-owned ships out of the canal. Mr. Farrell said that even if the Elgin, Joliet & Eastern and the Bessemer & Lake Erie were lines not controlled or influenced by the Steel Corporation, they could not be factors in the making of transcontinental rates, or rates from the Pittsburgh district to New York. He declared that they are in a pocket so far as rate making is concerned.

"The competition that is to be feared," said Mr. Farrell, "is not the competition between the rail and water lines and the rail lines involved in this proceeding, but the competition from European steel makers and European steamship lines to the west coast of the United States, especially the United American or Harriman line and the Hamburg-American. The combination between the Harriman and Hamburg-American makes possible the spectacle of American ships carrying German steel to American ports. It is possible to use the Luckenbach lines to Hamburg and back to San Francisco at a rate on steel of $3 a ton less than from New York to San Francisco. I do not say that that is being done now, but it is possible. The rates are so made that the steel could be shipped to Hamburg by the Luckenbach line and then back to San Francisco for less than from New York to San Francisco. That is the kind of competition that is to be feared.

Employs 30,000 Men.

"Our Pacific Coast business gives employment to about 30,000 men, with the services of whom we will have to dispense if the foreign competition continues to grow as it has been growing. In time of unemployment such as the present, that, it seems to me, is a serious matter."

Among the facts brought out by the testimony of Mr. Pfeiff was that the competition from Europe for the steel business of the American Pacific Coast is such that, in a commercial sense, it may be said that the western part of the United States has been "annexed to western Europe." Germany and Belgium, it was stated, are dominating that market and England is getting into it because the water rate from the ports of western Europe to Pacific Coast ports is only a little more than $7 a ton, which is less than the inland rate from Pittsburgh to New York. American steel makers, it was stated, are obtaining a little of the business because time of delivery is a factor. Mr. Pfeiff said that the customs duties and cost of transfer from the boat to destinations away from the water front of the Pacific ports enable Americans to take a little of the business, but Europeans control the market, even in competition with the mills in Colorado. The situation, owing to the low value of European money in comparison with the dollar, was described as being as unsatisfactory from an American point of view as it was in 1914 just prior to the outbreak of war when European steel makers were taking practically all the business.

It was brought out that the Steel Products steamship line does not participate in the various steamship conferences, but observes the rates and rules put out by the conference. One of the exhibits submitted by Mr. Pfeiff showed that while the Isthmian Line in the 13 months ending July 31, 1921, paid out $304,000 in canal tolls on traffic it carried through the canal to Pacific Coast ports of the United States and Vancouver, B. C., it transported only 10 per cent of the westbound traffic and 12 per cent of the eastbound.

Frank T. Bentley, traffic manager for the Illinois Steel Co.; Louis C. Bihler, traffic manager for the Carnegie Steel Co., and J. E. Steyers, general freight agent of the Bessemer & Lake Erie, gave testimony similar to that given by them a little more than one year ago when the commission gave permission to the Steel Products company to continue the operation of ships through the Panama Canal.

Reconstruction of French Steel Plants

Rebuilding Permits Adopting Advanced Practise—Hot Drawing, Mechanical Properties at High Temperatures and Heat Treatment Discussed by Iron and Steel Institute

(*Special Correspondence*)

PARIS, FRANCE, Sept. 10.—The final session of the Iron and Steel Institute's autumn meeting, held on Sept. 6, was largely occupied with the question of devastations and the progress of reconstruction in the plants of the war area, visible evidence of which was afforded in the excursions which occupied the remainder of the week.

War Issues to the Front

It is evident that there is very strong resentment at the systematic destruction of metallurgical plants by the Germans. This would be better understood by visitors from England if the whole of the Midlands and the Cleveland district had been put out of action, as well as half the coal mines and plants in Durham. Perhaps the average Englishman is too ready, after any and every kind of fight, to say, "Well, let's shake and forget it." But it certainly does seem that an attitude of this kind is the only policy which can save Europe. This attitude is naturally distasteful to those who have suffered so much; but it seems rather a pity that there has been a tendency to develop heart-to-heart talks on differences in points of view regarding purely political matters at a purely technical congress. If we may judge by some of their informal conversation, the French hosts of the British members know exactly what is in Lloyd George's mind and what are his inflexible intentions. In this respect they certainly have the advantage over their guests, and probably over Lloyd George as well.

In spite of the war damage and devastations, the French metallurgical industry seems to have come fairly well out of the war. Much of the plant which was removed to Germany has been recovered and replaced, while the metallurgical wealth of the restored territory is not an asset to be ignored. There are also some fine plants in full going order in the restored territory. The Thyssen interests completed the works at Hagondange just before the war, and this plant—one of the most up-to-date in Europe—is now in French hands entirely undamaged. The Lorraine works are turning out the cheapest steel in the world and are not yet working at full capacity, so the fact that other works are not in commission is not likely to affect France's position as a producer in the present state of the world's trade. The English maker, undersold in his own country, cannot altogether see that the French have very much to complain about under present conditions. In three or four years' time, when all the devastated plants have been reorganized and equipped in accordance with the most up-to-date practice, the devastations will probably be regarded as a blessing in disguise. Some of the English plants, which have been trying to keep going under adverse conditions, may be wishing before long that they had been devastated, too, and start a cry on their own account.

The reconstruction which has already taken place is really remarkable, and further activity on the same lines should assure a brilliant future for France in the iron and steel industry. At any rate, neither the state of mind of Lloyd George nor the state of Europe is likely to be materially affected by the heart-to-heart talks which took place during the various entertainments so kindly provided by the hosts of the Iron and Steel Institute.

Destruction and Rebuilding of French Works

THE first paper read at the second session was by Prof. Léon Guillet, of Paris, on the "Position of the Metallurgical Industries of Northern and Eastern France: Their Destruction and Reconstruction." Nearly in full, the paper is as follows:

It is of interest to note, in the first instance, the situation in which France found herself as the result of the invasion, so far as her metallurgical needs were concerned.

The French production of coal in 1913 was 40,844,000 tons, and 50 per cent of this production was from the occupied regions. The iron ore production in 1913 had risen to 21,918,000 tons. Of this amount 83 per cent was mined in the invaded regions. The pig iron production was 5,207,000 tons, of which 2,560,190 tons were produced in the East and 933,089 in the North. Of the total, 64 per cent of the productive capacity passed into enemy hands. Finally, of a total steel production amounting to 4,934,000 tons, 2,528,630 tons were made in the East and 1,165,888 tons in the North. By reason of the situation of the works, 63 per cent were on the side of the battle-front farthest removed from France. The list on the opposite page enumerates the principal iron works destroyed, but it should be noted that this list comprises only works making pig iron and steel, and does not include foundries, some of which, like those of Muller & Roger at Noyon, were exceedingly important. Nor does it include engineering works having subsidiary metallurgical shops, although, as in the case of the Société Française de Constructions Mécaniques (Anciens Etablissements Cail) at Denain, some of these were of considerable size. The amount of material removed by the enemy from iron works totaled: 56,321 tons of plant and machinery and 51,429 tons of stock yard material and finished products.

A point that requires emphasizing is that of all this destruction only a very small proportion was due to actual war damage. The bulk of this destruction was deliberate, and had as its object the putting of French iron works out of action for many years to come. In support of this statement may be adduced such facts as that in works situated along the actual firing line, whose destruction might otherwise be attributed to war damage, dynamite cartridges are known to have been used to destroy all the producing plant, such as furnaces, rolling mills, and hammers. The author has himself removed, at the Biache Saint-Vaast Copper Works, near Arras, a whole series of high explosive cartridges from the principal parts of the plant and machinery.

In regard to works situated at a considerable distance from the front two distinct periods are noticeable, more especially in the case of works in the Sambre. Soon after the invasion the enemy encouraged the captured work people to continue at work, and proceeded with the completion of workshops and plant then in course of construction. At, however, the beginning of 1916 came the period of a general inspection of the invaded works, when note was taken of which works should be destroyed and which should be despoiled. Shortly afterward the work of destruction was commenced; entire shops, pillars, girders, and roofs, as

well as shop tools, were removed, and what could not be taken away was, generally speaking, destroyed. In some regions so systematically was this destruction carried out that a whole arsenal of works-breaking machinery was created for the purpose. In a number of works the overhead travelers were called into service to drop heavy tups all over the machinery, floors and foundations, wherever, that is, they could reach.

Name of Works	Plant	Output and Number of Workers
Etablissements Arbel Hauts-Fourneaux de la Chiers	5 open-hearth furnaces, important forge and hammer shops, 4 blast furnaces, 3 converters, rolling mills	300 tons of steel, 2100 workmen, 82,000 tons of pig iron
Hauts - Fourneaux, Forges et Aciéries de Denain et Anzin.	8 blast furnaces, 4 converters, 10 open-hearth furnaces, 12 puddling furnaces, rolling mills and foundries	334,677 tons of pig iron, 396,262 tons of steel, 6500 workmen
Usine de l'Espérance	4 blast furnaces, 12 puddling furnaces, converters and rolling mills	142,843 tons of pig iron, 152,825 tons of steel, 1900 workmen
Société Métallurgique de Gorcy	Blast furnaces, forges, and wire mills	
Aciéries de Longwy	9 blast furnaces, 6 converters, rolling mills and foundries	364,680 tons of pig iron, 314,234 tons of steel, 6744 workmen
Usine d'Homécourt	7 blast furnaces, 4 converters, 2 open-hearth furnaces, rolling mills, &c.	453,650 tons of pig iron, 345,000 tons of steel
Aciéries de Micheville	6 blast furnaces, 4 converters, rolling mills and foundries	389,599 tons of pig iron, 208,832 tons of steel, 3000 workmen
Aciéries du Nord et de l'Est	7 blast furnaces 5 converters, 2 open-hearth furnaces, rolling mills, &c.	242,890 tons of pig iron, 192,308 tons of steel, 4800 workmen
Forges et Aciéries de Pompey	4 blast furnaces, 3 converters, 1 open-hearth furnace, rolling mills, and forge and foundries	
Hauts-Fourneaux et Fonderies de Pont à Mousson	8 blast furnaces, 26 cupolas, foundries and coke ovens	285,000 tons of pig iron, 179,000 tons of castings, 6200 workmen
Société Métallurgique de Pont-à-Vendin	3 blast furnaces, steel works and rolling mills	
Usines de la Providence (Hautmont et Rehon)	3 blast furnaces, 3 open-hearth furnaces, rolling mills and foundries.	196,000 tons of pig iron, 220,000 tons of steel, 2300 workmen
Etablissements Raty et Cie	4 blast furnaces, foundries	94,677 tons of pig iron, 335 workmen
Etablissements de Saintignon et Cie	5 blast furnaces	173,393 tons of pig iron
Société Métallurgique de Semelle-Maubeuge	7 blast furnaces, steel works, open-hearth and Talbot furnaces, rolling mills, foundries	4250 workmen
Société Lorraine Industrielle	2 blast furnaces	51,702 tons of pig iron, 125 workmen
Forges de Vireux-Molhain	Open-hearth furnaces, rolling mills, foundries	91,319 tons of finished products, 1200 workmen
Etablissements de Wendel	8 blast furnaces, 6 converters, rolling mills	393,723 tons of pig iron, 330,207 tons of steel, 2383 workmen

Reconstruction

The work of reconstruction has been truly remarkable, taking into consideration the conditions under which it had to be undertaken. After the armistice it was impossible to rely on finding anything that might be needed in the immediate locality. Everything had been systematically destroyed or stolen. Machinery, raw materials and labor were lacking, and the workmen were scattered far and wide. On the other hand, the lack of coal and of means of transport made it impossible to rely on the regions still intact, besides which the latter, suddenly diverted from the manufacture of munitions to the requirements of peace, and with very meager resources, could not for a long time be expected to grapple with the heavy demands with which they met. Indeed, by a paradoxical position of affairs, it was the very works to which firms more in the center of France would ordinarily have looked to provide coal and ores which were themselves most in need of material and fuel for their own reconstruction.

Details will be given of how this situation was met and of the results accomplished.

Société Anonyme des Hauts-Fourneaux, Forges et Aciéries de Denain et d'Anzin

This company had suffered very seriously. At the opening of 1921 only two workshops were at work, the refractory products department and the iron foundry. These departments were housed in two main buildings, each 120 x 15 meters, (394 x 49 ft.) provided with six overhead cranes of a capacity varying from six to 40 tons. By March, 1921, the production of refractories had reached 820 tons, while in the foundry 400 tons of iron castings and 40 tons of steel castings had been produced. This represents, however, but an infinitesimal part of the work of reconstruction. Foundations and constructions had already been put in hand to a value of 63,000,000 francs, and orders placed for further plant to the value of 103,000,000 francs. These orders include four blast furnaces of 300 tons capacity, with Stahler bin chargers (of which the first furnace will be blown in this year), four 30-ton basic converters, and a reserve mixer of 500 tons; four 40-ton open-hearth furnaces with two mixers, one of 150 tons and the other of 50 tons; a central power station, the building of which is already finished, and the plant for this power station, comprising seven 4100-hp. gas engines, seven 3200-kw. alternators, and four gas blowing engines of 100 m^3. capacity at 0.50 m. mercury (35,000 cu. ft. at a pressure of 7.35 lb. per sq. in.) The recuperation of the heat of the gases escaping from the gas engines will be undertaken in boilers and in turbo alternators.

Société des Aciéries de Longwy

The efforts put forth here have been no less considerable. Formerly the company possessed nine blast furnaces, seven at Mont-Saint-Martin and two at Moulaine, six km. (3¾ miles) from the steel works and connected therewith by a private railroad. The whole plant was systematically pillaged and destroyed. The Moulaine furnaces were restarted in July, 1919, and a furnace was blown in at Mont-Saint-Martin in January, 1920. Two more followed in April and July, and seven are now either working or ready for blowing in. Occasion has been taken to replace the blowing engines destroyed by much more powerful new ones, and the capacity of these seven blast furnaces which before the war was 32,000 tons per month has now risen to 38,000 tons per month.

The open-hearth plant contained twelve gas producers, one 350-ton mixer, three 60-ton tilting furnaces, and two 20-ton fixed furnaces. It was served by 14 overhead cranes and had just been completed when war broke out. The producers and the mixer have disappeared, while of the open-hearth plant only the dismounted shells of the two fixed furnaces remain. The structural steel work of the shops was, for the most part, demolished and the steel members cut up by means of the blowpipe and dispatched into Germany. The overhead cranes, with the exception of two, were taken away. The two that remained were kept for the purpose of stripping and loading up the material pillaged from the works.

Here again work has begun. The first 25-ton open-hearth furnace was put into operation in July, 1920, and the second in September of the same year. The structural steel work and overhead cranes have been restored, as well as one of the 60-ton tilting furnaces, which has been completely rebuilt. This open-hearth department is already capable of producing 8000 tons of open-hearth steel per month. Within five or six months its reconstruction will be complete and its monthly capacity will then reach 15,000 tons.

The basic steel department comprised two 200-ton mixers and three 18-ton and four 24-ton converters. The latter, installed in 1914, had not, at the outbreak of the war, been got to work.

After the armistice the condition of the plant was as follows: Of the mixers nothing but the shells remained. The three 18-ton converters had been demolished and the four 24-ton converters had been removed to Ger-

many, as had also a 20-ton overhead crane, part of the roof and the whole of the basic shop plant. The charging machines, the cupolas, the overhead transporters, the lime bins, and most of the floor plates had been destroyed, as well as one of the blast blowing engines and the four compressors. Of the accessory plant, such as stripping cranes, ladles, ingot molds, capstans, slag crushers, etc., nothing escaped either destruction or removal.

The first care of the company after the armistice was to recover the four 24-ton converters which had been taken to recovered Lorraine. Thanks to ceaseless work, these four appliances were restored by July, 1920, and on Aug. 16 the first charge was blown.

Whereas in the blast furnace and steel departments some little salvage remained, the 14 trains of rolls working in 1914 were systematically pillaged or destroyed. The problem of reconstruction was therefore more complicated, as it was impossible to recover the 14 mills and their accessories. The first care was to put in order the blooming mill, the heavy sheet mill, and the semi-continuous, the principal parts of which had been stolen but were recoverable. Reconstruction to this extent would allow of some degree of rolling down the steel works output. This program was sedulously followed in face of innumerable difficulties, for not only had much accessory plant been destroyed, but the mill parts recovered from Germany had suffered enormously in the course of dismantling and removal. Despite all these difficulties the company was able to start these three mills in July, 1920. There still remain to be reinstalled the whole of the sheet and section mills to replace those destroyed. The company will profit by the occasion by introducing all the most recent improvements and thus creating a plant corresponding completely with the latest metallurgical practise and with the economic conditions which the post-war situation imposes. The whole of this plant is on order, and much of it would have been put down by now had the contractors been able to keep their engagements. Thus, in less than two years a new works has arisen on the ashes of the old, not, it is true, complete, and still far short of what it was before the war, yet forming, as a whole, a unit capable of producing, monthly, 20,000 tons of rolled steel.

The Rehon works near Longwy were in great part destroyed and dismantled. Of the three blast furnaces, however, two were not beyond repair, and on May 23, 1919, one was blown in again and the second was similarly got to work on Oct. 14 in the same year. For this purpose a 500-kw. electrogenerative set and a blowing engine had to be repaired. From Oct. 15, 1919, to Aug. 15, 1920, the various central power station engines were got to work.

The basic steel plant, which had been entirely dismantled, was recovered from the Sarre district, as well as the rolling mills. The first cast was poured at the steel works on Nov. 18, 1919, less than a year after the liberation of the works. On June 8, 1920, the electric mill drive was first started, and by the end of the month the first blooms were being sent out. By Nov. 30 in that year the 950-mm (37½-in.) mill was in operation. Two years had been found necessary to repair the plant installed in 1910-1911. Besides this, over 8000 tons of material stolen by the enemy had been recovered.

Compagnie des Forges et Aciéries de la Marine et d'Homécourt

The Homécourt works, which were among the most important in France, comprised blast furnaces, steel works, rolling mills, and all accessory plant.

Out of seven blast furnaces provided with 29 Cowper stoves and capable of producing 1200 tons of pig iron per day, two have been restarted. The two 1000-hp. steam blowing engines and the five 1200-hp. gas blowing engines have been replaced by two 1700-hp. gas engines and a 2000-hp. turbo-blower, installed as a temporary measure. Two 160-ton mixers were destroyed. They will be replaced and reinstalled at the steel works. Out of 56 boilers giving 7360 m² heating surface and supplying steam for the blast furnace blowing engines, the steel works blowing engines, and the blooming and reversing mill engines, only 30, with a heating surface aggregating 3000 m², remained, (32,300 sq. ft. out of 79,200 sq. ft.) the rest having been either removed or destroyed.

The basic steel works, consisting of four converters of 17 to 21 tons capacity, capable of producing 1200 tons of ingots daily, the basic shop and all the accessory plant had been entirely destroyed. Among the rest were two 3000-hp. blowing engines and a series of pumps which had been reduced to scrap.

The steel works is in process of restoration. The building itself has been rebuilt. The open-hearth shop, with its two 40-ton furnaces and its producers, had been removed in their entirety into German works. The iron work of the shop buildings and the producers have been recovered and reinstalled.

The rolling mills of the Homécourt works consisted of two trains of blooming mills of 2750 × 1100 mm. for ingots of four to five tons, driven by steam reversing mill engines, and a two-high reversible 850-mm. mill of four stands, one for billets and three for large sections and rails. This mill was driven by two steam reversing mill engines. There were also a three-high 635-mm. mill for smaller sections with three stands, driven by a 1500-hp. three-phase motor, a three-high universal mill for flats up to 800 mm. wide, driven by a 2500-hp. motor, and a three-high Lauth mill for medium-sized plates with a three-high stand of 2200 × 750 mm. rolls for smooth sheets and an 1800 × 700-mm. stand of rolls for chequered plates driven by a 2500-hp. three-phase motor, besides a large shop for the straightening and dressing of rails and sections, machine tools for making beams, and Lackawanna planing machines.

[Editor's Note: 2750 × 1100 mm. = 108¼ × 43¼ in.; 850 mm. = 33⅛ in.; 635 mm. = 25 in.; 800 mm. = 31½ in.; 2200 × 750 mm. = 86½ × 29½ in.; 1800 × 700 mm. = 70⅞ × 27½ in.]

Only the mill buildings remained standing, and these badly damaged. All the plant and tools had been taken away. There were left but two bare housings in the medium plate mill and the 1500-hp. electric motor of the medium three-high section mill, likewise badly damaged. One blooming mill has been recovered, as well as the two 2500-hp. motors which had been taken to a German works.

At present the mills are in course of reinstallation and work is in hand in preparation for the future reinstallation of the blooming mill, of a Morgan billet mill, and of a universal mill for large plates up to 1.2 m. (47 in.) in width.

Much of the central station electric plant, particularly two 2000-hp. electrogenerative sets, had been removed. These have been recovered and are being remounted. The other motors, which had been badly damaged, are being repaired.

At the works of this company both the steel department and the rolling mills were utterly destroyed. Before undertaking the work of reconstruction an agreement was entered into with the Compagnie des Forges et Aciéries de la Marine et d'Homécourt that the work of the two companies should be carried on jointly, sections, rails, girders, U-sections, angles, etc., being made at Micheville while Homécourt should specialize in sheets, plates, blooms, and billets. The Micheville works will comprise:

The six blast furnaces which existed in 1914, renovated and altered so as to produce 250 tons of pig iron each per day.

Two gas-fired mixers of 600 tons capacity each.

A steel works provided with four 28-ton converters, space being allowed for a fifth.

Two car-casting sets and an overhead casting crane as a stand-by. Space has been provided for two electric furnaces for refining purposes, to be installed later.

A battery of unfired soaking-pits with 36 holes and two gas-fired soaking-pits with 24 holes each will be installed.

The rolling mills will consist of an 1150-mm. (45-in.) blooming mill driven by a steam reversing engine and two steam hydraulic shears, and a 44-in. American blooming mill driven by a reversible electric motor of 12,000 to 15,000 hp. These two blooming mills will suffice to feed two semi-continuous American mills, comprising:

1. A heavy section mill consisting of one stand of 36-in. breaking down rolls, driven by a reversible electric motor of 10,000 to 12,000 hp.; two stands of 28-in. three-high rolls driven by an electric motor of 3000 hp., and one stand of

28-in. finishing rolls driven by a 1500-hp. motor. These four stands, arranged tandem at distances allowing of simultaneous rolling in each, will allow of an output of 60 tons per hour.

2. A small section mill consisting of five stands of rolls arranged tandem so as to allow of the simultaneous and automatic rolling of products with an output of 40 tons per hour. This mill will be driven by two electric motors of 1500 hp. each, and one of 500 hp. It will be fed from two continuous mill reheating furnaces, each capable of supplying 40 tons of blooms per hour, charging cold.

Space has been provided behind the 1150 mm. blooming mill for the installation of a continuous mill for billets and flats similar to the one to be erected at Homécourt. At the end of the mill will be installed cooling beds, live roller gear, bar banks and overhead travelers, in order rapidly to remove and deal with the mill output.

The necessary energy will be supplied by a central station containing six 6000-hp. gas engines (three of which are on order) generating three-phase current at 5500 volts. This power house will be connected up with the "Sidérurgie Lorraine" system, which connects up all the power houses of the leading works of the region. There will also be:

1. A power-house comprising four gas-engines of 1500 hp. each, coupled with continuous current 450-volt generators.
2. Two Rateau turbines of 1500 hp. with 550-volt three-phase alternators, using the waste steam from the mill engines.
3. A Rateau turbine of 1500 hp. with a 450-volt continuous current generator, using the waste steam from the reversing blooming-mill engine.
4. Two 1500 hp. 5500-450 continuous commutators insuring liaison between the two stations.

There will also be installed a basic shop and a slag mill corresponding wtih the size and needs of the works. Space has been provided for a battery of coke ovens capable of supplying the whole of the coke required by the blast furnaces. The coke oven gases will be used to heat the reheating furnaces, mixers, etc.

Up to June, 1921, 436,000 m³ of foundations have been dug, 40,000 m³ of cement put in, and 600 ferro-concrete pillars have been put in position. Nos. 1 and 2 blast furnaces, which were partly destroyed, have been repaired; a blast furnace blowing engine, taken away by the Germans, has been recovered, and a battery of boilers has been got into working conditions. A blast furnace was blown in in March, 1921. The whole of the iron work of the former steel melting shop and rolling mills has had to be taken down and has been renovated and rebuilt. Over 6000 tons of iron work have been involved in this reconstruction.

Vireux-Molhain Ironworks

This company has also put forth great efforts, and its present state of reconstruction may be summarized as follows:

Two 20-ton fixed, open-hearth furnaces are in course of being built, as well as one 300-mm. rolling mill. A tire and axle shop has been restarted, as has also a foundry. The fitting shops, boiler shops, smithies, and cylinder-boring shops are also at work. In addition to the foregoing an 800-mm. sheet mill, a 550-mm. mill, a 25-ton tilting open-hearth furnace, a slag cement plant, a slag brick works, and a steel foundry are in course of construction.

Etablissements Arbel

This company had two important centers, the Douai works in the Nord and the Couzon works in the Loire. The former have been entirely removed or destroyed. They consisted of a group of several works. The most important was devoted to the manufacture of stampings; chassis and bogies of tram cars and other rolling stock and automobiles; boiler seatings, etc., and to structural steel work. These have been entirely rebuilt in handsome shops 308 m. long and 120 m. wide. Over 1000 tons of structural steel work is now being turned out monthly. A second works, which is at present devoted to the repair of cars, has been fully at work for the past two years. A third works consists of the open-hearth steel works and rolling mills. The buildings will be completed by about the end of September; the foundations are ready and the first deliveries of plant are momentarily expected.

Finally a fourth works will be devoted to making boilers and cars and is in course of being built. It will cover a very large area and the machine tools ordered are actually in course of delivery. Before the end of the year it is anticipated that this works will be in regular activity. The four works provide employment for over 1200 workmen, a figure which gives some idea of the enterprise shown. A power station developing 1200 kw. supplies the energy to this undertaking.

The basic steel works were begun in 1920 and the converter shop in May, 1921. At present four blast furnaces are ready as well as the power stations which contain gas engines aggregating 1500 hp.; four gas blowing engines for the blast furnaces and one for the steel works. All the gas engines and blowing engines were recovered after the armistice, from where they had been transported by the enemy. The company hopes that the steel works and blooming mill (which has likewise been recovered) will be ready by the end of the year, and the new rolling mills by the end of 1922.

Joeuf and Messempré Works of de Wendel & Co.

The destruction of the Joeuf works was largely carried out by means of a heavy tup which Messrs. de Wendel have had placed on a pedestal at the works. It has been decided to restore the works at Joeuf to their pre-war condition. On the other hand, the undertakings at Messempré, which in 1914 were distributed among three small works, will be combined into one, between Messempré and Osnes. The reconstruction at Joeuf is in an advanced state. Four blast furnaces have been blown in: Nos. 7 and 8 on June 11, 1919; No. 6 on May 27, 1920; and No. 5 on Oct. 19, 1920. Two more (Nos. 1 and 4) are ready for blowing in, and Nos. 2 and 3 will be ready very shortly.

The steel works was restarted on June 8, 1920, and the blooming mill, which has been partly restored and temporarily completed, was put to work on June 8, 1920. The wire mill, which has been entirely rebuilt, was restarted on Oct. 25, 1920. The rail and billet mill are in course of completion and will be started almost immediately. The new three-high 600-mm. mill is ready, while two thin sheet mills and two tinplate mills have been got to work at Messempré in April and in October, 1920, respectively. The complete reconstruction of this works is under consideration.

Works of the Société du Nord et de l'Est

This company combines the interests of three older undertakings:

Aciéries du Nord et de l'Est, at Valenciennes.
Espérance works, at Louvroil.
Société Métallurgique, at Pont-à-Vendin, Wingles.

At the outbreak of war these three works were in an advanced state of completion. At the two first the first stage of working had been reached, but not at the Pont-à-Vendin works. The repair of the more serious damage enabled, at most, the resumption of this stage at the first two works. At Pont-à-Vendin important fresh resources were needed to begin with. The carrying out of the pre-war program in its entirety would have clashed with the interests of the component companies. On the other hand, the extent of the work of destruction was such that there was no necessity to reconstruct identically with the original plan. For this reason it was decided to postpone until later the reconstruction of the Pont-à-Vendin works and to employ the resources thus liberated to realize the very feasible programme of the two older works at Espérance and the Nord-Est. Their reconstruction was undertaken in two stages.

The first involved the realization of the pre-war productive capacity of the Valenciennes and Louvroil works, that is to say, three 200-ton blast furnaces at Valenciennes and two 180-ton furnaces at Louvroil, with basic steel works and blooming and other mills capable of rolling every kind of section and of utilizing the entire output of the steel works.

The finishing mills of these two works having been destroyed as well as their buildings, this portion of the

plant was redesigned in accordance with the most recent practice. All the mills being electrically driven, the company decided to enlarge the power stations. The mills comprise:

At Valenciennes: One 850-mm. reversible mill of four stands, which is actually in existence; one three-high 600-mm. mill with reversing engines; one 325-mm. semi-continuous billet mill and one 275-mm. mill, served by the same billet mill.

At Louvroil: One 350-mm. two-high sectional mill; one 280-mm. two-high sectional mill and one 280-mm. tin plate mill.

Resumption of work could only be undertaken slowly and progressively. The figures relating to the number of workmen employed give a fair idea of the progress realized at these two works: November, 1918, 89; June, 1919, 870; March, 1920, 1450; December, 1920, 1900; April, 1921, 3200. The first year's work consisted solely of digging the foundations, and actual reconstruction did not commence until 1920 at Valenciennes. It was then possible speedily to set the fitting shops to work, driven in the first instance by a gas engine working on a lean gas. The steel works and the railroad tire and axle department were got to work in 1921. In regard to the remaining installation here and at Louvroil, which was either removed or systematically destroyed by dynamite, reconstruction, despite the energies of both workmen and staff, is far from being within sight of completion.

At the present moment two blast furnaces out of three are in working order at Valenciennes, together with the blowing engines, gas cleaners, and accessories. The open-hearth plant is nearly restored, the mixer is under repair, and the blooming mill and reversing mill are in course of installation, while the other mills are on order.

At Louvroil there only remains the brickwork of the blast furnace mantles to be completed, the bricks being already available. The steel works is in course of erection and the foundations for the new mixer are in. The blooming mill proper is ready and its extension and bar bank in hand. The power station has been restored to its pre-war capacity and its enlargement arranged for. The 350-mm. and 280-mm. mills, as well as the 280-mm. tin plate mill, are on order, and the buildings themselves nearly ready. The electrical machinery is also on order. The gas producers, the reheating furnaces, and the machine tool equipment remain to be completed.

Conclusions

From this short account the following facts emerge:

1. The destruction of the large works in the Nord and in the eastern districts of France was not due to the war alone. The destruction was deliberate, systematic, and thorough. This applies equally to works situated along the front.

2. The reconstructional energy has been admirable and widespread, and despite financial difficulties arising out of the incomplete peace treaty, the works are, little by little, resuming their activities.

3. In the course of their reconstruction the works have been modernized. The objects of the enemy have thus been frustrated and the future industry has an outlook as prosperous and promising as that of victorious France as a whole.

Discussion

There was no discussion, properly speaking, on this paper, but the author exhibited a number of striking lantern slides showing the condition of various plants before and after devastation. He emphasized the systematic and scientific nature of the destruction. In some cases plants were removed entirely to German territory, but they were brought back and re-erected on the original sites after the armistice. In rebuilding, the opportunity was taken to adopt improved practice whenever possible, and great improvements had been made, for example, at the Senelle-Mauberge works.

Sir Hugh Bell said he had seen the whole of the battle line at Easter, 1919, from the Belgian coast to Verdun, and it was extraordinary what destruction had been done over a length of 400 miles and a depth of 20 to 30 miles. French enterprise and courage had now, two years later, accomplished remarkable things, and he offered, on behalf of the institute, sincere condolences and sincere congratulations on the way France had tackled her reconstruction problems. He thought it was not desirable now to cast our eyes back to the past, but rather to look forward to the future. Sir Hugh then announced that news had been received of the death in Russia of Prof. Dimitris Tschernoff, the veteran metallurgist and an honorary vice-president of the institute, and the members rose in their places and paid a silent tribute to his memory.

An Investigation of Hot Drawing on the Mandril

The secretary then read a paper by Eugène Schneider, with the above title, which was not discussed. Although full of mathematical equations, it is of considerable practical value, and its conclusions should permit of a rapid and certain determination at sight on all the elements of drawing. The trial tests can be done without fear of any incidents, and the operation giving the best efficiency for a specific product with hydraulic machines of specified duty can be obtained. Under these conditions the method of working will no longer be empirical. All engaged in drawing hollow blanks should study the original paper. The following practical considerations are mentioned therein:

In a general manner it is better to keep a little below the maximum elongation obtainable. We can avoid the surprises which may be caused by large differences of temperature, and which we will enumerate below:

(*a*) Slowing down of the press can produce break-down, or, in case of limited power, the blockage of the blank in the die and on the punch.

(*b*) Signs of break-down in drawing of the blank, giving a diameter often smaller than that allowed for.

(*c*) Staving of bottom of blank due to the retaining of the temperature in this thicker region. This accident is especially to be feared with punches very conical at the end, and in that case it is advisable to keep well below the maximum elongotion. To insure this, the maximum elongation corresponding to the thickest part of the wall should be adopted.

(*d*) Contraction of the mouth of the blank, which is to be feared especially in the case of long and thin blanks, where the section is very cold when it arrives on the die.

(*e*) Erosions and striation of dies, which are principally produced with blanks at a low heat.

Dies should have, as nearly as possible, the ideal section indicated in the paper and should be very smooth and very hard. Certain kinds of chilled cast iron with dressed surfaces give good results. The surfaces of blanks must be well cleaned outside and inside before drawing.

The dies must be abundantly lubricated with black grease. It is well to heat them at low temperature before putting in service, and to be sure of their perfect support in the die-carrier.

The punches require every care both as to finish and quality. The tensile strength should be 65 to 70 kg. per square mm., and tool marks or erosions should be avoided, as these greatly diminish the life.

The spraying after each press should be done regularly on all the surface and on the greatest length possible, in such a way as to avoid deformation.

Apply a mixture of tallow and black lead, or of grease with black lead, carefully over the punch before drawing, in order to prevent the blank adhering to it, and to facilitate the detachment.

When the blanks have very thick bottoms the die should have a diameter slightly greater or equal to the external diameter of the bottom. It often occurs that when a blank is very eccentric it turns to the drawing without the die having touched it; if it is thick the torsion is often very important.

When a blank has an internal diameter appreciably larger than that of the punch, the roughed blank must be treated very regularly; if not, the drawing tends to create more elongation in the hot part, which often diminishes the thickness and creates an eccentricity which did not exist before drawing.

A table in the paper gives some examples of drawings in several dies. This procedure enables very large total elongations to be obtained. It is to be especially recommended in the case of blanks with very weak sides, and with some quick presses. The pass must be divided

out in such a manner that the work must be greatest at the first die and decrease successively on the others. This method of operation also allows the stroke of the press to be reduced and diminishes the wear on the last die, which has only light work to carry out.

Mechanical Properties at High Temperatures

An excellent piece of research work, carried out in the laboratory of the Compagnie des Forges de Chatillon Commentry et Neuves-Maisons at Montluçon by E. L. Dupuy, of Paris, was presented under the title "An Experimental Investigation of the Mechanical Properties of Steels at High Temperatures."

The author, to begin with, for the purposes of the investigation, took the values of the breaking stress and contraction of area as characteristic of the mechanical properties at various temperatures. The results obtained appear to show that the mechanism of fracture is not the same at different temperatures.

The figures obtained cannot therefore be taken as invariable measures of the same phenomenon: it is necessary to regard the curve representing the breaking load or the contraction of area not as a single curve exhibiting a certain number of singularities, but as a series of different curves, plotted one with another on the same diagram. The observed phenomena are therefore fairly complex, for besides the temperature and the composition it is necessary to take into consideration the nature and physical structure of the elements constituting the aggregate. To sum up, steels can be divided as follows:

1. Below A1 (and having A2 as their limit):

Dead soft steel: ferrite which undergoes deformation by cleavage before fracture.

Hypo-eutectic steels: only the ferrite undergoes appreciable deformation; fracture takes place when the pearlite areas come into contact with each other.

Eutectic steels: fracture almost without any deformation.

Hyper-eutectic steels: brittleness due to the presence of cementite.

2. Austenitic region:

No matter what the carbon percentage is, the γ-iron is entirely plastic.

3. Region comprised between A1 and A2:

The plasticity increases with the proportion of γ-iron.

4. Region comprised between A2 and A3:

Fracture almost without deformation owing to the low proportion of γ-iron and the brittleness of iron in the β region.

5. Intervention of the liquidus:

Sudden and simultaneous fall in the breaking stress and the plasticity.

Discussion

Colonel Belaiew drew attention to the very high temperatures used and said it was important to get, as the author had done the mechanical properties over 1200 deg. C. The results obtained were very much what it was expected they would be, but it was important to have the author's experimental confirmation.

Professor Guillet pointed out the value of studies of this kind in view of the need for alloys resistant to high temperatures in modern engineering developments, especially in internal combustion engineering.

Dr. W. H. Hatfield said that at the Brown-Firth research laboratory they had examined practically all the ordinary steels at the higher temperature, with pretty much the same results. He drew attention to the fact that the tables of data on which the author's curves were based were not published. This was always desirable, as some authors were inclined to produce remarkable curves from very few determinations. M. Dupuy, interposing, said he had made 40 to 60 determinations for each curve in the case of each steel. Dr. Hatfield said this was excellent and the paper was very valuable, indeed, especially if considered in relation to M. Schneider's paper on hot drawing.

Heat Treatment Curves

A paper on "The 'Characteristic Curves' of the Heat Treatment of Steels," by Albert M. Portevin and Pierre Chevenard, was introduced by the latter author. Its nature may be indicated by quoting the opening paragraphs:

At the outset of a quantitative investigation of the influence of cooling, it should be pointed out that recent researches on the hardening of steel have led to the establishment with, in this instance, great accuracy, of the mutual relationship which exists between the two fundamental factors of all heat treatment—the temperature of heating and the rate of cooling.

The final condition being a function of these two variables, it is easy to see the interest attaching to plotting a graphic representation of the result of a treatment by taking, for any given steel, these variables as co-ordinates. This method leads, as the authors will presently show, to the establishment of what they have termed the "characteristic curves" of the heat treatment of the steel in question. Such curves not only combine, within a single diagram, the fundamental data of every possible heat treatment, but they also afford a means of defining accurately the annealed and hardened states of the particular steel, and therefore constitute the basis and indispensable preliminary of every treatment properly carried out with a particular object.

In order that such a graphic representation may be plotted properly, it is necessary that the values from which it is built up shall be susceptible of numerical definition so as to be capable of measurement. The authors will therefore first describe how they evaluate the rate of cooling and how they define the final state, that is to say, the result of the treatment.

The authors proceed to describe their methods, to give some examples of characteristic curves, and to indicate the utility of such curves in heat-treating problems.

Discussion

Professor Guillet related some quaint old recipes for hardening steel and pointed out the advantages of researches such as that of the authors for insuring regular conditions of heat treatment.

Sir Robert Hadfield said he had seen the apparatus of M. Portevin at the Ecole Polytechnique and it was the finest apparatus for the hardening of steel he had ever seen.

Sir Hugh Bell said excellent results were obtained by the old empirical metallurgist, who knew exactly what he was doing, although he did not know why he was doing it.

The business sessions then concluded with the usual votes of thanks, discussion by correspondence being invited on the following papers:

N. T. Belaiew: "Damascene Steel."

K. Honda: "Does the Critical Point Depend on the Strength of the Magnetizing Field?"

A. M. Portevin: "On Constituents Found in Tungsten and Molybdenum Steels."

A. M. Portevin and V. Bernard: "A Contribution to the Study of Coalescence."

H. W. B. Swabey and R. Genders: "Manufacture of Shells in Canada During the War, 1914-1918."

A deputation of the institute visited the cemetery of Passy and laid a bronze wreath on the grave of the late Sidney Gilchrist Thomas, and in the afternoon parties of members left Paris to visit various industrial centers and inspect iron and steel plants.

Strike Declared Illegal

The Massachusetts Supreme Court, in a final decree in the case of the Springfield Foundry Co., Springfield, Mass., against the officers and members of the International Molders' Union of North America and local union 127, has ruled that the purpose of a strike beginning Jan. 14, last, against the individual contract system was "for an illegal purpose." The decree perpetually restrains the union from conspiring against the company to achieve the closed shop; from compelling the company to abrogate its individual contract; from molesting the company employees; from picketing, and from interfering with the business of the company, or "by the payment of strike benefits or other emoluments to any person for the purpose of maintaining a conspiracy against the plaintiff."

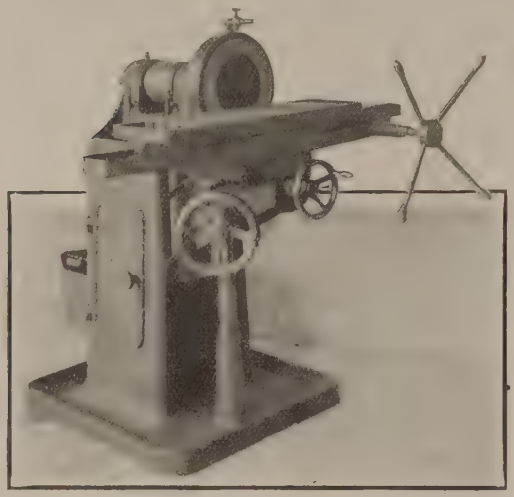
The Royal Typewriter Co., Hartford, Conn., recently sold a consignment of typewriters to the Russian Government, compensation being in sealskins, sables and other furs instead of money. The company has disposed of the furs in Argentina and other South American countries.

Knee-Type Ring Wheel Grinding Machine

A recent development in grinding machines for the rapid and accurate production of flat surfaces is being offered by the Graham Mfg. Co., Providence. The machine is a species of surface grinder, the cutting being done on the face of an abrasive ring.

As shown in the accompanying illustration the machine bears a general resemblance to a plain milling machine. The head, however, is separate from the column; the spindle is arranged for high speed, and the table is moved backward and forward by a pilot wheel resembling that of a screw machine.

An interesting feature is to be found in the method of varying the surface feed of the abrasive ring. A ring of heavy section is used the face of which can be quickly dressed to give any width of cutting surface and from 4200 to 5100 ft. per min. range on 1780 r.p.m. The outside diameter of the abrasive ring shown is 12



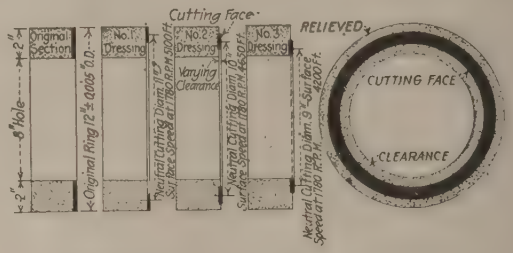
in.; the inside or hole, 7 in.; leaving a face 2½ in. wide. Grinding is usually done, however, on a face from ¾ to 1½ in. This cutting portion will not always be at the outer diameter, and with a ring dressed to 1 in. and located next to the hole, the neutral cutting diameter is 8 in. This is another method of varying the surface speed, permitting also, it is said, the use of a ring section of great strength. Dressing is readily accomplished as there is ample accommodation on the table for the holder especially designed and which uses commercial truing devices. The height of the ring when new is 3 in., and wears down to ½ in. or less. A number of rings may be required, depending on the variety of the work.

In a general way the machine as shown can be rated as having a capacity of 6 x 12 in., no width dimension being necessary as it is unlimited across the table. The top of the table will rise to center, and drop 7 in. The extreme travel of the table is 16 in., and can be moved back 3½ in. from the cutting face. Ordinarily the head is set over just enough to give clearance and although this is not sufficient to give a concave surface, concaving can be done if desired. Sometimes the head is set perfectly straight, which is said to increase greatly the capacity of the machine.

The head is cast separately and bored to receive bushings which in turn carry the outer races of Timken roller bearings. The front bushing is tight and placed to reduce the overhang as well as to reduce the effect of heat changes from temporary shut downs. The rear bushing has a close sliding fit and is pushed by a spring to automatically take up end motion and wear. Further adjustment is by a castellated nut and cotter. The spindle is of low-grade tool steel, ground to take the bearings, and has a collar shrunk on and machined to take the abrasive ring holder. Felt-packed dust collars protect the running parts and glass oilers indicate the height of lubricant. The abrasive ring holder is of pressed steel, accurately machined and well balanced. The abrasive ring is clamped by drawing a cone-shaped ring into a taper in the body and an adjustment flange screwed upon a large hub sets out the ring as it becomes worn.

The table block sits on the knee and has gibs fitted for movements in two directions, being also fitted with an adjustable nut that takes the cross-feed shaft and hand wheel. This is indexed in thousandths and regulates the depth of cut. The table is moved by means of pinion and rack. The drive is by belt from countershaft or from motor on the ceiling or wall. A motor may be mounted on a bracket at the back and attached end-to-end to the grinder spindle by a flexible coupling. Other arrangements of motor drive may be furnished.

The height to the center of the spindle is 42 in. and floor space 6 ft. square is required for operation. The power required is from 5 to 15 hp., the speed being 1780 r.p.m. giving 3700 to 5200 ft. per min. on neutral surfaces from 8 to 11 in. in diameter. The table work-



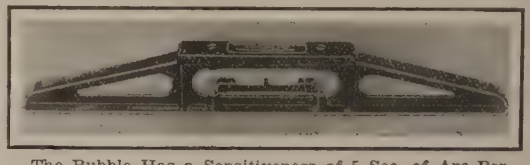
The Surface Speed of the Abrasive Ring Is Varied by Dressing the Face to Any Width of Cutting Surface, As Shown Above. The machine is shown at the left

ing face is 10 x 24 in. Many modifications of the machine can be made such as table design, magnetic chuck, special holders, automatic cross and table feeds and others.

Precision Machine Alining Level

The Universal Boring Machine Co., Hudson, Mass., has placed on the market a precision machine alining level, which, in design and construction, is said to be a departure from the usual instrument of its class. The frame is of cast iron, of truss construction, and the leveling surface or base, 27 in. long.

The vial used is the best Jena glass, specially ground and is contained in a japanned brass case, which, in turn, is mounted on two brass studs, lacquered, one at each end, being held in place by two locknuts working against each other. On one end of the case there are



The Bubble Has a Sensitiveness of 5 Sec. of Arc Per Graduation

two cross adjusting screws that work on the stud. Adjustments in the same manner as of level vials on surveying instruments are thus permitted. The bubble in the vial has a graduated sensitiveness of 5 sec. of arc per graduation, equivalent to showing per graduation on the vial a variation of 0.00029 in. per ft. The vial is stationed on the level casting in a manner that provides additional protection from breakage. The level casting is insulated from the palm of the hand by means of a rubber composition handle. Because of the extreme sensitiveness of the vial, unusual care is exercised in finishing the level casting. The base is not wet-ground finished as usual, but the leveling surface is first planed. All holes are then drilled, following which the casting is allowed to season for one full month under cover. It is next hand scraped and carefully tested, and finally the vial is adjusted. The level completed weighs 9¾ lb.

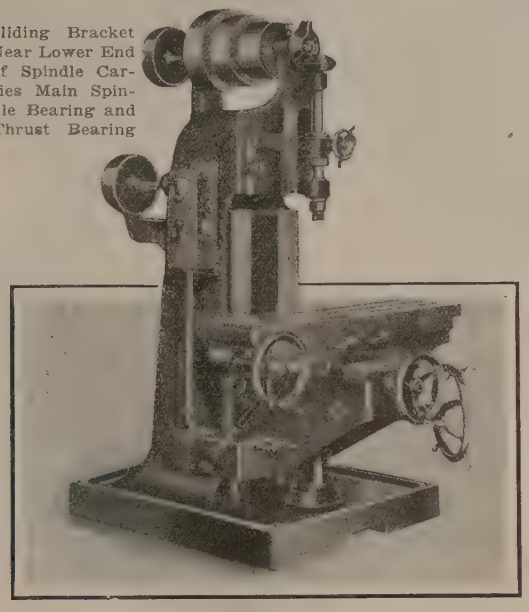
The Wickwire-Spencer Steel Corporation, Spencer, Mass., division recently awarded 14 cash prizes to employees for the best kept yards in Wire Village.

Vertical Milling Machines

Four new machines have been added recently to the line offered by the Jackson Machine Tool Co., Jackson, Mich. They are the 5A and 6A, and the 10A and 10B vertical spindle milling machines, designed for production and die-sinking purposes.

The 5A and 6A machines are very much the same as the company's No. 5 and 6 die sinkers previously offered, except that they are not equipped with the cherrying attachment. The spindle has a vertical movement, manipulated by hand power through mechanism which permits of both hand feed and rapid traverse. Near the lower end of the spindle there is a vertically sliding bracket called the spindle housing which carries both the main spindle bearing and the thrust bearing. This is operated for slow feed by the handwheel at the right and for rapid traverse by the spoked pilot wheel. A slight turn of a small knurled hand wheel engages or disengages the slow feed, which when disengaged leaves the rapid traverse free to operate. The spindle and housing is counterbalanced by a weight inside the column. A micrometer stop is provided for determining the depth of cut and vertical position of the spindle. The spindle housing may be clamped in position for a longitudinal or transverse cut when the proper depth is once obtained.

The distance from center of spindle to face of column in both machines is 14 in., the cross travel of table 13 in. and the vertical travel of spindle, 5 in. In the 5A machine the longitudinal travel of the table is 32 in., vertical travel of table, 17 in. and surface of table



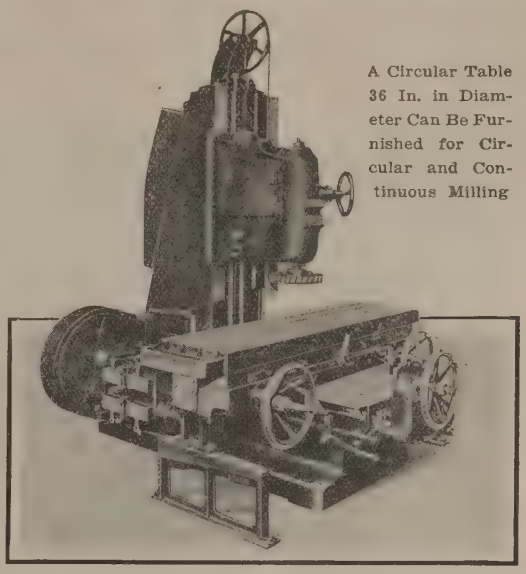
Sliding Bracket Near Lower End of Spindle Carries Main Spindle Bearing and Thrust Bearing

13 x 40 in. The corresponding dimensions in the 6A machine are 40 in., 21½ in., and 13 x 48 in., respectively. The spindle speeds are given as 50, 80 and 125, and the taper hole in spindle, No. 11 B. & S.

The 10A and 10B machines were designed for machining large, flat surfaces rapidly and with close accuracy. These machines are practically the same as the No. 10 die sinker except that the head carrying the vertical spindle and cherrying mechanism has been removed and a head carrying a heavy vertical milling spindle substituted. The distinguishing feature of the 10A and 10B machines is in the feed. The No. 10A has a table and cross-rail feed ranging from 0.001 in. to 0.015 in. per revolution of the spindle, while the No. 10B machine has a range of feeds from 5/16 in. to 16 in. per min. regardless of the speed of the spindle. All feed changes are controlled at the feed change box on the right hand side of the base.

Inside the head there is a back gear arrangement whereby 13 changes of spindle speed, from 8½ to 310 r.p.m. are obtained. A pull-pin lever on the lower left hand side of the head is used for quickly shifting from direct to back gear. All other changes of speed are from the speed change gear box on left hand side of the base. The lower end of the vertical spindle has a flange, integral with it, 6½ in. in diameter, with a ¾ in. keyway across the face of it, and two holes for securing and driving large cutter heads. It also has a 13/16 in. diameter hole throughout its length for a draw-in bolt and a No. 13 B & S taper hole at the bottom end.

A circular table 36 in. in diameter can be furnished for circular and continuous milling. The specifications



A Circular Table 36 In. in Diameter Can Be Furnished for Circular and Continuous Milling

include: vertical movement of head, 24 in.; distance from center of spindle to face of column, 18½ in., working surface of the table 18 x 72 in.; longitudinal travel, 56 in., and cross travel, 18 in. The size of motor required is 10 to 15 h.p.

Unemployment in the Valleys

Employment conditions in the Mahoning and Shenango Valleys are still far from stable. Youngstown managers of charitable agencies estimate that half a million dollars will be needed to aid the unemployed and their families during the coming winter. The Community Corporation, the governing agency for about 25 charitable and philanthropic institutions, estimates that fully 2500 families in Youngstown and environs will need food, clothing and shelter this winter. Conferences of leading manufacturers have been held with municipal authorities to discuss ways and means to alleviate conditions and to aid the unemployed.

Ordinarily about 45,000 workers are employed in Mahoning Valley industrial plants. It is estimated that less than 10,000 are now permanently employed, while the number who are working regularly or intermittently is placed at 23,000. Less than 8000 are wholly unemployed, it is claimed, due to the fact that many men who formerly worked in iron and steel plants have obtained work in road building, in construction or have gone to other sections.

The situation with respect to Youngstown's foreign colony is regarded as especially serious, because of the fact that many workers have large families. Many have been compelled to live on their savings, with the result that savings deposits in financial institutions have shown sharp decline within the past nine months.

New Castle, Pa., plant of the Carnegie Steel Co., which has been down tight since early summer, will resume operations shortly. Two blast furnaces at this works are being warmed up preparatory to blowing in and as soon as sufficient iron is available the steel works and bar mills will be started up. Big demands upon the American Sheet & Tin Plate Co. for sheets, have necessitated the starting up of the New Castle plants to provide that company with sheet bars.

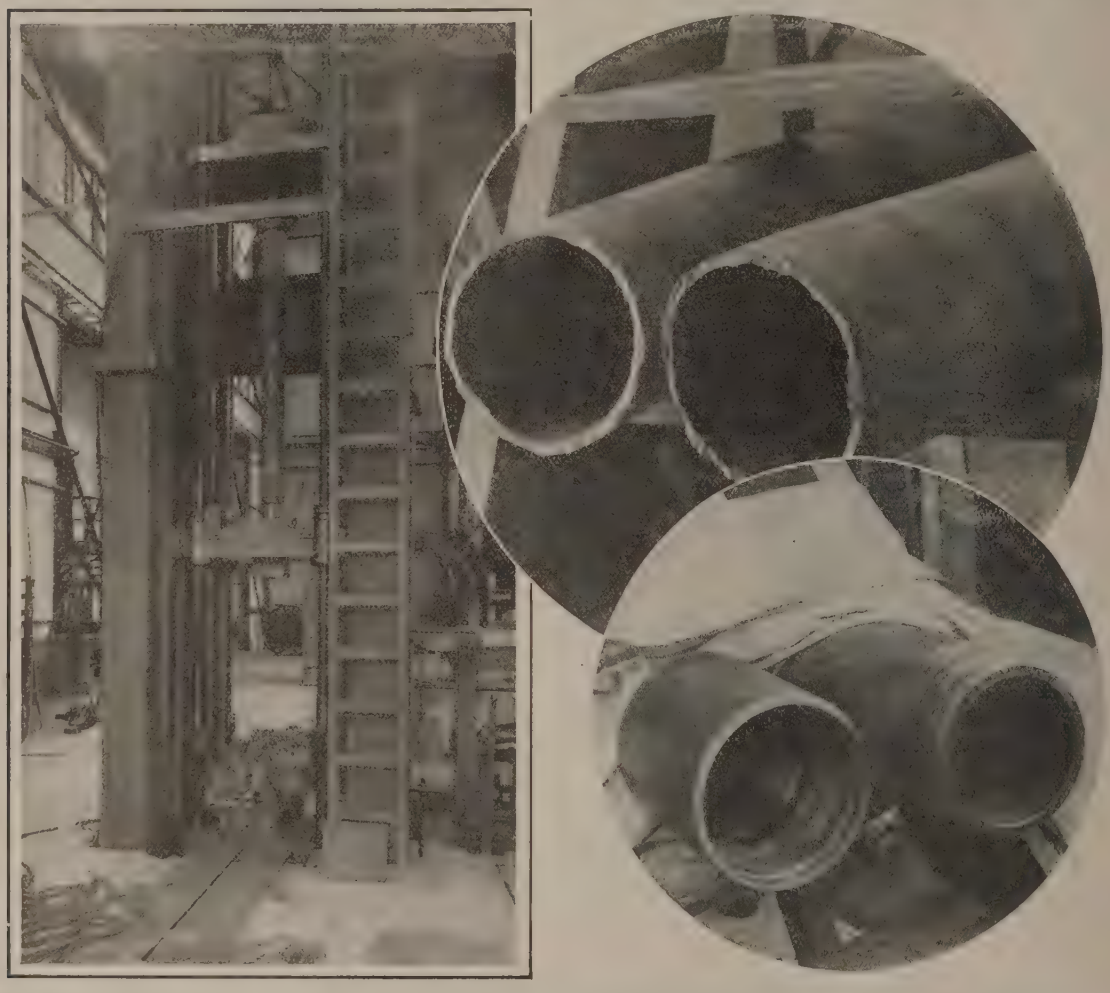
TESTS OF ROTARY DRILL PIPES

Deeper Threading Necessary to Develop Full Strength of Pipe

BY A. H. STANG*

A number of rotary drill pipes for oil wells and oil well casing pipes have recently been tested in tension at the Pittsburgh Branch, Bureau of Standards. It is thought that the results of these tests may be of interest to the steel industry since very few such test results have been published.

Each of the pipes tested was a standard 6 ft. length, threaded at both ends with standard pipe threads and provided with couplings into which were screwed special steel adapters by means of which the pipe length was attached to the 600,000-lb. testing machine, as shown in the accompanying illustration.



Pipe No. 1 was a seamless iron pipe, upset at the ends so that the effective area of material at the root of the threads was greater than in the body of the pipe. Drop of beam of the testing machine occurred at 172,000 lb. and the maximum load sustained was 317,900 lb. The pipe failed near the center of its length, after considerable necking down, showing a fairly even break, as in the illustration. Pipe No. 2 was of steel, with upset ends very similar to those of pipe No. 1. The drop of beam value for this specimen was 322,000 lb. and the maximum load sustained, 534,000 lb. The pipe had begun to neck down, but at this load one of the couplings pulled off the pipe. The tops of the threads of both the pipe and the coupling were sheared off but the threads were by no means stripped. The radial contraction in the pipe, due to the applied load, had evidently been so great that the coupling was able to slip off over the tapered threads of the pipe with little damage to either set of threads. The other coupling was so loose, after the failure occurred, that it could be turned off the pipe by hand. Fig. 3 shows the condition of the threads in the pipe and in the coupling at the conclusion of the test. Pipe No. 3 was also of steel, the ends of which were not upset. No drop of beam value was obtained, for one of the couplings pulled off at a load of 182,000 lb. The failure was very similar to that of pipe No. 2.

The other pipes were designated as oil well casing pipes, ends not upset, and were tested in a similar manner. All threads were cut on a taper of ⅝ in. per ft. All but one of them failed, as did pipe No. 2 and a further detailed description of each test is not considered necessary, the accompanying table giving the data obtained.

The manner of failure of these pipes raises the question whether the threads used for such large pipe were properly designed. From these few tests it would seem that a deeper thread is necessary in order to develop the full strength of the pipe.

Results of Tension Tests of Pipes Used in Oil Wells

Pipe No.	Diam., In.	Weight, Lb. Per Ft.	Material	Threads, Per In.	Maximum Load, Lb.
1	6	23½	Iron	8	317,900†
2	6	23½	Steel	8	534,000*
3	6	23½	Steel	8	182,000*
4	5⅝	17	Iron	11½	168,400*
5	5⅝	17	Iron	11½	153,400*
6	5⅝	17	Iron	11½	137,760*
7	5⅝	17	Iron	11½	126,000*
8	10	40	Iron	10	314,000*
9	10	40	Iron	10	217,300*
10	10	40	Iron	10	194,000*
11	10	40	Iron	10	265,860*
12	10	40	Iron	10	387,800‡

*Coupling pulled off the pipe.
†Broke at center of pipe.
‡Pipe broke just within the lower coupling.

*Associate physicist, Bureau of Standards, Pittsburgh. The article is published by permission of the Director, Bureau of Standards.

Expects Great Revival of Business

Cabinet Officer Predicts Unprecedented Business—Is Well Informed as to Iron and Steel—Dr. Julius Klein Denounces Dismal Stories as to Export Trade

BY L. W. MOFFETT

WASHINGTON, Sept. 27.—With the unemployment conference meeting in Washington arranging preliminaries looking to definite plans to relieve the labor situation, and a tone of increased optimism expressed in Government circles as to the business outlook, there is a general feeling that once American industry has been revived to a stable basis, it will enter upon broader activities than ever before. Recognition is given to the fact that considerable time may be required before normal conditions are restored, but there is a growth of cheerfulness over the gradual improvement being made in the basic industries, including iron and steel. While it is conceded that the struggle back to healthy operations may be a difficult one, confidence is expressed that their resumption will mean unusual activity not only in the domestic market but in foreign trade as well.

A Cabinet officer whose duty requires him to keep in close touch with the industries of the country, and whose judgment as to the iron and steel situation is accepted as being unusually sound, last week gave it as his firm conviction that it is only a matter of time, the length of which he said he would not attempt to estimate, when this basic industry, taken as the barometer of trade, would see an unprecedented revival of business.

Demand for Steel

Referring to the expansion in the capacity of steel output, this official gave it as his opinion that this will be more than taken up by such sources as foreign markets, material required to maintain the American merchant marine, for general purposes of reconstruction and the way of new requirements calling for the use of steel instead of other materials. Admittedly, foreign trade is lagging, as is pointed out by Walter S. Tower, head of the Iron and Steel Division of the Bureau of Foreign and Domestic Commerce, who says that the present outlook for exports during the remainder of the year shows little or no prospect for a larger tonnage than that of the past four months. The view is held, however, by Government officials that once recovery has been made from depression in foreign markets the iron and steel industry will enjoy a larger trade from those sources, and, as is well known, it is making preparations looking to this end.

Director Klein's Prediction

Dr. Julius Klein, director of the Bureau of Foreign and Domestic Commerce, in an address last Friday night before the Boston Export Round Table, vigorously denounced dismal stories from supposedly well informed business experts regarding the utter collapse of American export trade, partly for inland manufacturers, because of demoralized banking and transportation facilities, supplemented by struggling European competition. He asserted vigorously that American interests will hold their own in those markets and trades in which they have a real abiding interest. He pointed out that the past few months of anxiety have certainly been a trial by fire, "but those months have emphatically not revealed any inherent weakness in our foreign trade efforts and ambitions in spite of the alarmist reports and propaganda of many who unintentionally, or otherwise, are retarding our recovery from the present slump.

The director deplored the spirit of "nationalism" which he said, has been permeating practically every country of the globe, resulting in obstacles to American foreign trade in the shape of preferentials and subsidies to home industries, with heavy surtaxes and prohibition upon foreign goods. He said that "the precarious state of many foreign budgets and the imperative demands for economies and price reductions will require early and drastic modification of such expensive artificial stimulants to trade and that the guidance of international trade by sound business principles depended largely upon their removal."

Is Germany a Terror?

In speaking of what he called "the exporter's pet terror, German competition," the director cautioned that it takes more than price cutting to win and hold an export market permanently. Quality, delivery terms, and credit arrangements are three vitally important business factors and these should be taken into account in analyzing vague reports concerning German success. He said that the latest reports received in the Department of Commerce indicate a fundamental change from the pre-war qualities of German goods due to serious shortages of raw materials, industrial equipment, and skilled artisans. Even the much feared advantage of the German exporter in his depreciated mark exchange is of doubtful value, especially in industries requiring the purchase of non-German raw materials.

"It is well to remember, furthermore," said Dr. Klein, "that as her exports increase the value of the mark will automatically rise, although this return toward normal will be retarded by cash indemnity payments. Before the war, American merchandise was sold all over the world by German distributing houses. Now American merchants are taking care of their own sales, thereby depriving Germany of one of the keystones of her foreign trade structure. In the course of time, Germany will doubtless get back to her pre-war status as third, perhaps even second, among the rivals for various important markets," said Dr. Klein, who added "that it would be well to remember in accomplishing this feat she will be facing a very different America from that which confronted her before the war."

Latin-American Conditions

Turning to Latin America, the director first called attention to Cuba which he said was the best market in all of Latin America for American goods, taking about 36 per cent of our total exports to that region. The present depression in our Argentina trade, said Dr. Klein, is due mainly to the exchange situation which Argentina is experiencing in marketing its surplus agricultural and pastoral products. He said conditions are improving in that country. In some respects the Far East presents a more hopeful picture of reviving trade prospects than other overseas markets.

In closing, the director called attention to the preparations now under way for the provision of more effective and practical service to the sadly harassed exporters of the country by the Department of Commerce. He spoke of the 15 new commodity divisions, each in charge of an experienced executive whose especial duties will involve the establishment of direct contact with exporters and manufacturers on one hand and with the conditions and problems in their overseas markets on the other. He also mentioned the new division of Foreign Commercial Laws, the new Transportation Division, the change in *Commerce Reports* from a daily to a weekly publication and the reorganization

of the Government's foreign trade promoting machinery generally.

Gloomy Reports Not Justified

Gov. W. P. G. Harding of the Federal Reserve Board, in an address last week at Charlotte, N. C., said gloomy forebodings of last winter with respect to the banking situation are no longer justified. He stated that "the corner has been turned and we have passed the most acute stage of the readjustment period."

Greatest Need

Expressions of the Government officials regarding American opportunities for the maintenance and development of foreign market confirm those which have been made by farsighted business itself. As to the domestic market, the Cabinet officer who commented particularly on the iron and steel situation, pointed out that the greatest single need is for the resumption of a buying movement by the railroads of the country. It is felt that this is being retarded by delay on the part of Congress in taking up the railroad refunding bill. Some satisfaction has been derived, however, from the action of large financial interests in purchasing railroad equipment and trust certifications. The railroads are in pressing need of steel and it is believed that the decline in prices would prove attractive to them if they possessed the purchasing power and induce them to come into the market. It is stated that repairs for cars alone will take a large quantity of steel, figures showing that while ordinarily 5 per cent of the railroad rolling stock is in need of repair, at present 17 per cent of the railroad freight cars of the country are out of repair.

Concerning the statement with regard to steel requirements to maintain the American merchant marine, it was declared that the repairs alone for these ships will take more steel than was required for the complete construction of American vessels before the war. It was assumed, as a matter of course, that an adequate American merchant marine will be maintained, the statement being made that unless this is done, talk of developing a satisfactory export trade for America is absolutely idle.

New Line of Motor Driven Grinding Machines

A line of alternating current motor grinders of the type shown in the accompanying illustration has been recently developed by the J. G. Blount Co., Everett, Mass. The machines are built in three sizes: ½ hp. with 8 x 1 in. wheels; 1 hp. with 10 x ½ in. wheels, and 2 hp. with 12 x 1½ in wheels.

Among the salient features are SKF ball bearings in dust-proof mountings; bearings secured to the shaft by a light drive fit and locknuts; high carbon steel

The Starting Switch Is of the Textile Snap Type

spindles ground to size and adjustable rests of one piece. The flanges are machined all over, the inner flanges being pressed to the shoulder of the spindle. The tool tray and water pot are separate and detachable. Motors are of Westinghouse design, with starting switch of the textile snap type mounted on the motor facing the operator.

The machines are regularly equipped with grinding wheels, one coarse and one fine. Exhaust guards can be supplied in place of plain guards, if desired.

The Advance-Rumely Co., Laporte, Ind., manufacturer of agricultural machinery, has put in effect a 20 per cent reduction in wages in the oil pull and foundry departments. The working hours have been increased from 36 to 55 a week.

Specifications for Steel Forgings

Among the eleven standards of the American Society for Testing Materials now before the American Engineering Standards Committee, 29 West Thirty-ninth Street, New York, for consideration and approval are:

Specifications for Carbon Steel and Alloy Steel Forgings (A18-21).

Specifications for Quenched and Tempered Carbon Steel Axles, Shafts and Other Forgings for Locomotives and Cars (A19-21).

Specifications for Carbon Steel Forgings for Locomotives (A20-21).

Specifications for Quenched and Tempered Alloy Steel Axles, Shafts and Other Forgings for Locomotives and Cars (A63-21).

Specifications for Carbon Steel Car and Tender Axles (A21-18).

Specifications A18-21 for carbon steel and alloy steel forgings are general specifications covering the various classes of carbon steel and alloy steel forgings, on which the other specifications have been based with the addition of special requirements to suit the conditions of use. In submitting these specifications for approval by the American Engineering Standards Committee, the American Society for Testing Materials has presented data listing the companies, etc., that use them in their entirety or as general specifications upon which have been based other specifications suited to the particular needs. These specifications have been translated by the Department of Commerce into French and Spanish in connection with the development of foreign trade.

The American Engineering Standards Committee would be glad to learn from those interested of the extent to which they make use of these specifications and to receive any other information regarding the specifications in meeting the needs of the industry. The committee also has before it for approval the method adopted by the American Society for Testing Materials as standards for the analysis of manganese bronze (B27-19) and for the analysis of gun metal (B28-19), and desires to learn from those interested the extent to which these specifications are used and any other details concerning them.

American-flag vessels carried 39 per cent of our exports by weight and 72 per cent of our imports by weight in the year ended June 30, 1921, according to data furnished the Bureau of Foreign and Domestic Commerce by the records and information section of the Shipping Board, says E. S. Gregg, chief of the Transportation Division of the Bureau. The percentage of imports carried in American bottoms is high because of large shipments of crude oil brought in by tankers belonging to domestic oil companies. Of the total foreign trade of 96,084,582 long tons, 52 per cent was carried in our ships.

American Society for Steel Treating

Heat Treatment Problems, Alloy and Tool Steels and Other Subjects at Third Annual Convention — The Exhibition

CONSIDERING the prevailing industrial depression, the third annual convention and exhibition of the American Society for Steel Treating in Indianapolis, Ind., last week was a distinct success. There was a large attendance of members and visitors, officially estimated at 9000 for the five days. The registration of members was reported at about 1475 out of a total of over 3200. The technical sessions were all unusually well attended. The exhibition was held in the spacious auditorium of the exposition building at the Indiana State Fair Grounds and the technical sessions in the Woman's Building close by. Featuring the entire meeting was the elaborate program of entertainment prepared by the Indianapolis chapter.

Two new honorary members were elected at the regular meeting of the board of directors. They were Dr. John A. Mathews, president Crucible Steel Co. of America, New York. and Elwood Haynes, Kokomo, Ind., pioneer in the development of the automobile and inventor of stellite.

Technical and Other Sessions

A WEALTH of technical and general papers was provided for the meeting—over 70 on various subjects. Only a few were actually presented at the sessions, the remainder being offered by title and all of them to be printed for the first time in the society's *Transactions*. The sessions were all handicapped by the fact that the papers were so long that an adequate presentation consumed too much time, or because the brief abstracts prepared in printed form were insufficient, and as a result a free and beneficial discussion was in most cases impossible. As a whole the papers were of a higher order than previously. For the first time simultaneous sessions were attempted. There were also one or two sessions of a special nature.

Session on Carbonizing

A group of papers devoted to carbonizing problems was presented Tuesday morning, Sept. 20, when Dr. J. C. Hartzel, consulting metallurgist, Cincinnati, presided.

The first paper was by S. C. Spaulding, metallurgist Halcomb Steel Co., Syracuse, N. Y., on "A Comparison of the Rate of Penetration of Carbon into Various Commercial Steels in Use for Case Carbonizing." The steels investigated comprised plain carbon, cold rolled, chrome-silicon-manganese, chrome-vanadium, 3.50 per cent nickel, 5 per cent nickel, two types of chrome-nickel and a chrome-molybdenum. Test bars were run for periods of from 5 to 50 hr. at 1600 and 1700 deg. Fahr., allowed to cool in pots and then the depth of case measured. Some of the typical test pieces were given different heat treatments to show their effects on case and core. Time penetration curves for each steel and each temperature were given and a combined sheet showing all steels plotted to same co-ordinates for one temperature. From his investigations Mr. Spaulding indicates the superiority of the chrome-nickel and chrome-molybdenum steels in so far as rate of penetration of carbon is concerned. Chrome-vanadium and chrome-silico-manganese come next, then straight carbon with the nickel steels last. This would indicate nickel to be a retarding agent when present alone, but a helping agent when present with chromium. The difference between cold rolled and hot rolled straight carbon steels shows the retarding effects of high phosphorus and high sulphur. He found vanadium in percentage of 0.17 to be of no effect in the rate of penetration of carbon. From the standpoint of microstructure the tests indicate the superiority of the alloy steels over the straight carbon. They are more easily refined by single treatment and much superior after double treatment. Chrome-molybdenum steel appears to be an exception to this in that its case is not readily refined by either single or double treatment.

Alloy Carbonizing Boxes

C. M. Campbell, superintendent Pioneer Alloy Products Co., Cleveland, discussed the question, "Do Alloy Carbonizing Boxes Pay?" The author considered some of the factors governing the life and performance of carbonizing boxes, such as critical point at or below average atmospheric temperatures; low co-efficient of

New Officers of the American Society for Steel Treating: President, F. P. Gilligan; First Vice-President, F. C. Lau; Second Vice-President, R. J. Allen; Treasurer, J. V. Emmons. The present secretary, W. H. Eisenman, was re-elected

expansion and contraction at high temperatures; good elastic limit and ductility at high temperatures; tendency to resist carbon absorption up to and including temperatures of carbonization of steel, and resistance to oxidization. Resistance to warping and cracking seems to depend largely upon the first two factors and is independent of the shape of the box. Lack of grain growth is also important. The alloy which seems to possess most of these features is one having a nickel base with some chromium and iron. Attempts are being made to produce alloys of iron and chromium (iron base with chromium and silicon 1.5 to 3.5 per cent) in order to produce a medium priced box. These alloys resist oxidization as well as nickel, chromium, iron alloys up to 2000 deg. Fahr., but they will crack at from 600 to 1200 furnace hr., while the alloy which meets the five conditions mentioned stands up 1800 furnace hr. and better, depending on size and shape of box. Figures were given, taken from actual experiences, which tended to show that increasing the number of furnace hours, which a box will stand up, decreases the charge per furnace hour against the work. The suggestion was also made that carbonizing boxes might be supplied by centralized warehouses as a means of reducing the cost. In the discussion, it was brought out that alloy boxes can be made much lighter than hand cast iron boxes, thus saving a great deal of labor on the part of the workmen.

Carbonizing With Charcoal

H. Schagrin, chief chemist U. S. Naval Ordnance plant, Charleston, W. Va., described some of his experiences in "Carbonization with Wood Charcoal." The pieces used were inexpensive drop forgings of acid Bessemer steel. No precautions were taken as to the mesh of charcoal used, it being a mixture of powdered with pieces up to 30 mesh. The procedure followed was to place a layer of charcoal to a depth of one inch on bottom of carbonizing box, pack in one layer of forgings about 12 in. long as closely as possible and cover with charcoal, adding another layer of forgings and repeating the operation until about even with top of box. The forgings when allowed to cool in the box showed a silvery color indicative of very little surface oxidization. A good portion of the charcoal was consumed by air leakage, but this does not mean that air came in contact with pieces to be carbonized. The boxes were all charged when the furnace was at a temperature of 300 deg. Fahr. The object of the test was to determine the amount of penetration that takes place at 1400 and 1500 deg., and at excessively high temperatures, say 2000 deg. Fahr. From photomicrographs shown it was evident that carbonization actually began at 1450 deg., after being in furnace 1½ hr., and at 1950 deg. it was possible to secure a penetration of 1/16 in. for about 1½ to 2 hr. carbonizing period.

The paper was quite freely discussed. V. E. Hillman, Worcester, Mass., stated that he had made some experiments with wood charcoal but the results were disappointing, without the use of energizers. Answering a question, Mr. Schagrin said that various kinds of wood charcoal were used, including hickory and pine. It was necessary to heat higher with wood charcoal in order to get penetration, and that temperature was a very important factor. Free cementite was very pronounced at 2000 deg.

H. H. Harris, president General Alloys Co., Chicago, read a paper illustrated with lantern slides on the "Design of Heat Treating Containers." The author also discussed the question of the ratio of compound to the work treated and suggested that efforts be made to determine how much compound is essential to the best work after given temperature and penetration are available. In designing containers a number of points should be kept in mind, including the dimensions of the parts to be treated, the dimensions of the furnace, the number of parts to be placed in each container, and the number of containers to be placed in each furnace; as well as the weight, wall section and conductivity of the containers, and methods of handling and cooling. It is also desirable to get the largest possible cubical box content into the furnace with due regard to flue space for heat circulation.

Session on Tool Steel

Tuesday afternoon's session was devoted to the reading of a number of papers on tool steel. The first was by A. H. d'Arcambal, metallurgist Pratt & Whitney Co., Hartford, Conn., on "Physical Tests on High-Speed Steel." The author described transverse tests at room temperatures and tensile tests ranging from room temperatures to 1200 deg., conducted on two types of high-speed steel, one an 18 per cent tungsten, 1 per cent vanadium grade, and the other a 14 per cent tungsten, 2 per cent vanadium grade. Different hardening treatments were given the specimens, and after being tested the fractures were examined, samples file-tested and photomicrographs made. The transverse tests showed that samples quenched from a high temperature and drawn to 1100 deg. Fahr. possessed the necessary hardness and gave a high fiber stress, showing almost double the strength of specimens quenched from the same temperature and not drawn. Quenching into a bath at 1100 deg. Fahr. and not drawing gave about the same fiber stresses and exactly the same microstructure as samples quenched into oil and not drawn. Tensile test specimens quenched from a high temperature and drawn to 1100 deg. Fahr. showed the maximum tensile strength when pulled at 600 deg. Fahr. Specimens quenched from the high temperature and not drawn gave about 70 per cent of the tensile strength of samples quenched from the same temperature and drawn to 1100 deg. Fahr. before being tested at room temperature. The higher vanadium type of steel gave lower transverse tensile readings than the 18 per cent tungsten grade.

A. E. Bellis, Bellis Heat Treating Co., New Haven, Conn., discussed the "Influence of the Heating Medium on Structural Changes in Steel," and A. W. F. Green, metallurgist John Illingworth Steel Co., Philadelphia, read a paper on "Preparing Tool Steel at the Mill." L. K. Marshall, metallurgist North East Electric Co., Rochester, N. Y., described the methods employed by his company in a paper, "Tool Steel Manipulation." Discussion of the latter paper brought out a number of interesting points in regard to the efficiency of the spark test, which it appears is becoming quite commonly used in checking various types of steel.

Session on Heat-Treating Problems

One of the most important papers presented was delivered by E. J. Janitzky, metallurgist Illinois Steel Co., South Chicago, Ill., entitled "A Contribution to the Problems of the Influence of Mass on Heat Treatment." The author takes as a basis an investigation conducted by the British Engineering Standards Association on a 0.45 per cent carbon steel and on the test results of this he has conducted a mathematical analysis which he claims makes it possible to predict or determine the hardness of various sections of carbon steel depending on the heat treatment. That is, by the application of mathematical principles to these data "it is possible to correlate hardness with the diameter of heat-treated bars both in the quenched and drawn condition. From the equations thus established it is possible to predict the hardness of bars of any given diameter when given heat treatments used in these experiments." The author answered a number of questions and added that he had found also that his mathematical formulae or equations worked equally well on nickel steel and on nickel-chrome steel.

"Coarse Grained Forgings: Their Detection and Correction," by L. S. Cope, sales engineer Dannemore Steels, Inc., New York, was presented by the author. An abstract follows:

"Many forgings fail due to the fact that they possess a very coarse grain structure. The manufacturer of the forgings blames the steel maker for this condition while the steel manufacturer in turn blames the heat treater. As a matter of fact it is the forger who is to blame in a great many cases. Methods of detecting coarse grained forgings are discussed. Several well known methods are possible but all involve the destruction of the forgings. The author, however, has hit upon a method which does not destroy the

product and which may be used on a production basis. It consists in dipping polished portions of the forgings in dilute nitric acid, and noting the appearance of the wiped surface. This, however, does not put a stop to the production of coarse grained forgings. Coarse grained structure in forgings may be greatly reduced by the use of annealing and normalizing operations on pieces which must be heated to very high temperatures to properly carry out the forging process and the intelligent designing of forging furnaces."

W. J. Priestley, superintendent hot metal division United States Naval Ordnance Plant, Charleston, W. Va., read a brief abstract of his paper on "Fracture Tests on Steel to Determine Its Quality," which describes an inexpensive fracture test for steel forgings, blooms, billets or bar stock for locating flakes, slag, blow holes, or pipes, etc. The author also gives results of physical tests which substantiate the data disclosed by such fractures.

Sessions on Alloy Steel

There were two sessions on alloy steel which were combined into one on Thursday morning, Sept. 22.

Molybdenum Steels

At this session H. J. French, physicist Bureau of Standards, Washington, read an abstract of his paper "The Effect of Heat Treatment on the Mechanical Properties of a Carbon-Molybdenum Steel and a Chrome-Molybdenum Steel." A summary of the important results of the paper is as follows:

In a steel containing 0.27 per cent carbon, 0.90 per cent chromium, and 0.50 per cent molybdenum, the Ar_1 transformation is first split and lowered when cooling from 960 to 1000 deg. C (1760 to 1830 deg. Fahr.) at about 0.15 deg. C (0.27 deg. Fahr.) per second, the low point being observed at about 480 deg. C (895 deg. Fahr.). In water quenching from the highest temperature, a lower hardness is obtained than when similarly cooling from 960 deg. C (1760 deg. Fahr.). In this respect the chromium-molybdenum steel behaves similarly to steel containing 0.20 per cent carbon and 1.00 per cent molybdenum except that the observed changes are produced from higher temperatures.

In normalizing the chromium-molybdenum steel, a low limit of proportionality and impact resistance are obtained when using temperatures between about 780 to 845 deg. C (1450 to 1550 deg. Fahr.). The fact that no material changes in tensile or impact properties are produced by oil quenching the chromium-molybdenum steel from a wide range of temperatures when subsequently tempered at 540 deg. C (1000 deg. Fahr.) has been confirmed. To produce high impact values in the hardened steel, a tempering temperature in the neighborhood of 650 deg. C (1200 deg. Fahr.) is required.

In a steel containing 0.20 per cent carbon and 1.00 per cent molybdenum, for each maximum temperature of heating there is a critical rate of cooling which will lower Ar_1. The higher the initial temperature the slower is the rate of cooling required to produce the lowered transformation but by whatever combination this is produced the position of the "low point" is fixed within a narrow temperature range about 525 deg. C (975 deg. Fahr.). Its suppression can readily be brought about, however, by increasing the rate of cooling.

A high temperature transformation is observed slightly above and almost merging with Ar_3 when the steel is cooled from temperatures at or above 960 deg. C (1760 deg. Fahr.) at a rate of temperature change approximating 0.15 deg. C (0.27 deg. Fahr.) per second but is not observed when cooling at a much faster rate. Ar_3 is fixed at about 760 deg. C (1400 deg. Fahr.) independent of the maximum temperature of heating or rate at which the steel is cooled.

The most suitable temperature from which to harden the steel is in the neighborhood of 910 deg. C. (1670 deg. Fahr.). Free ferrite is found after quenching from 830 deg. C. (1525 deg. Fahr.), but the observed changes in mechanical properties with rise in quenching temperature within this range cannot be explained by known changes in carbon or iron, by differences in the rate at which the steel passes through the critical ranges resulting from changes in initial temperature of cooling, by unsatisfactory hardening or by the lowered Ar_1 transformation (except as related to a molybdenum change), for they are opposite to the changes found in plain carbon steel under similar conditions of treatment.

For the production of definite tensile strength, water quenching is to be preferred on account of the higher proportional limit, ductility and impact values obtained and conversely better tensile properties are obtained for a given impact resistance.

Raising the quenching temperature from 910 deg. C. (1670 deg. Fahr.) to 980 deg. C. (1795 deg. Fahr.) does not materially alter the mechanical properties of the steel when subsequently tempered at a relatively high temperature, 540 deg. C. (1000 deg. Fahr).

Toughness of High-Speed Steels

A paper, "The Toughness of High Speed Steels as Affected by Their Heat Treatment," was presented by M. A. Grossman, metallurgist Electric Alloy Steel Co., Youngstown, Ohio. The investigation was conducted in order to determine the best treatment of two high-speed steels of common analysis to attain the greatest toughness for certain thin section cutting tools. The Charpy impact machine was used. The author has found that there is a certain quenching temperature slightly below the proper-hardening range for which the steel is brittle on being quenched and acquires no toughness on being drawn up to 1100 deg. Below this quenching range, drawing imparts toughnes but lowers the hardness. Above that range drawing at 1100 deg. imparts toughness while at the same time developing secondary hardness. The toughness and hardness tests were carried out on the same test pieces. The data show that the development of secondary hardness in the proper hardening range is accompanied by an acquiring of toughness which may properly be called "secondary toughness" and that just below the proper hardening range there is a range of temperature which, while giving good hardness results in the steel being brittle and remaining so even with subsequent drawing to 1100 deg.

Nickel-Silicon and Other Steels

C. M. Johnson, director of research Park Works, Crucible Steel Co. of America, Pittsburgh, read in abstract his paper on "Some Alloy Steels of High Elastic Limit, Their Microstructure and Heat Treatment." The results of heat treatment and physical tests on a series of nickel-silicon steels, the same steels containing small percentages of chromium and vanadium and other modifications with other elements such as titanium, zirconium, tungsten and molybdenum.

"The Mechanical Properties of Some Chrome-Vanadium Steels" by J. S. Vannick, metallurgist research laboratory Department of Agriculture Washington, was presented briefly by the author who discussed three groups of steel: One containing 0.30 to 0.40 per cent carbon, 0.14 to 0.20 per cent vanadium with chromium varying up to 14.50 per cent; a second one with 0.30 to 0.60 per cent carbon, chromium 1.00 per cent and vanadium ranging from none to 0.65 per cent, and a third containing 0.15 to 1.20 per cent carbon, 1.00 per cent chromium, and 0.20 per cent vanadium.

Lantern slides of curves and photomicrographs were used for all these papers and for the presentation of many of the papers at other sessions.

A Non-Ferrous Session

An unlooked-for phase of the program was a brief session on special products. "Dow Metal and Its Applications" was the title of a paper by J. A. Gann, research department Dow Chemical Co., Midland, Mich. This alloy is one of magnesium with aluminum and its early history was outlined in an article in THE IRON AGE. This new paper, by curves showing the variation in physical properties of these alloys with increasing aluminum content, clearly indicates that alloys of widely different properties are readily obtained and that for many purposes the best combinations of physical properties are obtained with 6 to 12 per cent aluminum. These alloys are susceptible to heat treatment, the relative effect on the physical properties depending on the percentage of aluminum. Photomicrographs in the paper readily explain these facts and others.

"Brass Forgings" were discussed in a paper by H. L. Hess, the H. L. Hess Co., Philadelphia, which presents one of the most recent developments in non-ferrous metallurgy. The author discusses the machinery used in producing non-ferrous forgings and the possibilities of the finished product.

Two other papers on this program were "Duralumin," by W. B. Stout, president Stout Engineering Laboratories, Detroit, and "Heat Treatment of Copper

and Brass," by F. L. Helrigel, metallurgist Motor Products Co. Detroit.

Sessions on Equipment

The commercial phase of the program was embraced by two sessions devoted to papers on heat-treating equipment. Nine papers were on the regular program for presentation, most of which were delivered, while there were eight papers presented by title.

Special Sessions

Two programs were carried out which were of a special nature and not distinctly technical.

One of the Thursday morning sessions was conducted as an Army and Navy program. F. C. Langenberg of the Watertown Arsenal, Watertown, N. Y., described the methods employed at that plant on its heat-treating department, particularly the methods of routing material, and Mr. Branden, of the chemical warfare service, discussed some of the recent developments in that service. Commander Leary delivered an interesting account of the mine barrage laid in the North Sea during the war and of the work of the navy railroad batteries in France, using moving pictures. Films of the recent bombing of the ex-German destroyers, cruisers and the battleship Oestfriesland were shown.

Research was the subject of a special program on Friday morning at which the following prominent speakers appeared: Prof. C. A. Adams, Harvard University, and chairman of the division of engineering, National Research Council, "National Aspects of Research"; Lt.-Col. A. E. White, director department of engineering research, University of Michigan, Ann Arbor, Mich., "What the University Owes Industries"; E. P. Hyde, director of research Nela Research Laboratory, General Electric Co., Cleveland, "Field Industrial Research," and G. K. Burgess, chief division of metallurgy, Bureau of Standards, "The Role of Government Laboratories in Industrial Research," this being read by H. J. French in the absence of the author.

The Exhibition and Other Features

BECAUSE of the general condition of business the exhibition was not the success which characterized the one last year at Philadelphia. There were, however, more exhibits under actual working condition than at the two other exhibitions and the attendance was large each day. A list of the exhibitors and their exhibits appeared in THE IRON AGE, Sept. 15, and that program was carried out. About 23 industrial plants threw open their places for inspection during the week and the invitations were liberally responded to.

Delegates to the convention from the various chapters held several meetings at which business and other matters pertaining to the welfare of each and all the chapters were freely discussed. One committee was appointed to formulate plans to increase the interest and the attendance at the meetings of the various chapters.

The question of the place for the next convention and exhibition will be decided soon, invitations having been received from Chicago, Pittsburgh, Buffalo, Newark and Boston.

The Banquet

Nearly 400 members and guests attended the annual banquet on Thursday evening in the Riley room of the Claypool Hotel. The society's retiring president, Lt.-Col. A. E. White, presided, and after a round of vaudeville and other entertainment numbers, the evening was turned over to the toastmaster, Dr. Albert Sauveur, professor of metallurgy, Harvard University, who introduced first Governor McCray of Indiana and Mayor Jewett of Indianapolis. Following these were Dean A. A. Potter, dean of engineering, Purdue University, who spoke on "The Engineering Society and Public Service," and Prof. Comfort A. Adams of Harvard, director of engineering division, National Research Council, whose subject was "Co-operation in Engineering Research." Howard E. Coffin, vice-president Hudson Motor Car Co., Detroit, and member of Naval Advisory Board, taking as his subject "Our Air Policies and the National Defense," delivered a thrilling account of recent developments in aircraft, closing with a moving picture reproduction of the sinking of German submarines and battleships recently by bombs dropped from army flyers. He asserted that such destruction was easily accomplished despite efforts in certain high quarters to minimize the achievements.

Officers for Next Year

At the opening session on Monday afternoon, Sept. 19, after an address of welcome by the mayor's representative and a response by W. R. Chapin, chairman of the convention committee, and by Lt.-Col. White, the president, new officers for the ensuing year, elected by a referendum vote were announced as follows:

President—F. P. Gilligan, secretary-treasurer, Henry Souther Engineering Co., Hartford, Conn.

Vice-President—F. C. Lau, consulting metallurgist, Chicago.

Second Vice-President—R. J. Allen, metallurgist, Rolls-Royce Co., Springfield, Mass.

Treasurer—J. V. Emmons, metallurgist, Cleveland Twist Drill Co., Cleveland.

Secretary—W. H. Eisenman, Cleveland (re-elected).

Directors—J. J. Crone, Philadelphia, E. J. Janitzky, South Chicago; H. J. Stagg, Syracuse; and A. E. White, University of Michigan, Ann Arbor, Mich., the retiring president.

In retiring from the office of president, Colonel White, after reviewing the work of the society for the year, said that research work in the field of steel treatment is a great one and that experts should be kept in it. "Our research committee," he said, "had been attempting to find itself and to prepare recommendations relative to future activities. The situation is not one, essentially, of finding work, but rather one of finding money with which to do work. It is a dream of your president, though he had not yet broached this matter to the directors, that the time will come when our convention and exhibition will net the society a sufficient sum that our research committee may have funds available with which to do work."

The report of the retiring treasurer, W. S. Bidle, Cleveland, showed an excellent financial standing, with debts all paid and a substantial amount to the credit of the society.

Slight Improvement in Pennsylvania

Reports from the district employment offices of the Pennsylvania Department of Labor and Industry indicate a slight improvement in the industrial conditions of the State. The unemployed total, however, is placed at 288,940, which is only a few thousands less than the previous report covering conditions as of Sept. 1. Recalling of railroad employees, miners and a few steel workers has contributed to the betterment in the situation. Many of the miners and railroad men who were recalled had been employed at other work and have thus made places for those who were without work. Opening of schools and colleges has taken a few men from jobs and created openings, but the effect so far has been almost unappreciable. The majority of the offices carried large enrollments of college men who desired work for the summer, but in most instances were unable to place them. The estimates of the unemployment in the various districts as of Sept. 15 follow: Altoona, 17,585; Erie, 15,675; Harrisburg, 13,300; Johnstown, 13,640; McKeesport, 4915; New Kensington, 6050; Philadelphia, 126,000 (women's office, 12,150); Pittsburgh, 58,800; Scranton, 15,225; Williamsport, 5000.

At a recent conference between officers of the Phoenix Horseshoe Co., Joliet, Ill., executives of the Amalgamated Association of Iron, Steel and Sheet Metal Workers and employees, a wage controversy, pending since July 1, was amicably settled. A reduction of 26 per cent on a tonnage basis and a cut to 30c. per hr. for laborers were agreed upon. The 8-hr. day was abolished and ten hours with no overtime substituted.

Fuel Requirements of Steel Mills Analyzed

Solid, Liquid and Gaseous Fuels Discussed with Relation to Their Fitnesses for Many Uses—Limitation Outlined and Safeguards Suggested

BY F. E. LEAHY*

FUELS are available in solid, liquid and gaseous forms.

SOLID

Coal { Lump, Slack, Pulverized } Coke { Metallurgical, Domestic, Coke Breeze }

LIQUID

Oil Tar

GASEOUS

Natural Gas—By-Product Gas—Producer Gas—Blast Furnace Gas

Economic considerations include transportation, storage and distribution. In general, requirements include fuels for boilers, blast furnace hot blast stoves, heating furnaces, soaking pits, metallurgical furnaces and general utilities.

Steel mills have probably a more varied fuel requirement than any of the other large industries, and fuel is utilized in various operations in nearly every existing form. The quantities required are large, and the availability and handling of the fuels are the determining features in economical operation.

In this paper I will endeavor to outline some of the peculiar requirements of steel mills, and the reasons why it is desirable to use a certain kind of fuel in each of the various steel mill operations. This paper will apply more generally to a plant consisting of blast furnaces, steel producing furnaces and rolling mills.

Of the total quantities used, fuel in the solid form, as coal or coke, is in most cases the largest consumed; that in the gaseous form second, and lastly, that in the liquid form. The latter two forms may interchange, due to peculiar economic features existing in the district in which the plant is located.

Coal, Its Inspection and Uses

Coal is consumed in the operation of boilers, heating furnaces and gas producers. All coal received at the plant should first be satisfactory to an inspector. He should report as to the grade and physical qualities, noting the quantities of bands, ribs or slate contained; also the sizes, to provide against injury to the crushing equipment which may occur when large lumps of slate are carried with the coal into the crusher. It is a good practice, and general practice at many plants, to have a classification by chemical analysis in addition to the inspection, in order to determine its proper use in boilers, heating furnaces or gas producers.

When coal is to be used in gas producers, supplying gas for open-hearth furnaces, a limit should be placed on the amount of sulphur and ash in the coal. This should be done, on account of the sulphur affecting the metallurgy of the furnaces, and the ash affecting the operation of the producer itself.

If the fusing point of the ash is low, there is danger of the ash clogging the producer and slowing down the operation by preventing the air from passing uniformly through the fuel bed. Also, the producer may be of such capacity that, in the 24-hr. period in which it is making gas, the space might be insufficient to take care of the ash in the coal. Any coal containing ash above this amount will fill the producer before the normal cleaning time, and the producer must either be immediately cleaned or a delay experienced.

Coal, after being inspected and analyzed, is generally delivered to the conveying equipment, to be raised to the crusher bins. After being crushed to a given size, the coal is passed through screens where the slack is separated from it, and the screened coal delivered to the producer plant, while the slack is sent to the boiler house. If it be desired to supply heating furnaces with crushed coal, the shipment is usually made from the crushers, sized as desired, for the purpose. For heating furnaces it may be either slack or screened coal, depending on the firing equipment used.

By proper supervision and care in the distribution, a varying grade of coal may be received and economically utilized. This, of course, presupposes that coal will be paid for according to quality. At times it will be found that coal billed as lump is more nearly run of mine; with the proper vigilance, however, this can be brought to the attention of the proper authorities and the payment adjusted.

Where and How Coke is Used

Next in importance, from the standpoint of fuel consumption, is coke. This is used in blast furnaces, cupolas and kilns. It should be carefully selected, so that a uniform product may be obtained where it is used. While its use is not as diversified as coal, the large quantity consumed would seem to require that proper supervision be given to its selection.

In many plants the coke as received is passed through screens and graded before it is used. It is usually graded as follows: the large size (all that will not pass through a 1-in. mesh screen) is classified as furnace coke and the small size (all that will not pass through a ½-in. mesh screen) as domestic coke. The residue, after screening domestic coke, is called coke breeze.* Domestic coke is used to a limited extent in cupolas, and where the supply is in excess of the demand it is sold to the surrounding public for use in domestic heating furnaces. Coke breeze in the average plant is usually quite small in amount, and is generally consumed in making bottoms in soaking pits, or burned on special grates as boiler fuel.

In some plants coke breeze is no longer produced in a negligible quantity. A more careful screening of the coke has resulted in the production of an increased amount of coke breeze. In consequence this fuel is brought into more prominence, and financial returns justify the installation of the equipment necessary for its utilization under boilers.

Gaseous Fuels Ideal

Fuel in the gaseous form is adapted to meet the demands of any of the diversified requirements of steel plants. The supply of natural gas is now far below the demand, and has almost disappeared from the steel mills. Natural gas at one time was the standard for all open-hearth plant operation, but due to lack of supply has now been almost eliminated for all metallurgical furnaces, except in isolated cases where the amount used is small. This fuel was the most satisfactory of all the gaseous fuels, and met every requirement.

In changing from natural gas to a substitute many difficulties were encountered, which were gradually overcome until to-day this fuel has been replaced without any handicap to the metallurgical operation. By-product gas is fast becoming a satisfactory substitute for natural gas. When debenzolized by-product gas was used through the same lines and burners as those previously used for natural gas, difficulty was at first experienced. In open-hearth furnaces objections were made, when this fuel was used alone, to its lack of

*Fuel and experimental engineer, Carnegie Steel Co., Duquesne, Pa. The paper was presented before the Association of Iron & Steel Electrical Engineers, in convention at Chicago.

*Sometimes spelled "braize."

luminosity. To overcome the absence of illuminants in the gas, tar or oil in addition was burned simultaneously with the gas.

Some plants have been experimenting with the burning of by-product gas in open-hearth furnaces without tar or oil, and have been able to dispense with their use and get the desired results with by-product gas alone. The products of combustion of by-product gas and natural gas are so nearly alike in analysis that it is difficult, from the theoretical standpoint, to understand why they cannot be used interchangeably. The density of by-product gas is approximately one-half that of natural gas and many of the objections to by-product gas are attributed to the fact of its being relatively lighter. Some operators state that such gas tends to rise, and destroy the roofs and brick work of the furnaces.

Producer Gas and Its Producer

The next fuel gas in point of attractiveness, when by-product gas is not available, is producer gas. This gas is used in metallurgical furnaces, and with some changes in furnace construction can be used as a substitute for natural gas. It is used in the open-hearth and reheating furnaces, the results obtained varying in different plants.

Many difficulties can be traced to the gas producers themselves. In their selection care should be taken to provide ample capacity, and mechanical operation wherever possible. Many types on the market have mechanical pokers and coal feeders, as well as ash removal, leveling and rotating apparatus.

These features all have their advantages, and the manufacturers claim various results for them. In some cases published results of the performance of the producers are hard to duplicate in steel mill practice, as the results shown on these tests were secured from a better grade of coal than used in the steel plants. Any acceptance tests should be made on the same coal as that used in the plant. The producer should be operated at the capacity it is intended to operate in regular service, and the test be continued over a period sufficiently long to eliminate any chance of errors.

Care in the selection of the producer and in the design of the gas producer plant will give excellent operation of the open-hearth plant, with low fuel costs. The producer house should be located as close as possible to the open-hearth plant, and the connecting flues should be built overhead to facilitate the weekly cleaning, so that the time lost in cleaning flues will be reduced to a minimum. Some plants maintain continuous operation of their open-hearth furnaces during flue-cleaning periods by substituting by-product gas for producer gas on the furnace during that period.

In combined blast furnaces and steel works a large quantity of fuel is available, over that required for blast furnace purposes, in the form of blast furnace gas. In recent years study has been given to improving the efficiencies of all units consuming this fuel.

By the application of the waste-heat type of boiler, using this gas as fuel, efficiencies are obtained equal to that of any boiler fuel. In former practice, on account of the type of boiler used, which could not efficiently utilize this gas, due to the limited low initial temperature, the boiler practice was not good, as the efficiencies were low. Improved type fireboxes and burners equipped with regulating attachments have contributed largely towards obtaining and maintaining high efficiencies.

Without the use of economizers, some modern blast furnace gas-fired boiler plants now obtain in regular operation thermal efficiencies in excess of 75 per cent. Some years ago the average efficiencies obtained in steel mill boiler plants, burning blast furnace gas as fuel, did not average over 55 per cent. The economic returns possible are large, and many plants have already changed over to the more efficient type of equipment.

Gas Used in Hot Blast Stoves

The development of the modern blast furnace hot blast stove, with improved burner, has brought this type of blast furnace gas consumer up to efficiencies of 70 per cent, and in some cases better. The advances made in stove operation by this development may be realized when former records are examined and it is discovered that the efficiencies of the stoves, like the boilers, seldom exceeded 55 per cent.

Blast furnace gas used in modern blast furnace stoves with smaller checker openings must be cleaned. A few dry gas cleaners are now in use, and their designers claim for them cleaning equal to that obtained from wet washers. Whether dry cleaning or wet cleaning be used it is absolutely necessary, for the successful operation of these small checker opening stoves, that the dust in the gas be reduced below the point where it will deposit and clog the checker openings.

It has been the practice to require that, in wet washers, the dust content shall be reduced to not over 0.25 grain per cu. ft. The dry gas dust cleaning plant manufacturers assert that when the gas is dry cleaned, a dust content not over 0.50 grain per cu. ft. is sufficient. Before this can be positively decided it will be necessary to compare for a few years the results obtained from stoves now operating on dry cleaned gas with stoves operated on wet cleaned gas.

In gas engine practice, using blast furnace gas for fuel, is obtained the highest thermal efficiency. Blast furnace gas engines are installed for blowing blast furnaces and for power generation. Recent advances in the utilization of waste heat, by exhausting the gas engine through a waste-heat type boiler, have developed some interesting possibilities.

Liquid Fuels and Their Uses

Fuel is used in the liquid form as oil or tar, and the following instructions for its use apply: A storage tank should be provided of ample capacity for receiving and holding at least a 24-hr. supply. This tank should have a heating coil, so that the oil or tar may be maintained at the proper temperature to maintain fluidity. The lines through which the fuel is pumped should be insulated and heated. The usual practice is to run a steam line, inclosed with the oil or tar lines and covered by insulation common to both, to the point of consumption. Here should be a heater equipped with a steam coil. The temperature should be maintained constant at the temperature found by experience to give the best results.

To maintain a uniform temperature, in some cases the oil or tar is kept circulating through a closed circuit, but where the consumption is continuous this is not necessary. Suitable pumps should be provided, equipped with pressure regulating attachment, to maintain a constant pressure on the line. It is common to provide spare pumping capacity to guard against delay.

Various types of burners or atomizers are used; in the steel industry, steam atomizing is most generally resorted to. Very seldom is mechanical atomization used, the particular field for this type being in marine practice rather than land. The burners or atomizers are usually classified as internal or external mixing, according to their construction. For certain burners it is necessary to screen the oil or tar before using, to prevent clogging of the burner. Other burners are available, of such generous proportions that the oil or tar can be used as received without screening. Careful attention should be given to the design of the firebox in which this fuel is used, as a number of failures to secure satisfactory results have occurred where boilers were improperly arranged for the burning of liquid fuel.

General Summary

To summarize, steel mill fuel requirements are as follows: For boilers the general practice is to use slack, pulverized coal, blast furnace gas, coke breeze, tar, and under some conditions by-product gas. By-product gas is, of course, available only when the supply is in excess of the metallurgical furnace demands, usually only on Sundays and holidays, so that this gas is consumed only in negligible quantities under boilers. Slack is burned under boilers in either chain grate, overfeed or underfeed stokers, all giving quite satisfactory results, from the thermal efficiency standpoint. Pulverized coal can be applied to almost any boiler, provided the firebox is enlarged, and excellent

results are obtained. Blast furnace gas is burned under boilers of the waste heat type, with very good efficiency.

Coke breeze can be burned on certain types of chain grate stokers, which stokers are usually provided with an air blast, and the air can be controlled to the various sections of the stoker. Very good efficiencies can be obtained on this class of equipment. Good efficiencies are reported when using coke breeze mixed with coal on underfeed stokers, but as far as I know coke breeze has not been successfully used direct on chain grate stokers.

Blast furnace stoves are operated on blast furnace gas, and for high efficiencies, using stoves with small checker openings, it has been demonstrated that it is necessary to clean the gas.

Heating furnaces are fired with pulverized coal, or coal on either underfeed or chain grate stokers and on chain grates, very much the same as used in boiler practice. Where accurate temperature control and relatively high efficiency are desired, then it is more usual to apply a gas in some form to fire these furnaces. A heating furnace built on the regenerative plan is limited to the use of gas only.

Heating furnaces of the continuous type, equipped with recuperators and supplied with either a liquid or gaseous fuel, are the most highly developed efficient type of billet heating furnaces, from the fuel standpoint. Intermittent operation of the furnace, causing a sticking together of the billets, sometimes gives trouble, which may be reduced by careful attention of the heater to shut off the gas as soon as mill operation ceases. In this type of furnace the billets enter at the rear or coolest part of the furnace, and are gradually pushed forward to the front or hottest part, where they are discharged to mill tables.

Soaking pits are generally fired with either producer, by-product or natural gas. They are built on the regenerative plan and recent improvements in checker design and burner equipment have resulted in securing very good efficiencies.

Most of the metallurgical furnaces, as open-hearth furnaces, are of the regenerative type, and the fuel is either pulverized coal, producer, by-product or natural gas, or a liquid fuel.

Transportation is an important factor in the selection of various fuels, and all plants should be equipped with the proper track facilities to provide the necessary space for storage, and for shifting of cars. The storage supply must be designed to meet the plant requirements for a period sufficient to overcome irregularities in delivery. If the distance from the source of supply to the plant is short and transportation reliable, the storage capacity may be reduced correspondingly.

The general trend in the steel plants to-day is toward improvements that will show increased output and good economic returns, through the conservation of fuel, and the large advancement in improved methods of using fuel in the mills is following along such lines as will tend to conserve the energy commonly called waste heat.

PROPOSED LOWER RATES

Application of Transcontinental Bureau Will Soon Be Heard

WASHINGTON, Sept. 27.—Plans have been almost completed by the Interstate Commerce Commission for exhaustive hearings at a number of places regarding the so-called fourth section application of the Transcontinental Freight Bureau to lower rates on iron and steel and other commodities to Pacific Coast terminals. Specific reductions, averaging approximately 25 per cent, in proposed rates on all important iron and steel products from producing centers throughout the country, were stated on page 606 of THE IRON AGE of Sept. 8.

The application seeks to put the decreased rates to Pacific Coast points into effect without lowering those applying to intermediate points and it being a notable fact that interests in the Intermountain territory have always strongly combated this policy, it is believed that the forthcoming hearings will find them making a lively fight against the proposed reductions. The pending application is interpreted as a move by the carriers, one that has the support of the iron and steel industry, to re-establish conditions that brought about the well known Spokane case and its numerous appendices. It asks for authority to establish rates from so-called Eastern points of origin to Pacific Coast ports to meet competition through the Panama Canal. As a matter of fact, however, the points of origin actually extend as far West as Colorado, and include all iron and steel producing sections, so that the term "Eastern" is only relative.

Protestants against the granting of the application state that if granted it would restore operation of the "back haul" principle of making rates, which is opposed vigorously by Spokane and other intermediate interests. The carriers have contended for this principle on the ground that it is the way in which rates were originally made, for before the transcontinental lines were established, goods were brought from these so-called Eastern points to the Western ports by ships and then carried into the interior by wagons and other primitive transportation. The carriers point out that to require them to keep their rates at the interior points down to the level of the terminal rates would be to penalize them for having established through routes and supplying a superior service at lower costs than previously existed.

When ships disappeared from the Panama Canal route the commission, on complaint of the intermediate points, withdrew fourth section permission and required the alignment of rates in accordance with the letter of the long-and-short-haul section, divested of the proviso. Subsequently the Intermediate Rate Association asked that rates be graded from the intermediate points to the Western ports, but the commission, after service had been resumed through the canal, dismissed the complaint.

In one of the California interior terminal cases the commission modified the back-haul principle of rate making by authorizing the carriers to establish rates to the more distant points provided they would make rates at the intermediate points by adding to the terminal rates factors not higher than three-fourths of the local rates from the ports to the interior points. The pending application, hearings on which probably will begin soon in Chicago, proposes that the rates to the intermediate points be made by adding to the terminal rates the locals from the nearest terminals. The nearest terminal is defined in the application as the one having the lowest rate to the intermediate destinations, regardless of the actual mileage.

It is believed that the protestants will use as an argument against departures the fact that the transcontinental carriers on their Eastbound traffic have observed the terms of the long-and-short-haul part of the fourth section. They objected to the fourth section permission on Eastbound freight and won their fight, though it is pointed out that possibly this was due to the fact that the transcontinental lines were in a hurry to establish rates that would enable them to meet competition through the canal.

John B. Edgerton, president of the National Association of Manufacturers, will give a complimentary luncheon to Indiana manufacturers at the Claypool Hotel, Indianapolis, Oct. 13. There will be round table discussion of questions of moment to manufacturers, such as taxation, tariff, transportation, waterways, merchant marine, labor relations, etc., with the purpose of helping to devise common methods whereby the national organization can work for the betterment of all the industrial centers.

New Blast Furnace of the Crane Iron Works

Historic Iron Plant at Catasauqua, Pa., Modernized—Earliest Successful User of Anthracite Now Uses Coke as Fuel—Third Furnace on the Same Spot

BY RICHARD PETERS, JR.*

TOWARD the close of our Civil War, John Percy of the Royal School of Mines, London, gave to the iron making world his monumental work on the metallurgy of iron and steel, which for more than a generation was the leading authority on the subject. The author dwells at length on the anthracite furnaces in the United States, concluding with the statement that "the principal manufacture must always cling to the Lehigh and Schuylkill and Lower Susquehanna valleys in Pennsylvania, where the ore is abundant, the coal near at hand, the flux on the spot, where the whole land is a garden and therefore food cheap and labor plentiful, and the great sea ports not far off."

To a certain degree the prophecy of some sixty years ago has been fulfilled, although the changes brought forth by time and new methods have modified, to some extent, the broad assertions made. Of the districts mentioned by Percy, the Lehigh Valley has more nearly survived its promise, and while the anthracite coal used originally as fuel has been almost entirely replaced by coke from the western part of the State, and the local brown ores have given way to the Lake Superior hematites, yet the magnetites of New Jersey still remain as an important part of the burden of the furnaces in the Lehigh district.

The successful use of anthracite coal as fuel for iron smelting measured the start of the pre-eminent position which this country enjoys in the manufacture of pig iron. It is therefore of more than passing interest to note the recent completion of a modern blast furnace at Catasauqua, Pa., on the site of the pioneer plant which first produced pig iron as a commercial success with anthracite. By the rebuilding of the No. 2 furnace at its Crane Iron Works division, the Empire Steel & Iron Co. has made a noteworthy addition to the present reconstruction by American iron makers.

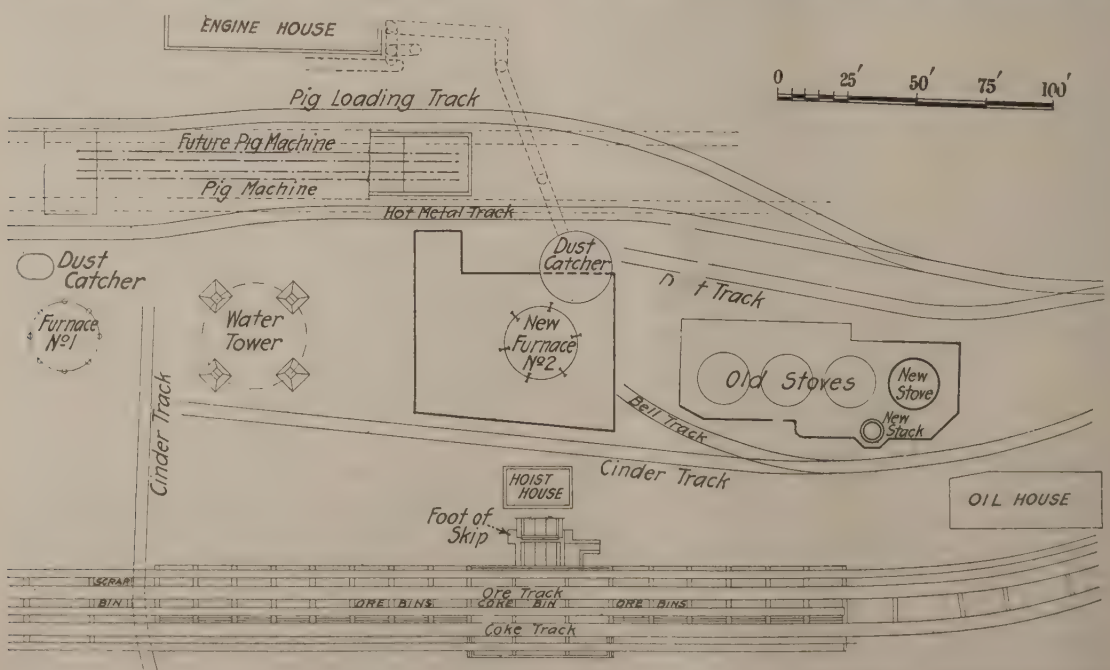
To comprehend more clearly the significance of the work, it is of interest to look backward over the history of this unit. In the period between 1825 and 1840, the iron masters of the eastern section of Pennsylvania made many attempts to smelt iron by using anthracite coal as fuel, but, with the exception of a three months' campaign at Pottsville in 1839, the results were commercially unsuccessful.

The Lehigh Coal & Navigation Co. was anxious to have established on its waterway iron works which would use its fuel. Its board of directors therefore passed a resolution, early in 1839, offering to give in fee simple all the water power of any of its dams between Allentown and Parryville, excepting that necessary for navigation purposes, to any company which would expend $30,000 in building iron works to smelt ores with anthracite as fuel.

Signifying its intention of accepting this proposition, the Lehigh Crane Iron Co., organized May 16, 1839, sent its representative, Erskine Hazard, to Wales to engage David Thomas, a practical furnaceman, to come to America to supervise the erection of a plant. Thomas had demonstrated the successful application of Neilson's hot blast to anthracite iron smelting at the Ynyscedwin Iron Works, in his native country. Upon his arrival, he immediately commenced the erection of the first furnace, a few miles from Allentown.

Construction work was attended by difficulties unknown to our present engineers, as in those early days there were no railroads in the Lehigh Valley, and few foundries or machine shops capable of making or handling castings of any size. A large part of the blowing apparatus was brought over from England, and

*Manager of sales Pulaski Iron Co.



Layout of the Main Portion of the Plant, Showing Location of the New Furnace and Its Appurtenances

even some of this had to be remade here, owing to the fact that a portion of it was too large to be taken into the hold of the vessel chartered for the purpose.

The original furnace was constructed of stone, of the usual type of the period, 30 ft. square at the base and 45 ft. high, with a 10-ft. chimney surmounting the furnace head. The bosh was 12 ft. in diameter, while the hearth tapered from 5 ft. 6 in. to 4 ft. 6 in. The hot blast oven, built on the ground, was arranged for coal firing, as no attempt was made in those days to bring the gases down from the open top of the furnace.

Blowing apparatus, consisting of two vertical iron cylinders, was worked by a pair of enormous wooden walking beams, bound with iron straps, which were driven by gears meshing into segments on the peri-

While the Blast Furnace (No. 2) Is New, from the Foundation Up, the Three Stoves Serving the Previous Furnace Were Retained. A fourth has been added, however, somewhat larger than its mates

phery of a breast water wheel 12 ft. in diameter and 24 ft. long.

After numerous delays, the furnace was lighted July 3, 1840, and the following day made its first cast of some 4 tons of iron. The enterprise being a success, the company erected a second furnace in 1843, using similar lines, but improving the arrangement of the hot blast by placing it near the furnace head. A third unit was built in 1846, giving the works a total weekly capacity of 420 tons.

Until 1855, when the Lehigh Valley Railroad was opened, all the raw materials for the plant were brought in by canal boats or by teams, and the dirt roads of the countryside must have swarmed with wagons draying in the local brown ores from the neighboring counties.

In 1880, No. 3 furnace having fallen down, it was determined to dismantle the original three stacks, leaving Nos. 4, 5 and 6, which were built in 1849, 1850 and 1868 respectively. Two new furnaces, designated as Nos. 1 and 2, were built in 1880 and 1885, and at this time Whitwell stoves were installed. These were built under the personal supervision of Thomas Whitwell, and were the first of this type erected in Eastern Pennsylvania. The furnaces were not of the modern type of shells resting on columns, but consisted of stone work supporting the boshes, with iron extensions, giving them the appearance of old fashioned railroad water tanks. The Crane Works were described by an early writer as a "noble pile," and old illustrations of the picturesque plant are hard to recognize as those of a smelting works.

In the early sixties the furnaces at Catasauqua probably constituted the largest single plant in the United States. Furthermore, greater production per furnace than was reached elsewhere was accomplished by the bold steps taken by Thomas, in blowing the stacks with higher blast pressure than had ever been previously attempted. An early writer, in commenting on Thomas' efforts, remarks:

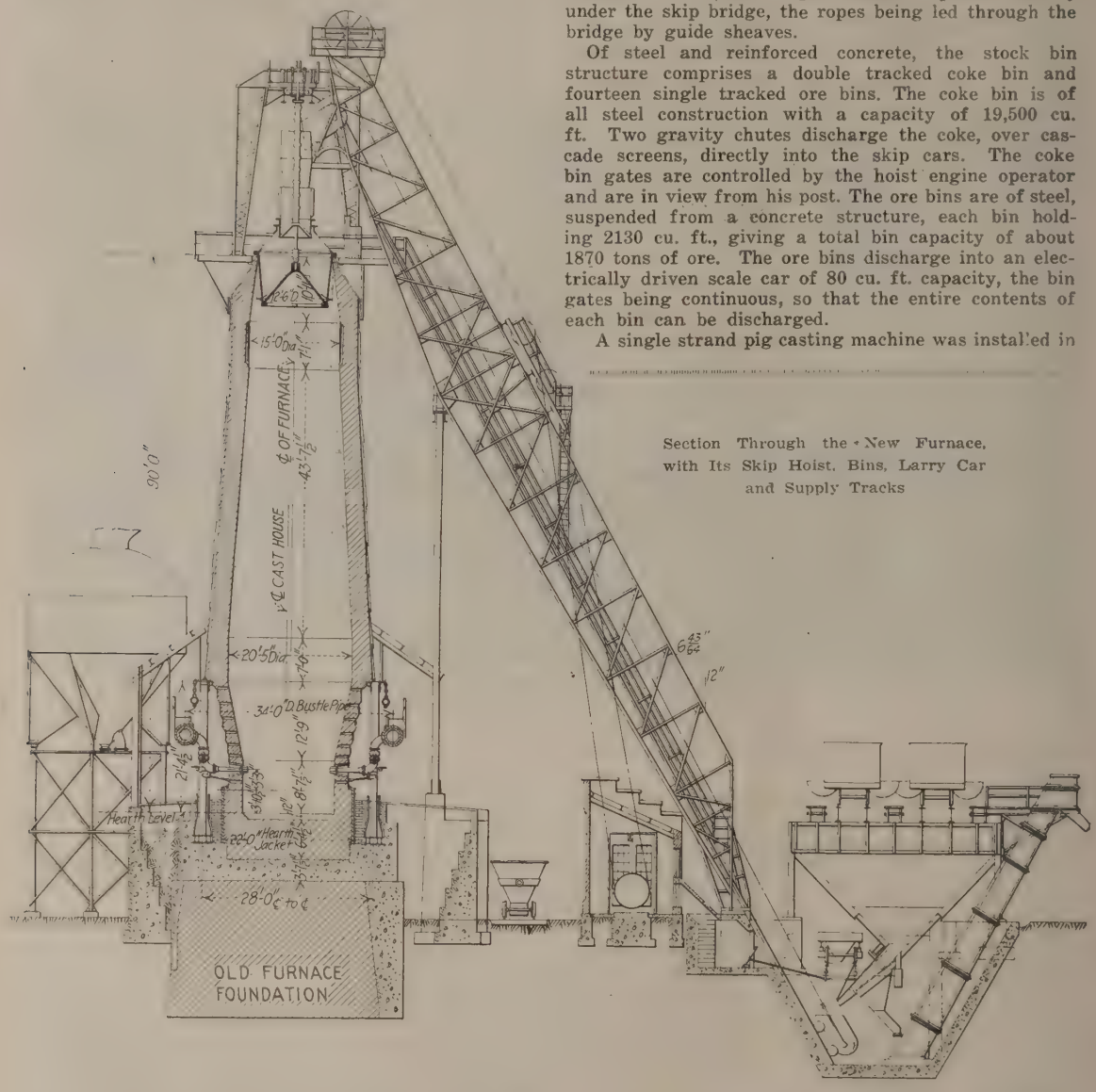
"The consummate skill and long experience of the manager must no doubt avoid or redress the ordinary troubles of the process, but the immense production can be accounted for only by the enormous consumption of oxygen. It is a satisfactory evidence of the constancy and reliability of the chemical and mechanical laws at our command for making iron that the introducer and oldest producer of anthracite iron in America has not been superseded, but is able still to lead off the greatly enhanced production with high figures. It is evidently no game of chance, but a trial of practical wisdom based on experience, and insured by the improvement of all the means at the disposal of man."

In the past 30 years the work of rebuilding and dismantling contracted the plant to but two furnaces, still known as Nos. 1 and 2, and during this period much of the original plot was restored to its former condition. It may well be understood, therefore, that when the Empire Co. decided to build a modern furnace on the site of a much rebuilt plant, the engineers were confronted with difficulties widely in contrast to that of laying out work on virgin ground. Many existing appurtenances were to be retained, for economical reasons, and the expansion of the plant was limited on one side by the Lehigh canal and on the other by the main street of the town of Catasauqua, while the ground between these boundaries is of limited area. This space was ample for the six old stacks, for in the early days the necessary raw materials were not of great proportion, and the stock trestles were arranged between the furnaces, as well as adjacent to the canal.

Credit is therefore due the engineers and contractors, Arthur G. McKee and Co., Cleveland, who furnished designs and materials and supervised the erec-

tion under a fixed contract. The improvement program involved the entire reconstruction of the furnace stack, the addition of a skip bridge, top structure and McKee revolving stock distributor, stock trestle and bins, hoist engine, scale car, pig casting machine and ladle cars, one new stove, new boilers, pumps, water tower and other auxiliary equipment.

The old stack was completely demolished and the foundation enlarged for the new work. The new furnace has a height of 90 ft., hearth and bosh diameters of 15 ft. and 20 ft. 5 in. respectively, and a 78-deg. bosh. The shell is ½-in plate with ¾-in. bottom ring, ⅝-in. top ring and ¾-in. top cone. The hearth jacket



Section Through the New Furnace, with Its Skip Hoist, Bins, Larry Car and Supply Tracks

is 1¼-in. plate, 9 ft. high, cast iron hearth cooling plates 4 in. thick, with cooling pipes, being placed inside the hearth jacket. The tuyere breast is 4 ft. 9 in. high, of 1-in. plate.

Eight rows of copper cooling plates are used in the hearth and tuyere breast. The new lining involves a total of 332,000 brick (9 in. equivalents), giving a furnace volume of 19,310 cu. ft. Cast iron wearing plates 6 ft. high are suspended from the top cone for protecting the brick work at the stock line. The large bell is 11 ft. 3 in. in diameter, the small bell 5 ft. 6 in. The stock distributor is electrically driven and controlled, its operation being interlocked with the hoist engine, so that the revolving and charging cycle is entirely automatic. The furnace top is equipped with a 25-ton trolley hoist for dismantling the furnace for repairs, and for raising material from the ground to the furnace platform.

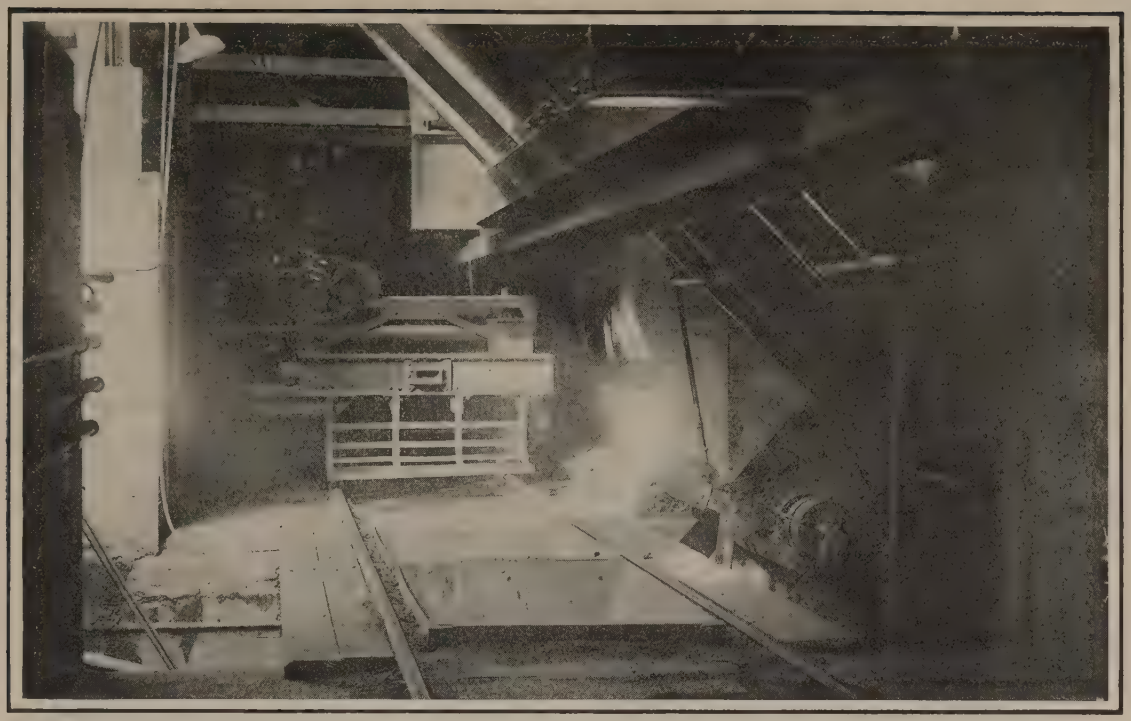
Of the through truss type, the skip bridge is double tracked, supported by a shear leg, independently of the furnace stack. The bridge has a steel plate deck and a stairway from the ground to the top platform. Each skip car has a capacity of 100 cu. ft. of material. A new steam hoist engine was installed, having 12 x 14 in. cylinders and a double grooved drum 66 in. in diameter. The hoist ropes are 1 in. in diameter. The hoist engine house is placed directly under the skip bridge, the ropes being led through the bridge by guide sheaves.

Of steel and reinforced concrete, the stock bin structure comprises a double tracked coke bin and fourteen single tracked ore bins. The coke bin is of all steel construction with a capacity of 19,500 cu. ft. Two gravity chutes discharge the coke, over cascade screens, directly into the skip cars. The coke bin gates are controlled by the hoist engine operator and are in view from his post. The ore bins are of steel, suspended from a concrete structure, each bin holding 2130 cu. ft., giving a total bin capacity of about 1870 tons of ore. The ore bins discharge into an electrically driven scale car of 80 cu. ft. capacity, the bin gates being continuous, so that the entire contents of each bin can be discharged.

A single strand pig casting machine was installed in a structure of sufficient size to house a second strand when required. A 75-ton mixer type hot metal ladle car receives the metal from the furnace runners and delivers to the pig machine.

The boiler equipment of this furnace formerly consisted of approximately 3480 hp. of water tube boilers. This was augmented by the addition of two new 505-hp. Stirling boilers equipped with Kling-Weidlein aspirating type burners for blast furnace gas. Other additions to the power equipment consist of two steam turbine driven pumps, each with a capacity of 2,500,000 gal. per day. A water tower giving storage for 80,000 gal. was also installed.

Increase in the size of the rebuilt furnace made



Transfer Car for Loading Skip Car; the Lower End of Skip Hoist and the Hoisting Cables Appear at Lower Left, the Dumping Chute in Lower Center

necessary additional stove heating surface, which was provided by adding one 20 ft. by 100 ft. McKee side combustion stove, to augment the three Cowper stoves of smaller dimensions built in 1909. This work also included new air and gas mains and their connections.

The new stack is designed to produce foundry, forge and basic iron from a mixture of about 65 per cent New Jersey magnetite ore from the mines of the Empire Steel & Iron Co. and 35 per cent non-Bessemer Mesabi ore. Local stone is used, with Connellsville coke as fuel.

Casting at the New Furnace. It will be noted that the closed or mixer type ladle is used. The pig machine appears at the left

STEEL MEN PROMINENT

Charles M. Schwab and James A. Campbell Appointed on Committees at Unemployment Conference

WASHINGTON, Sept. 27.—Of vital interest to the entire nation because of its human, economic and commercial phases, and greatly concerning such an institution as the iron and steel industry because of the large number of workmen it engages, the outcome of the unemployment conference, called into session yesterday, will be watched with exceptional interest. The formidable task laid before the 52 members of the conference has been begun in earnest and in an expeditious manner and hope is entertained that it will reach concrete plans for solution of not only emergency needs, but adopt practical measures of a permanent nature to prevent a recurrence of the present labor condition. This is the keynote that sounds throughout the conference, struck first by President Harding who opened the conference, repeated by Secretary of Commerce Herbert Hoover, who outlined specific ideas as to purposes it is hoped to accomplish, and expressed by members of the conference. Many suggestions already are at hand, among them those contained in the agenda of the Economic Advisory Committee of the Department of Commerce, but until the conference has proceeded with a careful study of its work it is not possible to say what plans may be adopted. It is intended that the subcommittee on the various subjects being taken up will be able to report their findings by Wednesday, Oct. 5, but in the meantime the subcommittee on Public Hearings, of which S. McCune Lindsay is chairman, started hearings today when different witnesses were heard, among them being F. I. Jones of the Employment Service, and Ethelbert Steuart of the Bureau of Labor Statistics, Department of Labor.

Iron and Steel Industry.

That the labor situation as it pertains to the iron and steel industry will be made familiar to the conference and perhaps concrete suggestion for its solution outlined is indicated by the fact that two of the most prominent men in the industry are members of the subcommittees, which were named by the committee on organization, the latter being headed by Henry N. Robinson, Los Angeles, president of the Los Angeles Trust Co., chairman of Bituminous Coal Commission in 1920 and a member of President Wilson's second industrial conference. The two steel men are Chairman Charles M. Schwab of the Bethehem Steel Corporation, and President James A. Campbell of the Youngstown Sheet & Tube Co. Mr. Schwab was made a member of the subcommittees on Emergency Measures by Manufacturers and Emergency Measures in Shipping, while Mr. Campbell was made a member of the subcommittees on Unemployment Statistics and Emergency Measures by Manufacturers.

The first work of the conference is to meet emergency needs of the unemployment situation and simultaneously with this an exhaustive study will be made in order to bring out the exact facts concerning unemployment. A statement given out by the conference points out that estimates of the number of unemployed vary from 3,000,000 to 5,500,000 and it is felt that reliable data as to the extent, geographical distribution and industrial distribution are imperative before relief measures can be put into effect. The committees named were selected because they are considered to be particularly qualified to handle the subjects to come under their purview. After the emergency measures and the collection of statistics are completed, the conference will be regrouped into committees whose functions will be to recommend permanent measures by which unemployment can be held at a minimum. The public hearings are to be held every day for the next week at the same time that the work of the small specialized committees is progressing.

President Campbell's Views.

The underlying necessity to bring about economic readjustment and to solve the unemployment problem is the restoration of the purchasing power of the farmer, according to President James A. Campbell of the Youngstown Sheet & Tube Co., a member of the unemployment conference. Mr. Campbell informally expressed his views yesterday while the conference was being organized and is expected to set them forth formally and in more detail during discussion of the problems before the conference. The view has been stated previously by Mr. Campbell and he still is thoroughly convinced that it represents the primary solution to the problem of unemployment.

The reduction of freight rates on his products is a requisite to restore purchasing power of the farmer, Mr. Campbell said. If transportation charges are reduced, it was pointed out, they will result in lower costs for things the railroads themselves require.

"In my opinion, some freight rates can well be lowered now," Mr. Campbell stated. "The railroads are paying 12 per cent less for labor, they are getting their fuel more cheaply, and the general steel schedule has declined 43 per cent in price since 1920."

Mr. Campbell is of the belief that high retail prices, and rents would be automatically lowered if there were reductions made in transportation charges and the buying power of the farmer restored.

Improvement in Refractories Not Sustained

PITTSBURGH, Sept. 26.—August improvement in the demand for and shipments of fire clay and silica brick was not maintained this month, but despite a decline in the shipments of about 5 per cent, the trade is almost uniformly of the belief that the low point of business has been reached. This feeling is based upon the definitely larger orders going to the steel mills in most producing districts and the knowledge that outside of the Steel Corporation subsidiaries, few of the steel manufacturers have any considerable reserve stocks of brick. Such orders and specifications as lately have been received indicate the very low point to which the iron and steel interests have allowed their stocks to fall, and while manufacturers have rather heavy stocks, it is doubted if this fact would stem an advance should there be a sudden increase in orders.

Large producers are making a firm stand at the prices established several week ago, but we hear of concessions being made in both fire clay and silica brick by the smaller manufacturers, some of whom probably find need of ready cash. As low as $28 is reported to have been done on Pennsylvania silica brick. Demands for concessions are being firmly resisted by the large producers who insist that present quotations fully discount any reduction in costs they have been able to effect. Until fuel and freight charges are lowered, it is asserted that any concessions from current prices mean a loss. It is the experience of some companies in central Pennsylvania, which buy their coal, that the freight charge now is as much as the freight and the cost of the coal combined was before the war.

We quote per 1000 f.o.b. works:

Fire Clay	High Duty	Moderate Duty
Pennsylvania	$34.00 to $37.00	$28.00 to $34.00
Ohio	34.00 to 38.00	28.00 to 33.00
Kentucky	33.00 to 37.00	30.00 to 35.00
Illinois	35.00 to 40.00	30.00 to 35.00
Missouri	37.00 to 42.00	28.00 to 33.00
Silica Brick:		
Pennsylvania		33.00 to 35.00
Chicago		38.00 to 40.00
Birmingham		46.00
Magnesite Brick:		
Standard size, per net ton		52.00
Chrome Brick:		
Standard size, per net ton		65.00

The Yale & Towne Mfg. Co., Stamford, Conn., locks, etc., has adopted a plan to aid employees in financing home building projects. The company has set aside $250,000 for this purpose.

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Key Points in Unemployment

So far as the steel industry is concerned, the unemployment conference at Washington can limit its search for causes of unemployment to three. There are others, but if these three were remedied the industry would soon be on its way to a scale of activity that would give work to tens of thousands of men who are idle to-day or working only a fraction of each week:

1. Transportation charges nearly double those of immediately pre-war time.

2. Fuel cost more than double and in some cases nearly three times that of 1914.

3. Building trades labor cost double that before the war, with performance of building trades labor often below that of pre-war time.

It has been shown over and over that the excessive freight rates of to-day bear more heavily upon steel than upon any other commodity, seeing that to produce a ton of steel requires the transportation of five tons of raw materials and supplies, as against little more than a single ton in the case of lumber, grain, leather, cotton or any other of the more common commodities. It has been shown also that this excessive transportation cost is excessive railroad labor cost. Vice-President Atterbury of the Pennsylvania Railroad told employees of that line this week that the two outstanding factors thus far unliquidated are coal and transportation, and that unless there is a further reduction in railroad labor costs the carriers face receivership or Government ownership.

The high fuel cost that is hobbling the steel industry is again unliquidated labor cost—first that of mine labor and second that of railroad labor.

One of the most widely accepted causes of shrinkage in car loadings and in the volume of construction work calling for structural steel and other products of iron and steel works is the refusal of union workers in the building trades to accept reductions in wages in line with the reductions already realized in the cost of living. Thousands of railroad workers, steel workers and coal miners are out of work because building trades workers prefer idleness to a reasonable readjustment of the war price of such labor.

Steel works labor has suffered repeated reductions. Railroad labor has been reduced but 12 per cent. Coal miners insist on the continuance of war-time wages, and workers in the building trades stand in the way of a demand for materials of construction that would give employment to hundreds of thousands.

The inquiries of the unemployment conference will ramify in many lines. As to major causes of the present industrial depression it will probably be agreed that they are world-wide and an inevitable part of the world's war burden. But when consideration is given to special and removable causes which bear upon the chief of the manufacturing industries—steel and the great allied metal-working trades—attention may well be concentrated upon three key factors. They are transportation, coal and the unbending attitude of building trades labor.

Railroad Returns in Future

So many complicated questions in connection with the railroads have engaged attention that few men, perhaps, realize how soon will expire the two-year period for which the Transportation Act fixes the standard of railroad operating income. The date is March 1, 1922, five months hence. The general authority of the Interstate Commerce Commission is to fix such rates as will yield for the carriers as a whole or in rate groups a fair return on the value of the property. The percentage of return may be changed later at any time by the commission, but the act decreed that for the two years to March 1, 1922, the rate should be 5½ per cent, the commission being authorized, however, to add one-half of one per cent for the purpose of making betterments. This the commission did, and the charges that became effective Aug. 26, 1920, were intended to yield 6 per cent. Of course they have not done so.

Effective March 1, 1922, or later, the commission can alter the present 6 per cent to any other rate. This cannot be done, however, in such a manner as directly to make up to the railroads any deficit they may have this year, because the act prescribes the disposition of any excess, in a year, over 6 per cent. That is, the commission is at liberty to prescribe a rate, say 8 per cent, and fix transportation charges accordingly, but the act arranges what shall be

done with the extra 2 per cent if the railroads earn it. One-half is to go to the commission to make up a contingent fund, the other half being retained by the carrier to pay interest and dividends against a year in which it has earned less than 6 per cent. The provisions in the act whereby each year is a unit may possibly be regarded as unfortunate. A railroad is "out" by all of the deficit it may have in a year, but it is "in," as an offset, only one-half of what it may make in excess. It may be mentioned that there is a provision, now purely of theoretical interest, that if a railroad is lucky enough to build up a reserve fund of 5 per cent, by retaining its half of extra earnings, it can use additional money accumulated "for any lawful purpose."

Thus the opportunity for the railroads to make up any deficit they may have for this year are quite limited. That there will be a large deficit is entirely probable, even if the net operating income continues to increase as it has been doing lately. During the first six months of this year the amount earned was at the rate of 1.8 per cent per annum. In substance, the railroads earned nine-tenths of one per cent in one-half the time in which they were expected to earn 6 per cent. To escape a deficit they would have to earn the other 5.1 per cent in the remaining half of the year, or at the rate of 10.2 per cent a year.

No doubt it is largely on account of the provision of the Transportation Act that each year shall be reckoned separately that railroad managers are especially indisposed to reduce rates at this time. In one sense, an extra dollar earned next December may do a railroad twice as much good as an extra dollar earned next January. The December dollar could be used for interest and dividends, but only 50 cents of the January dollar would be available if the 1922 earnings of the road should exceed 6 per cent. The other 50 cents would go to the commission.

In connection with all such matters, however, it should be remembered that the law allows wide latitude of interpretation to the commission, it being prescribed that rates be considered "under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment." Thus if the railroads do make some additional money it may be absorbed in maintenance instead of being split half to the railroad's reserve fund and half to the commission's contingent fund.

Progress in Heat Treatment

If the number of technical and other papers presented at last week's annual convention of the American Society for Heat Treating be the criterion, then progress in heat treatment has been marked in the past year. Over 70 papers were prepared dealing with carbonizing, tool steel, alloy and high-speed steel, heat-treating problems and equipment, metallographic research and various other subjects. Many of the papers were of a high order and registered a marked advance in the practical and theoretical knowledge of the art. For an organization only three years old, such an accomplishment is a credit to the enthusiasm of the members and the efficiency of the officials. Few of the older societies could do as well.

If, however, our measure of the progress in heat treatment be the amount of information actually made public and discussed at the convention last week, the results would not be so pronounced. Without doubt one of the principal benefits of such a convention to those who take the trouble to attend is the hearing and discussion of the largest number of papers possible. The pre-printing of a few papers and this followed by a full discussion is productive of the largest measure of profit, in contrast with the presentation by title or verbal abstract of a large number of topics and almost no discussion. The latter was the situation last week. With no papers pre-printed and with many of the printed abstracts inadequate, there resulted a distinct disappointment in the lack of opportunity to discuss some of the topics. Another unfortunate phase of such a procedure is that since all the papers are held for publication in the society's monthly journal, many of the important papers cannot be made public until late in the year, and this is naturally a damper on the enthusiasm of some authors.

There has been marked progress in heat treatment. The cooperation of some of the country's best metallurgists last week and the genuine enthusiasm and interested attendance at the sessions, particularly at those on alloy and other steels, is proof positive of progress in the knowledge of the subject and of a desire for better mastery of it by the rank and file.

Conditions for Construction Work

The everyday necessities of life in the United States, in food, clothing, shelter, etc., and including amusements as a necessity in accordance with present day philosophy, are being met fairly well, yet many men are working only part time while others are entirely out of employment. Whether by artificial aid or in the natural course of events, work for idle hands will develop. This work will be along the line of new construction. The work we have done in all the past can be divided into three general classes: First, the work necessary simply for us to keep going, by providing food, clothing, transportation, etc.; second, the production of goods exported, and third, new construction. The continued insistence in so many quarters that we must have a large export trade proves that there is general recognition of the fact that we cannot keep ourselves busy by simply doing work of the first class mentioned.

Often men balk at the idea of construction work through being impressed with the works of construction we have that we do not fully realize. That is a narrow view. Of construction work there is no end. If the hen house is large enough to accommodate all the hens a family cares to keep, it may be advantageous to acquire a cow, in which case there is need of shelter for her. There may be enough bedrooms in the house, but a sleeping porch might be a desirable addition.

The country had such an experience in 1920, with apparent shortages of labor and transportation, that in construction work in future it is likely to take strongly to such classes of construction work as are calculated to reduce the amount of work needed to keep things going. In the individual factories "labor saving machinery" has been intro-

duced. A similar policy can be pursued in more general and public matters. One of the most promising fields is that of power generation and distribution. We may have more factories than we need for the production of some articles of ordinary consumption, of which men want so many and no more, but we do not have too many economical central power stations or transmission lines. We can convert more coal at the pit mouth into power and distribute the power. We can develop water power. The investor requires assurance that his investment will pay, that there will be demand for the service provided. In such matters, nothing is better assured than the future of demand for power, as the rapid and continuous demand for coal from the beginning of coal mining testifies. The manufacturer of a commodity is limited. The public taste varies from time to time and the manufacturer may have difficulty in modifying his equipment or methods to follow the varying demand; but power, supplied by electric current, is simply power.

Useful ideas for construction work can always be found. The limitations in the past always have been the supply of capital and the cost, not the cost in the absolute so much as the cost at the time the project is considered, by comparison with the expected cost in future. The cost of some classes of construction may be artificially maintained, but not the cost of all classes of construction at a time when materials are in ample supply and there are idle men. As to the supply of capital, enough has been said in the criticisms of the federal tax law of 1918 to convince a normal man that under proper conditions much capital would be forthcoming.

The Deporting of Immigrants

A gentleman of foreign birth, now a citizen of the United States, who has had long and valuable experience in working among immigrants in this country, and is now devoting his attention to education of the foreign born in the English language, especially in iron and steel mills, calls the attention of THE IRON AGE to the unsatisfactory operation in some respects of the so-called "Three Per Cent Immigration Law."

Although the Department of Labor at Washington and the officials of Ellis Island have endeavored to enforce the law in a humane way, it has been impossible to prevent some cases of apparent injustice which have resulted in the separation of families and in other hardships. Because the number of immigrants arriving was larger than permitted by law, it has become necessary frequently to deport a considerable number who had hoped to make their homes in this country.

The deporting of an alien who has spent the savings of years to come to this country is a proceeding, even when required by law, which causes a feeling of resentment on the part not only of the person excluded but also of all who are related to him.

In answers to criticisms that have been made, Secretary Davis of the Department of Labor asserts that within the law he has exercised every leniency, but adds that after all the law must be enforced, and he describes frauds and impositions which have been practised or attempted on the immigration service. Owing to the many other matters of importance demanding the attention of Congress, it is probably too much to expect that a complete and permanent immigration law will be enacted this year, but it is not too much to demand that a bill now before Congress shall be passed. This bill authorizes the Department of Labor to appoint agents to be stationed at certain points in Europe to pass upon the character and merits of each applicant for entrance to this country, and to issue permits to those qualified. Thus the efforts of steamship companies to increase their business regardless of the character of the immigration encouraged would be thwarted, and many men and women would be prevented from enduring the suffering to which they are subjected under the present law.

SHEET MILLS BUSY

Doubt as to Whether Present Rate Can Be Maintained in the Valleys

YOUNGSTOWN, OHIO, Sept. 27.—Press reports have been prone to exaggerate expansion in steel plant operations, which are still averaging up well on tonnage driven to the mills by pressure of recent price advances. That production in affected departments is likely to suffer curtailment when this tonnage is rolled is common comment in the industry. There is a strong tendency abroad to place undue emphasis upon specific instances of improvement and to draw general, though often unwarranted, conclusions therefrom. The general trend in the Mahoning and Shenango Valleys, however, the past month and a half, has been progressive and as yet there are no sure signs that a reversal is to be encountered. The likelihood of over-emphasizing the importance of a moderate improvement in an effort to create optimism is obvious.

Hence the private opinion of a number of well-informed executives as to the immediate outlook is somewhat different from press statements, though all, naturally, are hoping that the buying movement which was instigated by price changes, may be sustained. A sidelight on actual conditions may be gleaned from the fact that one Valley sheet interest, which started the week with 17 active mills, reduced the number to 13 within several days, finding that business did not warrant the larger operations.

The aggregate improvement is partially attributable to the fact that all of the smaller, non-integrated sheet producers entered business on their books at the old figures of 2.25c. for blue annealed, 2.75c. for black and 3.75c. for galvanized. How these interests will share in business at the higher figures is somewhat problematic.

One of the sustaining encouraging influences, though, is found in the steady but slow expansion in productive capacity of subsidiaries of the leading interest in the two Valleys. On Monday the blast was put on two furnaces of the Carnegie Steel Co. at New Castle, Pa., which had been idle for a number of months. Bar and blooming mill operations will add to the activity of the New Castle plant within a short time. Iron production in the district will be still further enlarged about Oct. 1 when the A. M. Byers Co. lights its Mattie stack at Girard, for which it has already contracted for coke. Due to shortage of iron, the company has suspended its puddling and skelp mill departments at Girard for a short period.

While active sheet mill capacity shows some additions this week, output is scarcely above 75 per cent. Mills are being operated in the Mahoning Valley on the following basis—Youngstown Sheet & Tube Co., 15; Brier Hill Steel Co., 17; Trumbull Steel Co., 13 and one jobber; Republic Iron & Steel Co., 9; Newton Steel Co., 10; Sharon Steel Hoop Co., 7; Falcon Steel Co. and Mahoning Valley Steel Co. 7 each, for total of 86. This is actually the largest sheet mill schedule in this territory at any time this year.

CORRESPONDENCE

Price Reductions in Steel

To the Editor: The dependability of the statements contained in your publication can always be used as a basis in reaching conclusions.

Permit me to congratulate you upon the intelligent and exhaustive résumé of the general iron and steel business situation, as contained in your last issue. I am primarily interested in its application to the steel business.

According to your statement, steel prices to-day are only 37 per cent above the prices of 1913, which, taking everything into consideration, is an extremely small advance in price; and the logical conclusion cannot be avoided that if everything else that enters into the general business of the country had been willing to bear its share of the burden proportionately, the business of the country would not be in its present depressed condition.

I note particularly the fact that the excess in building materials in 1920 over 1913 was 241 per cent, with a drop at the present time of 143 per cent, that the price of steel mill labor in 1920 was 153 per cent above 1913, with a drop from 1920 of 103 per cent, or 67.3 per cent. Farm products have declined 87 per cent and food products 72 per cent of their excess.

A careful diagnosis of your article and taking into consideration the comparisons I take the liberty of making in this letter, the conclusion cannot be avoided that the main cause of the present depression in business is almost entirely due to the persistency with which the various labor unions throughout the country have not only insisted upon maintaining pre-war wages, and in some instances, as of very recent date in the case of the printers, are asking for an increase in wages.

Is it not possible in some way to reach the intelligent, fair-minded and level-headed union men in the country, and call their attention to these facts, and make them realize that they are to-day the stumbling block in the progress of business? They will undoubtedly, without any question whatever, have to come down from the lofty pinnacle upon which they are attempting to stand, and the quicker they do this the more satisfactory the results will be to them and to the country at large.

The steel industry has done its full part in the past few months, has borne the burden of depreciation and if our other industries will fall in line, we will soon come to a condition of prosperity.

LOUIS C. TETARD,
Secretary, National Steel Rolling Co.
New York, Sept. 23.

The Inventor's Opportunity Is Also the Manufacturer's Opportunity

To the Editor: Your editorial in your issue of Sept. 8, entitled "The Inventor's Opportunity," might well be supplemented by another entitled "The Manufacturer's Opportunity."

It is a fact that not for twenty years past has there been the incentive for manufacturers to purchase new inventions of real, demonstrated value covered by valid patents, that now exists.

For many years the inventor of a meritorious appliance, who has at last got the attention of the head of an industrial plant equipped to make and market the appliance, has usually been told:

"Yes, your invention is ingenious and will work all right, but it is really of no interest to us. We can get all the business we want making our standard line of goods and the trade takes them at good prices. It really doesn't pay us to bother with these new things and upset our production schedules, and have to spend money to develop and market something different. Sorry to disappoint you. Good day!"

In very many cases the manufacturer was right; but we have come now on totally different conditions, such as none of us ever experienced before. The seller's market that has endured so long is gone. It is a buyer's market to-day and all the indications are that it will be a buyer's market for a long, long time to come.

The plain, well known fact is that our producing capacity in all lines of manufacture has been enormously expanded during the past four years, while the purchasing ability of half or three-quarters of the world's population has been greatly reduced by the impoverishment resulting directly and indirectly from the war.

Therefore the manufacturer who makes standard goods in open competition must enter the race for survival of the fittest or run the risk of indictment and prison by entering combinations to kill competition.

Henceforward the big profits in manufacturing will be made by the concern which can offer something different from and better than any one else, and which can protect its exclusive right to make and sell it by strong patents. There is no better or safer investment that a manufacturer can make to-day than the purchase of such patents of proved value.

CHARLES WHITING BAKER,
Director, the Engineering Business Exchange.
New York, Sept. 22, 1921.

More Activity at Wheeling

WHEELING, W. VA., Sept. 26.—Steel plants in this district are having better operations now than before in several months, due to the enlargement of orders for sheets and tin plate, for the manufacture of which there is considerable capacity here and in nearby towns. The Wheeling Steel Corporation, the largest unit in the district, is doing little at its Wheeling City plants, but an accumulation of orders enabled it to start up a portion of its steel works department as well as several sheet mills at Portsmouth, Ohio, recently, and this week will see more activity at its Steubenville works, which for several weeks past have been running from 30 to 40 per cent of capacity. One battery of by-product ovens at this plant was started up last night and next Saturday or Sunday night, No. 2 furnace will be blown in and it is the expectation of the management shortly to blow in the Top Mill furnace, located on the West Virginia side of the river almost opposite the Steubenville works. Open hearth furnaces at the Steubenville plant are 50 per cent engaged, and also all of the sheet and jobbing mills on single turn. At Benwood, W. Va., the steel works and pipe furnaces are fairly constantly employed and the Belmont plant is operating in keeping with the requirements of skelp from Benwood. The National Tube Co. Riverside plant at Benwood, also is showing signs of life after several weeks of idleness, two of the seven pipe furnaces there being in operation.

Plants of the American Sheet & Tin Plate Co. in this district are averaging about 50 per cent operations, in connection with which is a little more activity at the Mingo, Ohio, works of Carnegie Steel Co., which supplies sheet bars for the Wheeling district plants of the former. Weirton Steel Co. is running close to normal maximum capacity. Six of the 7 open-hearth furnaces at Weirton, W. Va., are making steel, while the company has all of the 26 tin plate mills at that plant, 5 of 12 at its Steubenville, Ohio, works and 8 of the 12 at its Clarksburg, W. Va., plant running full time. Its strip mill operations at Weirton are averaging between 25 and 30 per cent. Operations of the Follansbee Bros. Co., Follansbee, W. Va., which have been almost 100 per cent, are expected to drop slightly this week, due to a falling away in the automobile demand for sheets. Considerable work remains to be completed at the new plant of this company at Toronto, Ohio, and reports that it would start up Oct. 1 appear to be a little premature.

Lowest Iron and Steel Exports in 12 Years

Nearly Every Item Shares in Slump—Total for August One-Sixth of August, 1920—Eight Months' Total 44 Per Cent Below 1920

WASHINGTON, Sept. 27.—At no time since the iron and steel industry of this country first made a serious attempt to develop foreign markets have exports fallen so low as they did during August, when they aggregated only 75,827 gross tons, valued at $27,647,-

Imports of Iron and Steel—Gross Tons

	August		8 Months Ending August	
	1920	1921	1920	1921
Ferromanganese	9,804	320	33,515	5,801
Ferrosilicon	1,048	1,318	10,484	3,250
Pig iron	10,662	2,433	96,049	18,028
Scrap	24,714	2,016	110,386	23,397
Bar iron	1,198	179	3,666	1,185
Structural steel	183	41	1,033	446
Billets without allcys.	761	23	17,731	2,738
All other billets	443	55	3,245	1,074
Steel rails	8,549	2,874	35,501	14,772
Sheets and plates	273	42	1,177	1,874
Tin and terne plates	49	..	271	308
Wire rods	651	47	2,621	552
Total	58,335	9,348	315,679	73,425
Manganese ore and oxide	99,601	28,939	334,590	326,342

816. It is necessary to go back to January, 1909, when the outward movement of iron and steel totaled approximately 68,000 gross tons, to find a level so low as that of August. The slump in exports, which began in February, is, of course, due to the world-wide depression from which some students think there is now a gradual recovery. Imports also were at a low point and totaled only 9348 tons, valued at $1,949,892.

August exports were more than 10,000 tons less than those for July, the latter having been 86,523 tons, valued at $27,639,787, according to the figures of the Bureau of Foreign and Domestic Commerce. That

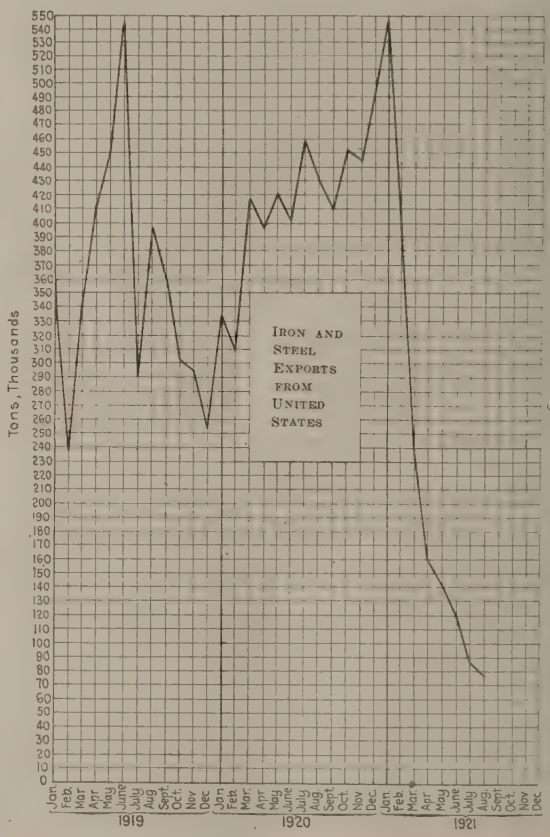
Exports of Iron and Steel—Gross Tons

	August		8 Months Ending August	
	1920	1921	1920	1921
Ferromanganese	252	5	1,186	418
Ferrosilicon	31	..	337	218
Pig iron	22,362	2,419	151,357	17,912
Scrap	37,573	1,616	121,594	25,814
Bar iron	3,566	257	25,954	11,546
Wire rods	12,988	351	90,572	11,314
Steel bars	54,344	5,179	417,631	157,877
Billets, ingots, blooms	20,920	2,447	176,450	6,773
Bolts and nuts	766	1,023	25,055	20,473
Hoops and bands	2,613	1,386	34,519	14,780
Horseshoes	240	42	1,385	405
Cut nails	468	7	1,764	595
Wire nails	10,197	1,112	54,148	18,407
All other nails, including tacks	704	219	7,239	3,462
Cast pipe and fittings	5,651	2,930	36,593	40,178
Welded pipe and fittings	28,385	10,537	176,060	299,215
Radiators and cast house boilers	674	380	4,959	2,023
Railroad spikes	1,205	196	10,999	6,753
Steel rails	56,160	4,782	389,963	261,720
Galvanized sheets and plates	10,219	2,354	74,053	42,920
All other sheets and plates	1,781	456	19,443	10,209
Steel plates	65,769	9,388	560,274	293,275
Steel sheets	12,721	14,169	104,982	84,628
Ship plates punched and shaped	3,318	25	28,682	7,937
Structural steel	36,603	9,852	273,298	254,662
Tin and terne plates	16,424	2,647	156,419	79,909
Barb wire	8,000	973	80,151	21,346
All other wire	15,550	1,075	109,806	56,764
Total	431,484	75,827	3,134,873	1,751,533

the value of July exports, with their greater tonnage, were somewhat less than that for the August exports, apparently is explained by slightly heavier movement of some of the finished lines in August.

The decided drop in exports in August stands out strikingly, when the movement is compared with the exports for August, 1920, which aggregated 431,484 tons, valued at $89,065,536, so that the tonnage of exports for August of this year was only 17.4 per cent of that of last year. For the eight months period ending with August, 1921, exports totaled 1,751,533 tons, valued at $493,022,231, compared with 3,134,873 tons, valued at $693,666,843, for the same period of last year.

Imports for the eight months period ending with



August amounted to 73,425 tons, valued at $20,228,916, as compared with 315,679 tons, valued at $33,850,363, for the same period in 1920. Manganese ore imports in August, 1921, totaled 28,939 tons, valued at $144,-500, showing a big increase over the inbound movement for July, which totaled only 5028 tons.

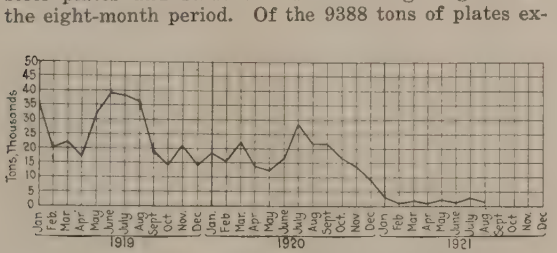
Steel sheets constituted the greatest single item of export for August, the total being 14,169 tons, of which 10,526 tons went to Japan and 2229 tons to Canada. Japan also was the greatest importer of sheets from the United States for the eight months, shipments to that country during this period having been 36,300 tons, and Canada ranked second, taking 24,848 tons. Welded pipe made up the next largest item of export in August, when the foreign movement totaled 10,537 tons, of which Mexico took 2936 tons and British India 2648 tons. Mexico was much the largest export market for the eight months period, having taken 101,752 tons, as against 30,627 tons shipped to British India, second in rank. Steel rail exports in August totaled 4782 tons, of which Honduras took 1413 tons and Canada 1322 tons.

Exports, January, 1919, to August, 1921, Inclusive

	Gross Tons		
	All Iron and Steel	Pig Iron	Semi-finished Material
January, 1919	360,456	35,793	11,594
February	234,793	20,178	10,407
March	344,506	22,054	8,176
April	408,204	16,300	11,488
May	447,050	32,233	20,771
June	544,580	39,540	46,016
July	287,823	38,373	21,318
August	396,743	36,071	36,162
September	363,505	18,991	37,513
October	302,456	14,108	20,713
November	295,045	21,429	13,211
December	254,676	14,612	21,538
Calendar year 1919	4,239,837	309,682	258,907
January, 1920	333,601	18,468	19,937
February	308,185	15,739	22,693
March	417,216	22,740	30,444
April	395,120	14,608	19,032
May	420,359	13,032	16,370
June	402,707	17,075	29,811
Fiscal year 1920	4,212,732	248,126	288,766
July	458,866	29,647	17,243
August	431,484	22,645	20,920
September	409,200	22,724	18,113
October	452,015	17,296	11,853
November	434,297	13,929	7,042
December	498,765	10,055	3,415
Calendar year 1920	4,961,851	217,958	216,873
January, 1921	547,394	3,710	315
February	393,328	1,307	92
March	230,635	2,320	1,023
April	162,592	1,234	678
May	142,551	2,541	749
June	119,081	1,689	1,106
Fiscal year 1921	4,168,619	129,541	82,549
July	86,523	2,744	363
August	75,827	2,424	2,447
Eight months	1,751,533	18,548	6,773

Of the 2354 tons of galvanized sheets and plates exported in August, Canada took 1049 tons, and of the 42,920 tons exported during the eight months Canada took 16,179 tons. Of the 2647 tons of tin plate exported in August, Canada took 1717 tons and for the eight months took 16,285 tons; Japan took 178 tons and 14,198 tons respectively; Italy, 96 tons and 6174 tons respectively. The total exports of this product for the eight months were 79,909 tons.

Canada also was the greatest export market for steel plates and structural steel during August and the eight-month period. Of the 9388 tons of plates exported in August, Canada took 6084 tons, and of the 293,275 tons exported during the eight months, 75,891 tons were exported to that country. Japan took 3262 tons in August and 23,213 tons during the eight months, while 17 tons were shipped to the United Kingdom during the month and 44,704 tons during the eight months. Of the 9852 tons of structural steel exported in August, Canada took 4094 tons, and during the eight months took 44,793 tons; Japan took 1687 tons and 39,718 tons respectively; British India 1608 tons and 27,272 tons respectively. The total exports of structural steel for the eight months were 254,662 tons.



Pig Iron Exports from the United States

Exports of machinery showed a slight gain in August over July, the respective total values having been $15,178,004 and $14,758,741. Metal working machinery to the value of $931,563 was exported in August, the total value for the eight months having been $16,833,061

Principal Foreign Buyers

The rank of the principal markets is considerably different for August trade from that reported for July, the leading countries in August being:

Countries	Gross Tons	Countries	Gross Tons
Canada	25,967	United Kingdom	1,779
Japan	16,534	Argentina	1,554
Mexico	6,755	Australia	1,192
British India	6,086	Brazil	1,072
Cuba	2,249	Philippine Islands	1,064
Honduras	2,046	Rumania	1,017

Peak of Industry Was in July, 1920

Preliminary figures from the unemployment studies of the National Industrial Conference Board, 10 East Thirty-ninth Street, New York, show that in the four industries that have been covered the high point of employment, from which the recent declines are usually estimated, registered a volume of employment that was 57 per cent higher than that of 1914, immediately before the war stimulation.

"It is obvious," said an official of the board to the New York *Times*, "that in any discussion of the amount of unemployment to-day, or of a return to 'normal' activity, this fact must be taken into the account. In these four industries the total decline from the 1920 peak has been 43 per cent. The percentage of decline, of course, is a percentage of a larger figure than is the percentage of increase, so that a 43-per cent decline from the peak more than wipes out the 57-per cent increase from the lower level. But the decline from the 1914 level to-day is very much smaller than seems generally to be supposed. For the four industries reported on, the figures collected show a decline of 11 per cent below the 1914 level of employment.

"These reports are made up from reports from 625 foundries, in all parts of the country, 25 paper mills, 150 printing establishments and 19 meat packing houses.

"The index numbers and percentages for these four industries are shown in the following table:

	Index No. 1914	Peak, 1920	Sept., 1921
Foundry	100	163	87
Paper	100	157	96
Printing	100	110	82
Meat packing	100	138	103
Composite	100	157	89

"In the printing business the peak of employment was in June, 1920; in the foundry business, it was in August, 1920; in the paper business it was as late as September, 1920; and in the meat packing business it was in June, 1920. In none of these four industries did the peak of employment actually occur in July, 1920, but that is the average or medial line, and that is generally true of all the industries of the country. The figures reported by the conference board for these four industries cover plants having an aggregate of 141,139 employees in 1914, 222,066 at the peak in 1920, and 126,120 at present."

Andrew J. Allen, secretary of the Associated Employers of Indianapolis, has written to President Harding, Secretary of Commerce Hoover and the industrial employment survey officials at Washington, asking them to obtain verification of the figures, 25,000, forwarded to Washington by the Indiana free employment service bureau as the number of unemployed in the city. Mr. Allen, who keeps in close touch with the labor situation, states that the figures should not be more than 10,000.

The Pawling & Harnischfeger Co., Milwaukee, manufacturer of electric traveling cranes, contractors' machinery, machine tools, etc., has extended the working hours in its plant from 48 hr. to 55 hr. a week without overtime. A notice posted in the plant for the information of employees explained the business situation and the necessity for the change.

Iron and Steel Electrical Engineers Meet

Numerous Technical Problems Discussed in Five-Day Meeting—Fuel Economy Is Given Special Attention—Exhibit of Equipment Is Large

FROM Sept. 19 to 24, inclusive, the fifteenth annual convention of the Association of Iron and Steel Electrical Engineers was held at Hotel La Salle, Chicago. The sessions were well attended by both members and guests, registration totaling more than 400. Exhibits of electrical devices, numbering 41 were shown in a large hall adjoining the room in which the technical discussions were held. Two afternoons were set aside for inspection trips. No particular works were visited by the members in a body; instead, small groups were formed which went to plants in which they were especially interested. The program throughout was handled in an excellent manner, and bore earmarks of the earnest efforts of A. O. Swartz, chairman of the convention and publicity committee. On Friday evening the annual banquet was held, followed by a dance. The banquet differed from its predecessors in that there were no invited speakers, but instead professional entertainers provided music and amusement.

Both the national and sectional officers for the coming year were announced at the conclusion of the banquet by Ernest S. Jefferies, electrical engineer, Steel Co. of Canada, the retiring president. The national officers are as follows: President, W. S. Hall, electrical engineer Illinois Steel Co., South Chicago; first vice-president, R. B. Gerhardt, electrical engineer Bethlehem Steel Co., Sparrows Point, Md., second vice-president, L. F. Galbraith, electrical engineer, West Penn Steel Co., Brackenridge, Pa.; directors, R. R. Shepherd, electrical superintendent Steel & Tube Co. of America, Indiana Harbor, Ind.; I. N. Tull, electrical engineer McKinney Steel Co., Cleveland; F. H. Woodhull, electrical superintendent Lukens Steel Co., Coatesville, Pa.; W. H. Gilbert, electrical superintendent Tennessee Coal, Iron & R. R. Co., Fairfield, Ala.; treasurer, James Farrington, electrical superintendent, La Belle Iron Works, Steubenville, Ohio; secretary, J. F. Kelly, 513 Empire Building, Pittsburgh.

The sectional officers include: Chicago, chairman, James L. Mills, electrical engineer North Works, Illinois Steel Co.; secretary, W. H. Williams, Williams-Beasley Co.; Cleveland, chairman, C. B. Skelly, American Steel & Wire Co.; secretary, A. R. Lintern, Nichols-Lintern Co.; Birmingham, chairman, J. E. Fries, chief engineer Tennessee Coal, Iron & R. R. Co.; secretary, F. M. Sturgess, electrical engineer American Steel & Wire Co.; Pittsburgh, chairman, A. C. Cummings, electrical engineer Carnegie Steel Co.; secretary, John F. Kelly; Philadelphia, chairman, George H. Schaeffer, electrical engineer Carpenter Steel Co.; secretary, L. O. Morrow, L. O. Morrow Co.

Abstracts of Papers and Discussions

A FEATURE of the technical sessions was the amount of time provided for discussion. Not more than two papers were read at any one session, and the remainder of the period was set aside for comments. After each discussion the author of the paper was called upon to answer questions asked, or criticisms offered. One entire day was devoted to the subject of fuel economy. The general fuel requirements of steel mills were outlined by F. E. Leahy, fuel and experimental engineer Carnegie Steel Co., Duquesne, Pa.*

Steel Mill Fuel Requirements

He enumerated the different kinds of fuels used, and briefly described their application, from the standpoint of economy. He pointed out numerous ways in which fuel formerly wasted at steel plants has been conserved. Fuel in gaseous form, he said, is adapted to meet the demands of any of the diversified requirements of the steel plants. By-product gas is being successfully used in metallurgical furnaces and elsewhere, as is producer gas. In the waste heat type of boiler using blast furnace gas, efficiencies are obtained equal to that of any boiler fuel. Without the use of economizers, some modern blast furnace gas-fired boiler plants now obtain, in regular operation, thermal efficiencies above 75 per cent, whereas some years ago they did not average over 55 per cent. The highest thermal efficiency obtained through the use of blast furnace gas for fuel is in gas engine practice.

In discussing Mr. Leahy's paper, G. R. McDermott, assistant engineer Illinois Steel Co., South Chicago, stated that in every steel works a plant heat balance should be worked out, with the blast furnace as the starting point. In other words, provision should be made, first for disposing of all blast furnace gas, then for utilizing all of the waste heat of the open-hearth furnaces, and so on through the plant, until the coal-fired boilers are reached. In this way the use of new fuel would be kept down to a minimum.

Gordon Fox, Freyn Brassert & Co., Chicago, pointed out that most boilers using blast furnace gas are not of the waste-heat type, but get their heat by radiation rather than convection. Commenting on this point, Mr. Leahy stated that, as the boilers referred to in his paper were of the waste-heat type, they gave better results than the older type of boilers, their efficiency sometimes reaching 75 per cent. From waste-heat boilers, with later modifications in design, the Jones & Laughlin Steel Co., he stated, had obtained efficiencies of 80 per cent. A discussion of boiler efficiencies caused Wilfred Sykes, chief electrical engineer Steel & Tube Co. of America, Chicago, to make the criticism that high boiler efficiencies are generally discovered under test, when every regulatory precaution is taken, whereas the actual efficiency of a boiler can be ascertained only by securing results over a long period of operation under ordinary conditions.

Using Waste Heat Usefully

Waste heat utilization for steam generation in a steel plant was covered in a paper by G. R. McDermott.† Numerous applications of the waste-heat boiler are mentioned, and results are presented of comparative tests of water-tube and fire-tube boilers using waste heat. Specific reference is made to the fire-tube type of boiler using waste heat, designed by C. J. Bacon, formerly steam engineer of the Illinois Steel Co., South Chicago. This type has shown greater efficiency, in tests referred to by Mr. McDermott, than the water-tube boilers. The popular impression that fire-tube boilers are not as efficient as water-tube boilers he attributed to the fact that only the usual types of tubular boilers and methods of using them are considered.

As a matter of fact, he said, the heating surface of tubular boilers can be made as effective and more so than that of water-tube boilers. The trouble with the usual fire-tube boilers, especially when used for waste-heat applications, is that the area for the passage of gases is too large, and there is not sufficient length of travel for the gases. These objections are overcome by

*The paper, substantially in full, will be found on page 811.

†A paper on this subject, by Mr. McDermott and F. H. Willcox, was read Nov. 15, 1920, before the Western Society of Engineers. An abstract of that paper appears on page 899, THE IRON AGE, April 7.

making a long boiler of small diameter, or, what amounts to the same thing, dividing the boiler into two or more passes. The matter of tube size is also a large factor, and if the question of cleaning were not of such real importance, the tubes could, to great advantage, be as small as locomotive tubes, or even smaller.

Waste gases from large gas engines, such as those using coke oven and blast furnace gas as fuel, are of sufficiently high temperature and quantity to justify the installation of waste-heat boilers, said Mr. McDermott. On account of the comparatively low waste gas temperature, it is necessary to confine the design of the boiler to that of a fire-tube type with small flues. No installations of waste-heat boilers using the exhaust from gas engines have been made in this country, but there have been a number in Europe. One of these, in the Westphalian coal district, is described by the author who, himself, recently designed a fire-tube waste-heat boiler to use waste gases at a temperature of 850 deg. Fahr. from a 3300-kw. blast furnace gas engine.

In the discussion, the objection was raised that the formula used, in determining the rate of heat transfer for water-tube and fire-tube boilers, was empirical, and that there is no assurance that it would apply with different designs of either type of boiler. It was also pointed out that the computations covering fire-tube boilers with smaller diameter tubes, 1 and 2 in., were entirely theoretical, and that actual results with such boilers might differ materially from those which Mr. McDermott worked out mathematically. In closing the discussion, the author stated that boilers with small tubes, through which the gases are passed at high velocity, had been developed in England, and that a British government commission appointed to investigate steel mills in occupied territory in Germany had discovered that such boilers, utilizing exhaust gas from gas engines, are being used with success to supply steam to drive turbines.

Boiler Combustion Control

Control of boiler operation was the subject of a paper by Walter N. Flanagan, steam engineer Ohio Works, Carnegie Steel Co., Youngstown. He pointed out that boiler control is a relatively recent development and offers large possibilities for economy. Hand methods of control, especially the centralized and well co-ordinated means that have been applied in connection with the use of instruments to show the operation of individual boilers, represent a great step in advance of the guesswork formerly used; but at best these can give only approximately correct results, particularly where a fluctuating load is carried. With the best of hand control, the boilers are continually being driven above and below the economical range of operation, even though the average lies well within. This causes an increased fuel consumption, which is augmented by the fact that since the air and fuel and draft supply all have to be readjusted by the operator, each time he tries to correct for the load change, there is a chance for improper combustion every time the load changes, with resulting fuel loss.

Mr. Flanagan said that there are numerous examples of automatic control in use to-day, and described one of particular interest to electrical engineers, because of the wide use of electricity as a controlling medium. All of the auxiliaries, i.e., forced draft fans, stokers, and induced draft fans, are driven by d.c. motors. The armature current for each motor is taken directly from the line, supplied either by d.c. main units, motor-generator sets, or house turbines. The fields of the motor are supplied from a small motor-generator set, consisting of one d.c. variable speed motor, and a generator for each set of auxiliaries, i.e., one for forced draft fan motors, one for stoker motors, and one for induced draft fan motors (if such are used). The motor speed is controlled by a field rheostat operated by a compensated steam pressure regulator, which moves the rheostat to a definite position for every given pressure.

In every plant there is a more or less appreciable drop in pressure between the boilers and the point of consumption, which varies as some power of the load. The regulator is connected to the steam main at or near the point of consumption. This pressure drop causes the regulator and rheostat to move through the full range, as the demand increases from no load to maximum load. The rheostat is so designed that, for each position of the regulator, i.e., for each load, it gives the correct motor-generator set speed to produce the proper field voltage, so that the stokers and fans will have a correct speed to deliver the necessary quantity of coal and air to meet that load. Since all of the stoker motors receive the same armature and the same field voltage, and the forced and induced draft fans likewise, all of the boilers carry the same load and change their rating at the same time. The control of any number of boilers on the same load is centralized in one regulator, with a motor-generator set, and the operation of a large number of boilers is thus reduced to the terms of one, and that one is taken care of automatically, so far as combustion is concerned.

In discussing the paper, Joseph Harrington, Brady Foundry Co., Chicago, and member executive committee, Fuel Section, American Society of Mechanical Engineers, questioned the value of a graph presented by the author of the paper, showing the variation of combined boiler and stoker efficiency per boiler output in per cent of normal rating. He asserted that efficiency of combustion has no relation to rate of combustion, that the time element does not enter, and consequently capacity should not affect efficiency. He asserted that such progress has been made in boiler operation that the same efficiency can be secured at normal rating, at double rating, or 250 per cent of rating.

Touching on this point, Mr. Flanagan stated that, in his opinion, such results can be secured only when the radiation loss is constant, whereas ordinarily, when the load increases, the ash increases and the flue gas temperature rises. Referring again to the subject of control, he stated that automatic control of both coal and air supply is far more satisfactory than automatic control of one and hand control of the other, as there is inevitably a lag between the automatic operation and the manual operation.

Production of Cheap Oxygen

Probably the most interesting paper of the convention was one on the Influence of Cheap Oxygen on Economy of Fuel and of Time, by E. A. W. Jefferies, consulting engineer, Worcester, Mass., and father of the president of the association. In this paper, read in the absence of the author, who was ill, is contained the first public announcement of his discovery of a method to produce cheap oxygen. The new process has been put into practice and successfully demonstrated on a large scale, not in a production of oxygen, but in a separation of helium from the natural gases of Texas, which, he states, is a much more difficult task.

Mr. Jefferies was one of three engineers authorized by the government to investigate the possibilities of producing helium for use in balloons and dirigibles. He does not explain his new process in detail, but states that in general it consists of liquefying the air by compression and expansion, and then distilling off the volatile nitrogen, just as it is now done by the Linde and other processes used to supply oxygen in cylinders. Instead, however, of consuming large amounts of power to drive compressors, and then throwing practically all the work away by free expansion into the still, the new method is based on the simple idea of carrying on the distillation under pressure, that is, at the pressure to which air is originally compressed.

By this means the nitrogen, which is 79 per cent of the whole volume of the air, leaves the still under the original pressure. It can then be heated to increase its volume and power capacity, and used in a piston engine to drive the compressor. For this purpose very little heat is required to do a lot of work, because the efficiency of conversion of heat put into a gas, already under pressure, is about 75 per cent, whereas only about 15 per cent of the heat put into raising steam is converted into work. Thus a method has been evolved which requires no external power to operate, but uses

instead a comparatively small amount of fuel.

Nature imposes only a small resistance to the separation of a mixture of gases; in fact, only about 3 hp. is theoretically required to separate 1000 cu. ft. of oxygen per hour from the atmosphere and the new method, when applied on a large scale, works at about 60 per cent efficiency, which is ten times as efficient as current practise. A combined effect of these two favorable factors, that is, of high processed efficiency and of the fact that the small amount of power required can be supplied by the heat instead of from outside sources, has made it possible to produce oxygen at a cost ranging from 8c. per 1000 cu. ft., when produced at 4000 cu. ft. per min., to 28c. per 1000 cu. ft., when produced at 400 cu. ft. per min.

Benefits from Use of Oxygen

Mr. Jefferies pointed out the far reaching effects which he expects his discovery to have on industry. By converting bituminous coal into gas by a mixed current of steam and oxygen, he believes that public service companies will be able to reduce their costs markedly.

In the open-hearth furnace the use of oxygen would speed up operation, and cut down proportionately the amount of gas consumed. The difference of only a few degrees in melting temperature makes a great difference in the time required per heat. The introduction of a small stream of oxygen into the gas ports, he believes, will result in a great change in practise —probably a reduction of 50 per cent in time and fuel, which, of course, would greatly influence the cost of making steel. It would involve some change in constructing furnace roofs, but Mr. Jefferies states that he has been assured by certain prominent steel manufacturers that this aspect of the problem presents no great difficulty. There are also possibilities of the use of oxygen in the blast furnace, with like economies.

In commenting on Mr. Jefferies' paper William S. Aldrich, combustion engineer American Bridge Co., stated that lack of suitable refractories might stand in the way of oxygen enrichment in combustion chambers. He pointed out that clay commences to soften at about 3250 deg. Fahr. and completely volatilizes at 4050 deg. Fahr.

Mr. Flanagan asserted that it would not be necessary to increase temperatures to 4000 deg. Fahr. to obtain a great improvement in open-hearth practice. An increase of a few hundred degrees would materially shorten the time of melting, and result in great economy. The radiation of the heat would be absorbed by the steel, and not necessarily go to the brick work. Some changes in design would probably have to be made, and in this connection Mr. Flanagan referred to what had been done in boiler design, the flame being entirely inclosed by water-cooled tubes, so that the refractories are not touched.

Electric Furnace Report

In the report* of the Electric Furnace Committee, of which E. T. Moore, electrical engineer Halcomb Steel Co., Syracuse, N. Y., is chairman, the opinion was expressed that as good steel can be made using dual voltages as with one voltage, provided the melting voltage is not too high, and at the same time better economy is secured electrically and from refractories.

In discussing electric furnaces, George Schaeffer, Carpenter Steel Co., Reading, Pa., stated that the breaking of electrodes causes great losses in efficiency, which are not taken into consideration in theoretical tests. He stated also that his company has used dual voltages without success, owing to the rapid wear on the refractories. A. C. Cummings, Carnegie Steel Co., Duquesne, Pa., related the experience of his company with both graphite and amorphous carbon electrodes. The principal objection to the amorphous electrode is that it is subject to frequent breakage. This has been overcome to a large extent at the Carnegie plant, however, with the result that operators prefer the amorphous to the graphite electrodes, because of their longer life.

*Published, substantially in full, on page 723, THE IRON AGE, Sept. 22.

Main drive equipments were discussed in the report of the Electrical Development Committee, R. B. Gerhardt, electrical superintendent, Bethlehem Steel Co., Sparrows Point, Md., chairman. Main roll drive equipments put into operation or placed on order since last year are enumerated, and comments offered on unusual installations. Attention is called to the development of the gas engine as a prime mover in steel plants. Single units have been installed with a capacity of 4000 kw., which is considerably more than with the older units.

It has also been successfully demonstrated that a gas engine installation can be operated from a single furnace in blast, by using a gas holder and certain automatic regulating valves in connection with it. At Sparrows Point, since last March, from two to four gas-electric units, depending on the load requirements, and two 47 and 84 by 60 in. gas blowers, have been operating, with only one 500-ton furnace in blast. The report emphasizes the possibilities of the super-power systems now projected, in connection with steel plant operation. An interconnection with such a system would make it possible to maintain full output on the generating station during week ends, and periods when the mills are idle and the furnace gas and heat now wasted.

Use of Super-Power Energy

In the discussion of proposed super-power systems, President Jefferies, A. J. Gaudy, Sessions Engineering Co., Chicago, and A. C. Cummings, Carnegie Steel Co., pointed out advantages which might be derived by the use of the electron manipulation tube recently introduced. This tube would greatly simplify co-ordinating systems in which currents of different frequencies exist. It was also suggested that such a tube, by virtue of its ability to change frequencies very rapidly, might make the flywheel set on reversing motors unnecessary. Mr. Gaudy stated that a mercury arc rectifier had been used with success in Switzerland, for purposes similar to that for which the electron tube is intended, but the application was not so wide.

Paper on Anti-Friction Bearings

An exhaustive discussion of anti-friction bearings, their merits as compared with the oil-ring type of bearings, when applied to motors, and the possibilities of their more extended use in steel mill motors, is contained in a paper presented by A. M. MacCutcheon, chief designing engineer Reliance Electric & Engineering Co., Cleveland. The comments on this paper indicated disagreement as to the extent to which anti-friction bearings can be applied to motors, and that installations have not been uniformly successful.

G. E. Stoltz, Westinghouse Electric & Mfg. Co., East Pittsburgh, averred that ball bearings can well replace bearings that are grease lubricated, and where the motor is not subject to great shock. But where the motor is subjected to vibration and is operated at high speeds, trouble is likely to be encountered. He does not believe that anti-friction bearings can be generally applied, and states that further adoption of them for certain uses would force manufacturers to assume the burden of carrying two lines of motors.

D. M. Petty, Bethlehem Steel Co., South Bethlehem, Pa., spoke favorably of anti-friction bearings as applied to motors, stating that aside from all other advantages the benefit derived from preventing oil from getting into the motors could not be overemphasized. He asserted that from 80 to 90 per cent of motor failures are due directly or indirectly to the entrance of oil into armature and field windings.

Steel Mill Electrical Engineers

The duties of the steel plant electrical engineer were given a broad interpretation in a paper presented by F. B. Crosby, electrical engineer Morgan Construction Co., Worcester, Mass. Although he is perforce a specialist, his innumerable contacts with allied engineering interests demand that he be a specialist of great versatility. His activity should not be confined exclusively to engineering problems, but by virtue of his intensive training in straightforward reasoning, and correct discrimination between fact and fancy, he

should assume an active part in the defense and development of our industrial system, the foundations of which are being shaken by unsound propaganda. In a narrower sense, the steel plant electrical engineer can exert influence for good by promoting economies in his own field, as, for example, through standardization.

To show the effect of such work, Mr. Crosby stated that he had used the association's specifications as the basis for the purchase of over 100,000 hp. of main-roll motors in the last three years. While there is still great diversity of opinion on proper standards for so-called mill-type motors for mill tables, transfers, screw-downs, etc., Mr. Crosby believes that practical specifications could be formulated which would at least fix the principal mechanical dimensions, such as length of shaft, size of bearings, distance from center line of shaft to bottom of base, the spacing and size of foundation bolts, as well as the horsepower ratings and speeds. A comparison of printed publications of three manufacturers shows that their standard lines of mill-type motors up to 180 hp. include 23 different hp. ratings and 30 different combinations of power and speed ratings for 230-volt, 60-min., 75 deg. Cent., compound-wound inclosed motors only.

In discussing the predetermination of power requirements, Mr. Crosby pointed out difficulties involved in such determinations in the case of plate, sheet and merchant mills. More nearly accurate data can be obtained from continuous than other types of mills, and the author briefly described the method employed by his company to predetermine the power requirements of continuous mills.

Electrifying Steel Mill Railroads

Electrification of steel plant railroads was covered in detail in a paper by R. B. Gerhardt, electrical superintendent Bethlehem Steel Co., Sparrows Point, Md. He discussed comparative costs of steam and electrically operated roads, operating problems which would be encountered in the electrification of steel plant lines and safety considerations. His conclusion was that economy was on the side of electric operation, and predicted that electricity would replace steam on steel plant lines.

The report of the Standardization Sub-Committee on Illumination was presented by the chairman, H. L. Kirschberg, consulting illuminating engineer, Pittsburgh. The committee prepared a table showing present practice in illumination in 15 representative steel companies. The tungsten filament lamp, in the vacuum type for small units and the gas-filled type for large units, seems to be generally used and, in the opinion of the committee, to be preferable to other types. It was brought out that in some cases carbon lamps are used, where there is excessive vibration. D. M. Petty, Bethlehem Steel Co., stated that his company had decided to install a new mill type 220-volt Mazda lamp, as it is believed that this lamp will stand consideraby more vibration than the carbon lamp, at the same time giving much more light.

Revised general specifications for electric traveling cranes for heavy duty steel mill service were submitted by the Crane Standardization Committee, F. W. Cramer, engineer of tests Cambria Steel Co., Johnstown, Pa., chairman. As the discussion included both favorable and unfavorable comment concerning the proposed code, acceptance was deferred to a mail vote.

The report of the Educational Committee, L. F. Galbraith, electrical engineer West Penn Steel Co., Brackenridge, Pa., chairman, consisted of a manual of instructions for crane operators. Mr. Galbraith pointed out that general educational work had failed to gain the interest of the men, and it was for this reason that a manual of special application had been prepared. In discussing the manual, J. F. Chapman, electrical engineer Colorado Fuel & Iron Co., stated that it would fill a very real need. There is no published material of much value to the ordinary workman in the electrical department, and heretofore he has been forced to gather such information as he could from his fellow employees, themselves poorly informed. His company has conducted classes and issued bulletins to enlighten employees regarding their daily tasks, and has achieved a large degree of success. He recommended that further manuals of this type be prepared.

General specifications of a.c. motors for main roll drives, as revised by the Standardization Sub-Committee on Motors, were read by D. M. Petty, chairman. The report of the Safety Committee was presented by the chairman, Walter Greenwood.

Recent developments in the methods of starting polyphase induction motors of the "squirrel-cage" type by means of auto-transformers or compensators, were described in a paper prepared by Millard C. Spencer, designing engineer Crocker-Wheeler Co., Ampere, N. J. Developments in induction motor starter design, he asserted, have been toward strict interchangeability throughout, simplification of the wiring, and complete accessibility of all parts; and the design of overload relays, toward a temperature-operated device, rather than a mechanical time limit mechanism, for protecting a motor against injury due to overheating.

Labor Conditions in Germany

WASHINGTON, Sept. 27.—The common impression that agriculture and industry in Germany are running at full tilt and labor is entirely employed is shown to be erroneous by a census taken on Aug. 4 in 534 of the more important of the 2250 municipal employment bureaus, the results of which have been published in Germany and forwarded to the Bureau of Foreign and Domestic Commerce by Economist Consul Maurice Parmelee, Berlin. There were registered 248,737 male applicants for work, for whom there were available 34,774 vacancies, and 89,473 female applicants, for whom there were available 40,851 vacancies and 338,210 applicants of both sexes, for whom there were available 75,625 vacancies. In other words, there were vacancies available for about 14 per cent of the male applicants, 46 per cent of the female applicants and 22 per cent of the total. This shows an improvement over July, when there were vacancies available for only 17 per cent of the total number of applications.

In the manufacture of machines and instruments, classified as the metal industry, it is shown by the Aug. 4 census that there were 63,247 applications for work and only 3590 vacancies; in the weaving industry, including dyeing and finishing, 8873 applications and 1584 vacancies; in leather and leather manufactures, 3812 applications and 338 vacancies; in clothing and cleansing, 11,013 applications and 3461 vacancies; in the building trade, excluding locksmiths, carpenters and unskilled laborers, 5221 applications, with an excess of vacancies, which totaled 7482.

Prospects of a settlement of the strike of the building trades in Pittsburgh are brightened by an agreement recently reached between representatives of the contractors' and the carpenters' union. The settlement is believed to forecast agreements between the contractors and other crafts. The agreement with the carpenters, however, must be considered a victory for the unions, for while a wage reduction of 25c. an hour has been accepted, the contractors signed the new scale for a period of two years, instead of one as formerly, and recognition of the union, which is involved, means that the attempt to put the building industry on an open shop basis has been given a decided setback.

Charles M. Magnuson, Duluth, Minn., has been awarded the contract by the Chippewa Iron Mining Co. for the construction of 4½ miles of spur track to connect the company's Armstrong Bay mine on the Vermilion Range to the main line of the Duluth & Iron Range Railroad. The grader established his first camp and started grading on Sept. 22. It is the intention to grade the entire railroad this fall so that the steel may be laid early in the spring.

More than 150 miners, employed by the American Manganese Mfg. Co. at Dunbar, Pa., walked out recently and refuse to return to work unless granted the H. C. Frick Coke Co. scale of wages.

Iron and Steel Markets

OUTPUT INCREASING

Betterment Still Chiefly in Lighter Products

Effort to Advance Plates, Shapes and Bars—Pig Iron More Active

Leaders in the steel trade speak of larger mill operations in the last quarter of the year with a confidence they did not show as September opened. The past week has brought further signs of betterment.

Following the advance of $5 per ton in sheet prices made by several independent makers, the Steel Corporation's sheet subsidiary announced that from Sept. 22 its prices also would be based on 2.50c. for blue annealed, 3c. for black and 4c. for galvanized sheets. As in wire products two weeks previous, the sheet advance brought a flood of orders and specifications at the old prices, estimated at close to 200,000 tons.

Sheet manufacturers are running at 70 to 75 per cent of capacity under the replenishment demand developed by the new turn in the market. There is pretty general adherence to the new prices on black and galvanized sheets, but a few mills still quote blue annealed in all gages at 2.25c., while some name that price only on No. 12 gage and heavier.

Along with the sheet advance has come an effort to lift the sheet bar market. Two or three independent mills ask $32, or $2 above the present contract basis.

Not a little stir was created by the action of the Carnegie Steel Co., which became known on Monday, putting its prices on plates and structural shapes at 1.75c. and on bars at 1.65c. These figures are $2 per ton below those last announced, but are $2 to $3 higher than the actual market of recent weeks.

It is too early to tell how far independent producers of the heavier products will hold for the advanced prices or how they will fare with the Steel Corporation itself, in view of its policy of meeting competition. A first effect has been the appearance of inquiry for bars for the last quarter of the year, and in some cases for structural shapes and plates. It is well understood that in the heavy products, especially rails, plates and shapes, present and prospective demand is only a fraction of capacity.

The increased rate of wire, sheet and tin plate production is encouraging, but these light products make a smaller increase in ingot output than might be gathered from some optimistic reviews of the week.

The New York Central Railroad has placed orders for the repair of more than 4000 cars, thus doubling its July order. The B. & O. has bought 1000 new cars, but half of them will be built from its own stock of steel.

A small Western road has placed 12,000 tons of rails and 1000 tons of angle bars, besides spikes and track bolts—an outstanding contract in the general dearth of rail business. A part of these rails will be shipped this year.

Tank builders have been somewhat larger buyers of plates. Two oil companies will place orders requiring 2000 tons of plates and shapes. Chicago mills have had some plate business for oil storage tanks to be built for stock.

The pig iron market shows a decided increase in buying. A sanitary manufacturing company has purchased 15,000 tons of foundry iron for last quarter delivery, 5000 tons for each of its three plants. For Southern iron the price was on the basis of $19, Birmingham, for No. 2. On some of the Northern iron the price was 50c. below the recent quotation of $21, Valley, but for the greater part $21 was paid. Sales amounting to 25,000 tons of foundry iron were made in the Philadelphia district, 22,000 tons at Buffalo and about 8000 tons at Boston. In eastern Pennsylvania, sales have been made at an advance of 50c. and some furnaces have marked up their quotations $1.50. A strong feature of the present situation is the low stocks held by merchant furnaces. On the whole, the foundry iron situation is stronger, but prices do not yet encourage idle merchant furnaces to blow in.

Japan is a continuously heavy buyer of sheets, especially in light gages. Another item in Oriental trade is the reported award of the great Yellow River bridge for the Pekin & Hankow Railroad to Belgian contractors at $10,500,000, though the financing is still in doubt.

After weeks of limited demand and dragging prices the buying of 2500 tons of electrolytic copper by one large domestic consumer is significant. Prices and demand for lead and zinc are also distinctly better.

Pittsburgh

PITTSBURGH, Sept. 27.

Predictions that the last quarter of the year would develop definite improvement in the iron and steel market are being fulfilled. The experience of makers of wire products with regard to business following their marking up of prices has been duplicated by the sheet makers, whose recent advance of $5 per ton has brought a flood of orders and specifications, largely at the old prices. It is estimated that orders for sheets provoked by the announcement of higher prices aggregate in the neighborhood of 200,000 tons, and there has been a quick response to this development in sheet mill operations, it being figured that about 75 per cent of all the sheet mills of the country will be in operation at the end of the week. The movement away from prices which were showing the steel makers substantial losses this week has extended to plates, shapes and bars, at least as far as the Steel Corporation is concerned, as its principal subsidiary has notified district offices that the price of plates and shapes now is 1.75c., and on bars 1.65c., also that former quotations were to be withdrawn. This attempt at an advance is not as clear-cut as that in wire and sheets, for demands for the heavier products remain limited and as yet few of the independent companies have taken action.

An effort also is being made to boost semi-finished steel, announcement having been made by a couple of makers of sheet bars to $32 and $32.50 for sheet bars

A Comparison of Prices

Advances Over the Previous Week in Heavy Type, Declines in Italics

At date, one week, one month, and one year previous

For Early Delivery

Pig Iron, Per Gross Ton.	Sept. 27, 1921	Sept. 20, 1921	Aug. 30, 1921	Sept. 28, 1920
No. 2X, Philadelphia†	**$21.84**	$21.34	$20.84	$53.51
No. 2, Valley furnace†	21.00	21.00	21.00	47.00
No. 2 Southern, Cin'ti†	23.50	23.50	23.50	46.50
No. 2, Birmingham, Ala.†	19.00	19.00	19.00	42.00
No. 2, foundry, Chicago*	22.00	22.00	21.00	46.00
Basic, del'd, eastern Pa.	19.25	19.25	19.00	51.26
Basic, Valley furnace	19.25	19.25	19.00	48.50
Bessemer, Pittsburgh	21.96	21.96	21.96	50.46
Malleable, Chicago*	22.00	22.00	21.00	46.50
Malleable, Valley	**20.50**	20.00	20.00	50.00
Gray forge, Pittsburgh	21.96	21.96	21.96	50.96
L. S. charcoal, Chicago	*31.50*	33.50	33.50	58.50
Ferromanganese, del'd	60.00	60.00	70.00	170.00
Rails, Billets, etc., Per Gross Ton:				
Bess. rails, heavy, at mill	$45.00	$45.00	$45.00	$55.00
O.-h. rails, heavy, at mill	47.00	47.00	47.00	57.00
Bess. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. billets, Pittsburgh	29.00	29.00	29.00	55.00
O.-h. sheet bars, P'gh.	**32.00**	30.00	30.00	65.00
Forging billets, base, P'gh.	34.00	34.00	34.00	70.00
O.-h. billets, Phila.	35.74	35.74	35.74	60.74
Wire rods, Pittsburgh	41.00	41.00	40.00	75.00
	Cents	Cents	Cents	Cents
Skelp, gr. steel, P'gh, lb.	*1.60*	165	1.75	3.25
Finished Iron and Steel, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Iron bars, Philadelphia	1.95	1.95	2.00	4.85
Iron bars, Chicago	1.75	1.75	1.75	3.75
Steel bars, Pittsburgh	1.60	1.60	1.70	3.25
Steel bars, Chicago	1.75	1.75	1.88	2.73
Steel bars, New York	1.98	1.98	2.08	4.13
Tank plates, Pittsburgh	1.60	1.60	1.70	3.25
Tank plates, Chicago	*1.65*	1.75	2.00	3.03
Tank plates, New York	1.98	1.98	2.08	3.63
Beams, etc., Pittsburgh	1.60	1.60	1.75	3.10
Beams, Chicago	*1.75*	1.80	1.85	2.83
Beams, etc., New York	1.98	1.98	2.13	3.48
Steel hoops, Pittsburgh	**2.25**	2.15	2.25	5.50

*The average switching charge for delivery to foundries in the Chicago district is 70c. per ton.
†Silicon, 1.75 to 2.25. ‡Silicon, 2.25 to 2.75.

Sheets, Nails and Wire Per Lb. to Large Buyers:	Sept. 27, 1921 Cents	Sept. 20, 1921 Cents	Aug. 30, 1921 Cents	Sept. 28, 1920 Cents
Sheets, black, No. 28, P'gh.	**3.00**	2.75	2.75	7.00
Sheets, galv., No. 28, P'gh.	**4.00**	3.75	3.75	8.50
Sheets, blue an'l'd, 9 & 10	**2.25**	2.20	2.25	5.25
Wire nails, Pittsburgh	*2.90*	2.90	2.75	4.25
Plain wire, P'gh	2.60	2.60	2.50	3.75
Barbed wire, galv., P'gh.	3.55	3.55	3.40	4.45
Tin plate, 100-lb. box, P'gh.	$5.25	$5.25	$5.25	$9.00
Old Material, Per Gross Ton:				
Carwheels, Chicago	**$15.00**	$14.50	$13.75	$37.00
Carwheels, Philadelphia	17.00	17.00	17.00	43.00
Heavy steel scrap, P'gh.	14.00	14.00	13.00	28.50
Heavy steel scrap, Phila.	11.50	11.50	11.50	24.00
Heavy steel scrap, Ch'go.	**11.75**	11.50	11.00	23.00
No. 1 cast, Pittsburgh	17.00	17.00	16.50	42.00
No. 1 cast Philadelphia	17.00	17.00	17.00	39.00
No. 1 cast, Ch'go (net ton)	**13.50**	13.25	13.00	32.00
No. 1 RR. wrot, Phila.	**15.50**	15.00	14.00	32.00
No. 1 RR. wrot, Ch'go (net)	11.50	11.50	11.00	22.50
Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$3.25	$3.25	$3.00	$16.50
Foundry coke, prompt	4.25	4.25	4.00	17.50
Metals, Per Lb. to Large Buyers:	Cents	Cents	Cents	Cents
Lake copper, New York	12.25	12.25	12.00	18.50
Electrolytic copper, N. Y.	12.12½	12.12½	11.62½	18.50
Zinc, St. Louis	**4.35**	4.17½	4.12½	7.70
Zinc, New York	**4.85**	4.67½	4.62½	7.70
Lead, St. Louis	4.45	4.45	4.20	7.75
Lead, New York	**4.70**	4.65	4.40	7.75
Straits tin, New York	**26.75**	26.50	26.75	43.50
Antimony (Asiatic), N. Y.	**4.60**	4.45	4.50	7.12½

The prices in the above table are for domestic delivery and do not necessarily apply to export business.

Composite Price, Sept. 27, 1921, Finished Steel, 2.236c. Per Lb.

Based on prices of steel bars, beams, tank plates, plain wire, open-hearth rails, black pipe and black sheets — These products constitute 88 per cent of the United States output of finished steel.

Sept. 20, 1921,	2.200c.
Aug. 30, 1921,	2.293c.
Sept. 28, 1920,	3.903c.
10-year pre-war average,	1.684c.

Composite Price, Sept. 27, 1921, Pig Iron, $20.10 Per Gross Ton

Based on average of basic and foundry irons, the basic being Valley quotation, the foundry an average of Chicago, Philadelphia and Birmingham

Sept. 20, 1921,	$20.01
Aug. 30, 1921,	19.64
Sept. 28, 1920,	47.83
10-year pre-war average,	15.72

as compared with $30, the recent nominal quotation and $29, at which some business actually has been done.

Evidence of the improvement in business is not confined merely to the advances in prices. At least three steel works blast furnaces will be added to the active list this week, one at the LaBelle Iron Works, Steubenville, Ohio, and two at the New Castle, Pa., works of Carnegie Steel Co. It is commonly expected that the Crucible Steel Co. soon will relight one of its idle furnaces at Midland, Pa., and the Mattie Furnace of the A. M. Byers Co. at Girard, Ohio, goes into blast the last of the week. The steel works of the New Castle, Pa., plant of the Carnegie Steel Co. will resume as soon as iron is available from the blast furnaces about to start up. The Carnegie Steel Co. as a whole had more than 30 per cent of its ingot capacity engaged last week, and a higher rate is probable this week, due to the demands of the American Sheet & Tin Plate Co. and independent tin plate makers dependent upon the Carnegie company for sheet bars. Besides the gain in sheet mill operations, there also has been a substantial increase in the activities of the makers of tin plate. Wire plants in this district are operating at close to 50 per cent of capacity, with some enlargements noted in the activities of the American Steel & Wire Co., both at Donora, Pa., and the Schoenberger Works in Pittsburgh. Slight gains have been recorded in active pipe-making capacity, but there has been some slowing down at the plants making automobile steel incident to the contraction in that industry. Whether the revival of the past few weeks is the beginning of a real market or merely is a flash in the pan, still is an open question. It is frankly admitted that large and confident buying still is lacking, and that much of the recent buying has been inspired by the higher prices and possibly by a desire of buyers to be at least partially protected against possible shortages which might easily develop during the winter in the event of any transportation or labor troubles.

There continues to be considerable following to the idea that until the railroad labor and freight-rate situation is thoroughly ironed out, there will be much hesitancy on the part of buyers about anticipating their needs. The thought is that with lower freight rates lower prices could be quoted on iron and steel, and even those who maintain that present prices fully discount such a freight reduction as is likely to be made admit that the idea of lower prices, based on lower freights, must be carried out before the industry can hit a real stride.

The pig iron market has been featured by the sale of 15,000 tons of foundry iron for last quarter delivery

to the Standard Sanitary Mfg. Co., which has served to give real support to recent quotations.

Pig Iron.—Trading has been confined almost entirely to foundry iron. The Standard Sanitary Mfg. Co. has bought 5000 tons of No. 2 and No. 2X grades for each of its three plants for delivery over the last quarter. The iron for its Louisville plant was bought at $19, Birmingham, for No. 2 plain, with the usual differential of 50c. above that price for the No. 2X iron. The iron for its Pittsburgh and New Brighton plants was bought at $20.50 to $21, Valley furnace for No. 2, but only a small proportion of the 10,000 tons was secured at the lower figure, and since it is doubtful whether any more iron is available at that price we make no change in our quotation of this grade, of $21, Valley furnace. The National Radiator Co. has bought 500 tons of No. 2 foundry iron for its Trenton, N. J., plant, at $20.50, from an eastern Pennsylvania furnace. The Westinghouse Electric & Mfg. Co. is in the market for approximately 1300 tons of foundry iron for its Trafford City, Pa., plant. We note moderate sales of malleable iron at $20.50, and it is doubtful if any tonnage of this grade now could be bought for less, while some makers are asking $21. An effort is being made to secure $20.50, furnace, for standard Bessemer, but so far it has not succeeded. There is very little interest at the moment in either basic or Bessemer iron. Jackson County makers of silvery and Bessemer ferrosilicon have advanced prices $2 per ton.

We quote Valley furnace, the freight rate for delivery to the Cleveland or Pittsburgh district being $1.96 per gross ton:

Basic	$19.25 to $20.00
Bessemer	20.00
Gray forge	20.00
No. 2 foundry	21.00
No. 3 foundry	20.50
Malleable	20.50

Ferroalloys.—Business still is limited in this and nearby districts. Steel makers merely are covering their actual needs and forward buying is entirely lacking. The Trumbull Steel Co., Warren, Ohio, has not yet closed against the 100 tons of 80 per cent ferromanganese for which it recently inquired. The lowest price named against this business by domestic makers was $65 delivered, while English material was offered at $58.35 c. i. f. Atlantic seaboard, or with a freight of $6.16 from Baltimore, $64.51 delivered, to which must be added the freight tax. Interest by consumers in spiegeleisen still is meager; prices are nominal in the absence of business. Interest in 50 per cent ferrosilicon also is lacking and no business recently has been done here in the lower grades of ferrosilicon or in silveries.

We quote 78 to 82 per cent domestic ferromanganese at $65 delivered; 78 to 82 per cent British ferromanganese, $58.35, c.i.f. Atlantic seaboard. We quote average 20 per cent spiegeleisen at $30 to $32, delivered, Pittsburgh or Valleys; 50 per cent ferrosilicon, domestic, $60, freight allowed. Bessemer ferrosilicon is quoted f.o.b. Jackson and New Straitsville, Ohio, furnaces as follows: 10 per cent, $38.50; 11 per cent, $41.80; 12 per cent, $45.10; 13 per cent, $49.10; 14 per cent, $54.10; silvery iron, 6 per cent, $27; 7 per cent, $28; 8 per cent, $29.50; 9 per cent, $31.50; 10 per cent, $33.50; 11 per cent, $36; 12 per cent, $38.50. The present freight rate from Jackson and New Straitsville, Ohio, into the Pittsburgh district is $4.06 per gross ton.

Billets, Sheet Bars and Slabs.—Large specifications and orders for sheets following the advance recently announced find reflection in a much livelier market in sheet bars and also in an effort on the part of makers to obtain higher prices than they would accept recently. The latter development, in addition to the larger demand, is due to the higher prices lately established on scrap and to the higher valuation of pig iron. The effort of sheet makers is to get tonnages as cheaply as possible, since little, if any, of their business carries the new prices. An Ohio company is understood to have secured a tonnage as $31.10 delivered, equal to about $29 back at the shipping point, but considerable doubt now exists that less than $30, Pittsburgh or Youngstown, could be done and some makers have named a price of $32.50. Little is going on in billets or slabs, which nominally may be appraised at $30, Pittsburgh or Youngstown.

We quote 4 x 4 in. soft Bessemer and open-hearth billets at $29 to $30; 2 x 2-in. billets, $30; Bessemer and open-hearth sheet bars, $30; slabs, $30; forging billets, ordinary carbons, $34 to $35, all f.o.b. Youngstown or Pittsburgh mills.

Wire Rods.—Inquiries are more numerous, but actual business remains small. Most makers of wire products have their own steel and rod making capacity and the increase in business in those products does not have much effect upon the rod demand. Rivet makers are not much busier than they have been and do not call for many rods. Chain makers are ordering shipments out fairly steadily. The new price of $41, Pittsburgh, for the base size of soft rods still is to be established by sales. We note a sale of 1500 tons of rods for shipment to Japan on a basis of $38 for soft rods. Prices are given on page 844.

Steel Skelp.—The market is not at all firm even at 1.65c. Pittsburgh, for pipe skelp, as this price has been quoted and has failed to bring an order. Business in pipe is better, but apparently has not increased sufficiently to bring those companies not making their own skelp into the market. An appraisal of present price possibilities is from 1.60c. to 1.65c.

Structural Material.—The outstanding feature of the market is the higher price ideas of the Steel Corporation in an announcement naming 1.75c., base, for plates and shapes and withdrawing lower prices which were outstanding. The flow of structural awards to Pittsburgh district fabricating shops continues good. The American Bridge Co. has taken 2000 tons for the extensions and new building of the Bell Telephone Co. in Pittsburgh and 200 tons for one of the dams of the Ohio River near Wheeling, W. Va. The Jones & Laughlin Steel Co. has taken 300 tons for the Greenfield School, Pittsburgh. The McClintic-Marshall Co. has been awarded 900 tons for a combination church and office building, Los Angeles; 780 tons for the George Washington Hotel, Washington, Pa.; 450 tons for a building for the American Tar Products Co., Chicago; 350 tons for an office and transportation building in Detroit; 280 tons for a wharf in Kahulur, Island of Maui, Hawaii; 100 tons of beams, rafters, etc., for the Logan Clay Products Co.; 100 tons for the Oswego High School, Oswego, N. Y., and 75 tons for a mill building and boiler house extension at the Ellwood-Ivans Tube Works, Oakland, Pa. The University Club of Pittsburgh recently sold its club house to the Pittsburgh Athletic Association, which the latter will raze, using the land for an addition to its present home, while the University Club is planning a new building. Plain material prices given on page 844.

Nuts, Bolts and Rivets.—Actual business in all three products still is of limited proportions, but the market is better to the extent that competition is less severe and there is more stability to prices than there was recently. Prices and discounts are given on page 844.

Iron and Steel Bars.—Demands for merchant steel bars from makers here still are moderate and this is not surprising in view of the fact that makers in other districts have been naming much more attractive prices. The Steel Corporation is reported to have named a quotation of 1.65c. on merchant bars and to have withdrawn any lower quotations which may have been out. It is not clear yet whether independents who have named less than 1.65c. will follow the lead of the Steel Corporation. Two Youngstown makers virtually have withdrawn from the market rather than accept business at the prices recently current. There is no change in iron bars.

We quote steel bars rolled from billets at 1.60c. to 1.70c.; reinforcing bars, rolled from billets, 1.60c. to 1.70c. base; reinforcing bars, rolled from old rails, 1.60c.; refined iron bars, 2.25c. in carloads, f.o.b. mill, Pittsburgh.

Spikes.—The railroads still are pursuing a hand-to-mouth policy in purchases, but competition for business, even of this sort, is so sharp that prices do not show much strength. Some makers are holding to $2.50 base per 100 lb., but the more common selling price is $2.40 and some business has gone at the equivalent of $2.35, Pittsburgh. Prices on small spikes also are rather unsteady, sales having been done as low as $2.60 base, as compared with the nominal quotation of $2.75. Prices are given on page 844.

Wire Products.—Specifications from jobbers against orders recently entered are satisfactory, but consumers who buy direct from the mills and who did not have

requisitions in at the time prices were advanced, are balking at paying the new prices and using every effort to buy at the old quotations. This effort has not been successful, and orders from this source have fairly established nails at $2.90 base per keg.

We quote wire nails at $2.90 base per keg, Pittsburgh, and bright basic and Bessemer wire at $2.60 base per 100 lb., Pittsburgh.

Sheets.—Effective Sept. 22, the American Sheet & Tin Plate Co. advanced its prices $5 per ton, meeting the advance announced about a week previously by most of the independent makers. All business on the books of the company not carrying a specified price, it was stated, would be invoiced at the new prices of 3c. base for black, 4c. base for galvanized, and 2.50c. base for blue annealed sheets. Just as the independents were flooded with orders and specifications at the old prices following the announcement of an advance, so the American Sheet & Tin Plate Co. has experienced a rush of such business. The past week with that company is stated to be the largest it ever enjoyed in orders for early delivery and specifications as distinct from business put upon its books carrying extended deliveries. All of the business lately taken is for shipment at the convenience of the company and there has been, in consequence, a decided increase in operating schedules to complete the business as promptly as possible.

Tin Plate.—There seems to be no let up in the demand for supplies for immediate shipment and the market is growing firmer, despite the fact that the past week has seen a further expansion in mill operations. The Standard Tin Plate Co., Canonsburg, Pa., resumed operations at 50 per cent of capacity at midnight, Sept. 25, while the Weirton Steel Co. has its Clarksburg, W. Va., plant of 12 hot mills all on, and altogether is operating at its three plants 43 of a total of 50 mills. The American Sheet & Tin Plate Co., which last week operated 52 per cent of its mills, this week has 65 per cent of them under power.

Cold-Finished Steel Bars and Shafting.—There seems to be a better feeling, but the improvement has not filtered through to the demand, which still is moderate, and with more sellers than buyers, prices favor the latter. The common quotation on cold-rolled and drawn bars and shafting is 2.40c. base, Pittsburgh, but 2.35c. has been done and it is intimated that on really desirable tonnages 2.30c. might be done. Ground shafting still is quoted at 2.75c. mill, in carloads.

Plates.—The market is still inactive, except for such demands as are created in structural awards and a few tank inquiries. The South Penn Oil Co. is reported to be in the market for four 55,000-barrel oil storage tanks, for which about 1000 tons of plates will be required. As low as 1.60c. has been done on plates, but the market is not very clearly defined since the Steel Corporation now is quoting 1.75c. and is understood to have withdrawn the lower quotations that have been outstanding.

We quote sheared plates, ¼ in. and heavier, tank quality, at 1.60c. to 1.75c. f.o.b. Pittsburgh.

Boiler Tubes.—Leading makers of charcoal iron boiler tubes have cut prices $10 per ton by increasing the discounts 5 points. The new prices are effective as of Sept. 21. This cut matches one recently made in lap welded steel tubes.

Hoops and Bands.—A base of 2.25c. has been generally re-established on hoops and some are also quoting that price on bands, but concessions on the latter product have not entirely disappeared. Business does not improve much.

Hot-Rolled and Cold-Rolled Strips.—Business is lighter in keeping with conditions in the automotive industry, but the absence of business means less price cutting, and quotations of 2.25c. on hot-rolled and 4c. on cold-rolled are more representative than they were recently.

Iron and Steel Pipe.—Considerable activity has developed in line pipe since the recent reduction in prices and more business has been placed in the past week than before in several months. Among the orders was one for approximately 120 miles of 10-in., 8-in. and 6-in. for a line to be jointly constructed in the Mid-continent field by the Producers' & Refiners' Corporation and the Midwest Refining Co. We also note several other orders involving from four to 25 miles, for shipment into various districts. Improvement also is noted in the orders for oil well pipe, it being observed that some jobbers who had been ordering out about one car of casing a month now are seeking two and three cars a month. Increased building operations are helping the demand for merchant pipe. Observance of the Sept. 16 card is rigid in merchant and oil country pipe, but competition for line pipe business still is sharp and buyers are able to obtain lower prices than are quoted in the card. Discounts are given on page 844.

Chain.—Leading makers have increased the discounts by 5 to 15 per cent, effective Sept. 20, on breast chains, cart back, cart breeching chains and pins, machine, coil, passing link, heel and well chains, halter chains, loops and rings, dees, bridle squares and steel rings. Otherwise chain prices established in July are being observed. Demand is better, but not active.

Coal and Coke.—The market on foundry coke is slightly stronger, due to the fact that in addition to a continued good spot demand, a number of fair-sized contracts for the last quarter have been entered by melters anxious to be protected against their requirements during the remainder of this year. The market still is quotable from $4.25 to $4.75, and there have been reports of business at $5, but this probably represents the sale through brokers who have exacted more than the usual commission. A number of inquiries have come out against the possible lighting up of several blast furnaces, but these demands have not strengthened furnace coke prices because a number of Connellsville operators anxious to start up idle ovens are actively seeking orders, while Connellsville coke is meeting rather strong competition from steel works by-product coke in the East. We continue to quote beehive oven coke at $3.25 to $3.50, per net ton, oven, but the lower figure is more representative of to-day's possibilities of sizable tonnages. Starting up of steel works by-products plants has resulted in a large demand for by-product coal, which has strengthened the price of that grade. We note a good-sized contract for last quarter in that grade at $2.10 per net ton, mines, and on current sales prices range from $1.90 to $2. Steam coal is rather sluggish at from $1.75 to $1.90 on mine run, while gas coal is quotable from $2.25 to $2.50.

Old Material.—The market is firm but not quotable on sales at any advance over the prices of a week ago. There are no offerings by dealers of heavy melting steel now at less than $15 per gross ton delivered, but thus far efforts to obtain this price have not been successful. Sales of this grade have been made in the Youngstown district at $13.50, which would be equivalent to from $14.05 to $14.30 to Pittsburgh common rate points. The highest price yet reached here on sales is $14, but it is doubtful whether less than $14.50 now would be accepted and we recognize that price in our quotation.

We quote for delivery to consumers' mills in the Pittsburgh and other districts taking the Pittsburgh freight rate, as follows:

Heavy melting steel, Steubenville, Follansbee, Brackenridge, Monessen, Midland and Pittsburgh	$14.00 to $14.50
No. 1 cast cupola size	17.00 to 17.50
Rerolling rails, Newark and Cambridge, Ohio; Cumberland, Md.; Parkersburg and Huntington, W. Va., and Franklin, Pa.	15.50 to 16.00
Compressed sheet steel	11.00 to 11.50
Bundled sheet sides and ends, f.o.b. consumers' mills, Pittsburgh dist.	9.50 to 10.00
Railroad knuckles and couplers	14.50 to 15.25
Railroad coil and leaf springs	14.50 to 15.25
Railroad grate bars	11.00 to 11.50
Low phosphorus melting stock, bloom and billet ends, heavy plates, ¼-in. and thicker	17.50 to 18.00
Railroad malleable	13.00 to 13.50
Iron car axles	20.00 to 21.00
Locomotive axles, steel	19.50 to 20.00
Steel car axles	15.00 to 15.50
Cast iron wheels	16.00 to 16.50
Rolled steel wheels	14.50 to 15.00
Machine shop turnings	8.75 to 9.00
Sheet bar crop ends at origin	13.00 to 13.50
Heavy steel axle turnings	10.50 to 11.00
Short shoveling turnings	10.00 to 10.50
Heavy breakable cast	15.00 to 15.50
Stove plate	12.00 to 12.50
Cast iron borings	9.00 to 9.50
No. 1 railroad wrought	12.00 to 12.50

Chicago

CHICAGO, Sept. 27.

Local mills report an appreciable improvement in demand for practically all types of finished steel, including plates, shapes and bars, which hitherto were inactive. The Illinois Steel Co. has had the best week in point of orders booked and specifications received since April, and other producers also note a betterment in buying. The increase in business has been reflected in improved operations. The steel output of the Illinois Steel Co. has been jumped from 30 to 38 per cent, and one additional blast furnace has been blown in, making a total of nine active stacks. Although this furnace was put in primarily for the purpose of changing over from one stack to another, the company will probably continue to operate nine furnaces if the recent improvement in demand is sustained. The Inland Steel Co. is also running its mills at a better rate, now being on a 35 per cent basis, while the Mark Mfg. Co. is maintaining an average operation of between 40 and 50 per cent.

Jobbers have been prominent in the recent buying movement. Their appearance in the market is regarded as indicating their belief that present going prices are at bottom and that further changes in the market may be in an upward direction. The reaction which has already taken place in sheets and wire products was the natural result of sharp competition which brought prices so far below costs that mills lost all incentive to seek further business at those levels. A similar reaction in plates, structural steel and bars is looked for by some observers. In fact, an unofficial report received from New York to-day states that Steel Corporation subsidiaries have established a minimum of 1.65c. for bars and 1.75c. for plates and shapes f.o.b. Pittsburgh. Whether these prices will be adopted by the local subsidiary cannot be learned at this time, and in view of the fact that Pittsburgh basing has been largely ignored in this territory for some time, developments are awaited with interest.

Another important element in the revival of demand is the railroads. A Western line has placed an order for 12,000 tons of rails and the New York Central has distributed repairs on 5000 freight cars. Just as the railroads are showing a disposition to break loose from the restraints which have guided their buying policy throughout the year, labor difficulties again threaten them. A vote now being taken by the Brotherhood of Railway Trainmen shows a large majority of the members in favor of a strike. At the same time, the Pennsylvania Railroad, which has sought to deal with its own employees without outside interference, has defied the United States Railroad Labor Board.

Another industry which has been an important factor in recent buying is the oil industry. The construction of tanks and the laying of pipe lines occupy an important place in the programs of oil producers because the low prices now prevailing on their products make an increase in storage facilities highly desirable. Notable among recent orders for steel coming from this source may be mentioned one placed by the Midwest Refining Co. and the Producers' & Refiners' Corporation with the Mark Mfg. Co., Chicago. This calls for 90 miles of plain end gas line pipe in 14-in., 12-in. and 10-in. sizes, for use in the Wyoming fields.

Pig Iron.—Demand is somewhat more active than a week ago, but individual purchases are somewhat smaller than before the recent advance. Orders commonly range from 100 to 200 tons and current inquiries are of similar size. Perhaps the largest inquiry pending is 1000 tons of No. 2 foundry wanted by a Duluth melter for delivery over the rest of the year. Inquiries for two 200-ton and one 300-ton lot of foundry have been received from Illinois melters, while a Wisconsin foundry is in the market for 100 tons of malleable. The only active merchant blast furnace in this district is booked two months ahead and merchant stocks on furnace yards the country over are low. During August shipments exceeded production, so that stocks as of Sept. 1 were less than those reported at the beginning of the previous month. In fact, present stocks on furnace banks are said to be not over one quarter what they were in the depression of 1914. A sale of 300 tons of copper bearing low phosphorus has been made at approximately $39, delivered. A Louisville melter has bought 200 tons of charcoal at $28.25, base, furnace, and subsequent sales have been closed at $28, base. Jackson County producers of silvery have advanced their prices $2 a ton, effective Sept. 27, on silveries and Bessemer ferrosilicon.

Quotations on Northern foundry, high phosphorus malleable and basic irons are f.o.b. local furnace and do not include a switching charge averaging 70c. per ton. Other prices are for iron delivered at consumers' yards, or when so indicated, f.o.b. furnace other than local.

Lake Superior charcoal, averaging sil. 1.50, delivered at Chicago	$31.50
Northern coke, No. 1, sil. 2.25 to 2.75	22.50
Northern coke, foundry, No. 2, sil. 1.75 to 2.25	22.00
Northern high phos.	22.00
Southern foundry, sil. 1.75 to 2.25	25.67
Malleable, not over 2.25 sil.	22.00
Basic	22.00
Low phos., Valley furnace, sil. 1 to 2 per cent copper free	$34.50 to 35.50
Silvery, sil. 8 per cent	34.82

Ferroalloys.—Two sales of 200 tons each of ferromanganese have been made by domestic producers at the price recently announced by foreign makers, namely, $58.35, seaboard, plus the freight from New Orleans, or $66.75, Chicago. An inquiry for 500 tons of 14 to 15 per cent ferrosilicon is current. The local buyer who has been in the market for 50 per cent ferrosilicon has not yet bought, as was reported last week. A St. Louis district plant is also inquiring for a carload of 50 per cent.

We quote 78 to 82 per cent ferromanganese, $66.75, delivered; 50 per cent ferrosilicon, $62.50 to $65 delivered; spiegeleisen, 18 to 22 per cent, $36 to $37 delivered.

Railroad Equipment.—The New York Central has distributed repairs as follows: 500 40-ton steel underframed box cars to the Streetor Car Co., Kankakee, Ill.; 500 of the same type to the Ryan Car Co., and 500 of a like type to the Standard Steel Car Co.; 500 50-ton steel hopper cars to the Buffalo Steel Car Co.; 500 of the same to the Detroit plant of the American Car & Foundry Co.; 500 of the same to Ryan Car Co.; 250 of the same to the Steel Car Co., Euclid, Ohio; 500 box cars to the Koppel Industrial Car & Equipment Co. The Michigan Central has let repairs on 500 40-ton steel underframe box cars and 250 50-ton steel twin hopper cars to the Illinois Car & Equipment Co. The Big Four has let repairs on 500 50-ton all-steel box cars to the Madison (Ill.) plant of the American Car & Foundry Co.

Structural Material.—Several local crafts today applied to Judge Landis, umpire in the recent building dispute, for a rehearing of their respective cases. Whether this action will expedite a settlement of the building situation is an open question. In the meantime, practically no new work is being released in this city. Evidences of activity are to be noted in other sections of the West, although the rate of improvement is slower than had been anticipated. The view that high freight rates constitute the main obstacle to better conditions is rapidly gaining adherents among fabricators. A recent investigation conducted by the Bridge Builders and Structural Steel Society indicated the freight on fabricated jobs averaged $25 a ton, or about 40 per cent of the average delivered price. Mills report an appreciable increase in bookings, with the jobers particularly conspicuous as buyers. There has been little change in plain material prices. Fabricating awards include:

Kansas City Power and Light Co., power house, Kansas City, 600 tons, to Kansas City Structural Steel Co.

Western Maryland Terminal Railroad elevator, Baltimore, 274 tons, to Pittsburgh Bridge & Iron Co.

Texas College of Industrial Arts, music hall and auditorium, Denton, Texas, 223 tons, to Austin Bros. Bridge Co.

Coal and sand station, Semet Solvay Co., Solvay, N. Y., 363 tons, to Link Belt Co., Philadelphia.

Two-ton unloading tower for New Zealand, 100 tons, let by Mead Morrison Mfg. Co. to unnamed fabricator.

City of Los Angeles, shed, 494 tons, to unnamed fabricator.

State of Idaho, highway spans, Jefferson County, 118 tons, to unnamed fabricator.

Four-story building for W. R. Wallace, Salt Lake City, 148 tons, reinforced concrete substituted for structural steel.

Prospective business includes:

University of Illinois, natural history building, Urbana, 120 tons, F. C. King & Co., Champaign, general contractor.

Blum Building addition, Michigan Avenue, Chicago, 500 tons.

Government, Leclaire Canal Locks, Rock Island, Ill., 150 tons.

Division of highways, Illinois, two 60-ft. spans near Goodfield, and one 100-ft. span near Limestone.

The mill quotation on plain material ranges from 1.75c. to 1.85c., Chicago. Jobbers quote 2.88c. for materials out of warehouse.

Rails and Track Supplies.—One of the smaller Western roads has bought 12,000 tons of rails and 1000 tons of angle bars, together with some spikes and bolts, part of which are to be shipped this year and the remainder in 1922. This is the first rail order reported in this territory since last winter. Although this tonnage was bought at the present price of $47, mill, the opinion is common in railroad circles that action on their needs for next year will not be taken until the mills announce their prices for that delivery. Spikes and bolts are moving rather freely in lots of 500 to 1000 kegs, and prices seem somewhat firmer. One order for 300 kegs of bolts, in fact, was placed at 3.50c. Pittsburgh. Tie plates and light rails are quiet.

Standard Bessemer rails, $45; open-hearth rails, $47; light rails rolled from new steel, 1.75c. f.o.b. makers' mills. Standard railroad spikes, 2.40c., Pittsburgh; track bolts with square nuts, 3.40c., Pittsburgh; tie plates, steel and iron, 2c., f.o.b. makers' mills.

Plates.—Mills are encouraged by a noticeable increase in both orders and specifications. This turn for the better is not confined to plates, but applies equally to structural steel and bars. Substantial orders have been received from jobbers and numerous others have come from widely distributed sources. Apparently the idea is gaining headway among buyers that prices are close to bottom and that no benefit can be derived from further waiting. Despite the undeniable betterment in buying, there continues to be wide variation in going prices. On tank plates as low as 1.60c., f. o. b. local works has been quoted recently by an independent rolling a limited range of sizes. From 1.75c. to 1.80c., Chicago, is being done rather commonly, and on a relatively insignificant inquiry covering about 200 tons 1.65c., Chicago, was named. The railroads continue to place car repair orders calling for considerable steel. The New York Central, which distributed the repairs of 4000 cars in July, has exercised its options, practically doubling the original orders. Tank builders are also a source of plate tonnage. While they are not operating at capacity, they are busier than generally supposed. Oil storage tanks are of standard dimensions and fabricators are constructing many of them for stock in order to have them in readiness when purchasers appear.

The ruling mill quotations range from 1.65c. to 1.80c., Chicago. Jobbers quote 2.88c. for plates out of stock.

Bolts and Nuts.—The Ford Motor Co. bought about 10,000,000 nuts and some bolts last week, but its total purchases were considerably below what had been expected owing to the fact that its operations have been reduced. Demand for bolts and nuts remains unsatisfactory and discounts are irregular. In some cases, makers are absorbing the freight from Pittsburgh on all except very small orders. For nominal mill prices, see finished iron and steel, f. o. b. Pittsburgh, page 844.

Jobbers quote structural rivets, 3.68c.; boiler rivets, 3.78c.; machine bolts up to ⅞ x 4 in., 60 per cent off; larger sizes, 55 off; carriage bolts up to ⅞ x 6 in., 55 off; larger sizes, 50 and 5 off; hot pressed nuts, square and hexagon tapped, $3 off; blank nuts, $3.25 off; coach or lag screws, gimlet points, square heads, 60 per cent off. Quantity extras are unchanged.

Bars.—Orders and specifications for soft steel bars were heavier last week than for some time. Jobbers were prominent purchasers, but forge shops and other manufacturing users also came into the market. Some reinforcing steel continues to be bought, but on the whole the tonnage going into building work has been disappointing. The Cook County Detention Home, a local reinforcing project, calls for 340 tons which has not yet been placed. The railroads refrain from buying bar iron, evidently in the hope of securing lower prices. The mills, which are operating intermittently, refuse to sell for less than 1.75c., Chicago, on the grounds that their costs will not permit it. Hard steel bar mills have booked more business in September than during any month since early in the year, but are still on an unsatisfactory basis.

Mill prices are: Mild steel bars, 1.75c. to 1.85c., Chicago; common bar iron, 1.75c., Chicago; rail carbon, 1.75c., mill or Chicago.

Jobbers quote 2.78c. for steel bars out of warehouse. The warehouse quotation on cold-rolled steel bars is 4.20c. for rounds and 4.50c. for flats, squares and hexagons. Jobbers quote hard and medium deformed steel bars at 2.53c. base.

Sheets.—The American Sheet & Tin Plate Co. on Sept. 22 advanced its prices to conform with those adopted by the independents the week before. Demand has not been so active since prices went up, but this is not surprising, as practically all pending business was closed on the eve of the advance. The local independent is sold out on all except some of the heavier gages for fully two months ahead. Jobbers have not yet advanced their quotations in conformity with the changes in mill prices.

Mill quotations are 3c. for No. 28 black, 2.25c. to 2.50c. for No. 10 blue annealed and 4c. for No. 28 galvanized, all being Pittsburgh prices, subject to a freight to Chicago of 38c. per 100 lb.

Jobbers quote: Chicago delivery out of stocks, No. 10 blue annealed, 3.38c.; No. 28 black, 4.15c.; No. 28 galvanized, 5.15c. Hoops and bands, 3.48c.

Wire Products.—Jobbers are buying more freely for quick turnover, but as yet are not piling stocks. Railroad purchases are fair, a typical recent purchase being 1200 kegs of nails. The merchant trade of the leading producer is now well over 60 per cent of normal, and its output of all products exceeds 40 per cent.

We quote warehouse prices f.o.b. Chicago; No. 9 and heavier black annealed wire, $3.48 per 100 lb.; No. 9 and heavier bright basic wire, $3.63 per 100 lb.; common wire nails, $3.63 per 100 lb.; cement coated nails, $3.05 per keg.

Cast Iron Pipe.—Springfield, Ohio, will take bids Sept. 30 on 1000 tons of 20 and 24-in. to be sublet by a general contractor. St. Paul, Minn., will receive tenders Oct. 3 on 140 tons of specials. Spring Green, Wis., has rejected bids on 200 tons. Hammond, Ind., has let 3800 tons to the United States Cast Iron Pipe & Foundry Co., and Springfield, Ill., has awarded 250 tons to the National Cast Iron Pipe Co.

We quote per net ton, f.o.b. Chicago, ex-war tax, as follows: Water pipe, 4-in., $45.60 to $47.10; 6-in. and above, $42.60 to $44.10; class A and gas pipe, $3 extra.

Old Material.—Speculative activity by dealers dominates the market. While users refuse to pay the prices at which sellers are buying much railroad material, they do come into the market occasionally and pay considerably more than they did a month or two ago. Thus about 1000 tons of heavy melting was bought at $12.25 per gross ton. Inquiries are numerous, but dealers find it difficult to convince users that recent advances will hold. Although it is difficult to put one's finger on the ruling market, it is apparent that a number of items quoted below are higher by from 25c. to 50c. a ton than prices named. Railroad lists are not numerous. The Burlington offers 4000 tons, the Monon 600 tons, the New York Central a blind list.

We quote delivery in consumers' yards Chicago and vicinity, all freight and transfer charges paid, as follows:

Per Gross Ton	
Iron rails	$16.00 to $16.50
Relaying rails	27.50 to 30.00
Car wheels	15.00 to 15.50
Steel rails, rerolling	13.50 to 14.00
Steel rails, less than 3 ft	13.00 to 13.50
Heavy melting steel	11.75 to 12.25
Frogs, switches and guards cut apart	11.75 to 12.25
Shoveling steel	11.25 to 11.75
Low phos. heavy melting steel	13.75 to 14.25
Drop forge flashings	7.00 to 7.50
Hydraulic compressed sheet	7.50 to 8.00
Axle turnings	8.00 to 8.50
Per Net Ton	
Iron angles and splice bars	14.00 to 14.50
Steel angle bars	11.00 to 11.50
Iron arch bars and transoms	15.00 to 15.50
Iron car axles	18.50 to 19.00
Steel car axles	13.50 to 14.00
No. 1 busheling	9.00 to 9.50
No. 2 busheling	6.25 to 6.75
Cut forge	10.75 to 11.25
Pipes and flues	7.50 to 8.00
No. 1 railroad wrought	11.50 to 12.00
No. 2 railroad wrought	10.75 to 11.25
Steel knuckles and couplers	12.00 to 12.50
Coil springs	13.50 to 14.00
No. 1 machinery cast	13.50 to 14.00
No. 1 railroad cast	13.00 to 13.50
Low phos. punchings	11.50 to 12.00
Locomotive tires, smooth	11.00 to 11.50
Machine shop turnings	3.50 to 4.00
Cast borings	5.00 to 5.50
Stove plate	12.50 to 13.00
Grate bars	11.00 to 11.50
Brake shoes	11.00 to 11.50
Railroad malleable	13.25 to 13.75
Agricultural malleable	13.25 to 13.75
Country mixed	9.00 to 9.50

New York

NEW YORK, Sept. 27.

Pig Iron.—While no large tonnages have been sold during the past week, the market is firmer and $20.50 for No. 2 plain at eastern Pennsylvania furnace now seems to be the minimum, with at least one furnace asking $21 for No. 2 plain and $22 for No. 2X. One company is quoting $20.50 for No. 2 plain, $21 for No. 2X and $22 for No. 1. Sales include 500 tons of No. 2 foundry at $20.50 to a radiator company and 100 tons of Virginia iron, 2.25 to 2.75 silicon, at $23 furnace. This is the first Virginia iron sold in this district for a long time. A Bridgeport, Conn., melter has been inquiring for 700 tons of foundry iron and 200 tons of malleable. The New York Central is in the market for 500 tons of foundry iron. Several other inquiries ranging from 100 to 500 tons are pending. Several sellers have withdrawn from the market temporarily.

We quote delivered in the New York district as follows, having added to furnace prices $2.52 freight from eastern Pennsylvania, $5.46 from Buffalo and $6.16 from Virginia:

East. Pa. No. 1 fdy., sil. 2.75 to 3.25..	$24.52
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	23.52
East. Pa. No 2 fdy., sil. 1.75 to 2.25..	23.02
Buffalo, sil. 1.75 to 2.25.....	25.46
No. 2 Virginia, sil. 1.75 to 2.25 (nom.)	28.16 to 29.16

Ferroalloys.—Demand for ferromanganese has lessened after the comparatively heavy sales a week ago and only 300 tons is reported to have been sold in the last week at the prevailing quotations. Inquiries are confined to a few carload lots. The spiegeleisen market is also inactive, sales of a few carloads being reported, as well as inquiries for similar amounts. Quotations are unchanged. There is no demand for manganese ore. The 50 per cent ferrosilicon market is lifeless at prevailing quotations.

Imports of ferromanganese in August are reported as only 320 gross tons, bringing the total for the first eight months of the year to 5801 tons, as compared with 33,515 tons for the first eight months of last year. Imports of manganese ore in August were fairly large at 28,939 tons, bringing the total for the year to Sept. 1 to 326,342 tons, as against 334,590 tons for the same period a year ago.

Quotations are as follows:

Ferroalloys

Ferromanganese, domestic, delivered, per ton,	$60.00 to $63.00
Ferromanganese, British, seaboard, per ton	$58.35
Spiegeleisen, 20 per cent, furnace, per ton,	$25.00 to $26.00
Ferrosilicon, 50 per cent, delivered, per ton,	$60.00 to $65.00
Ferrotungsten, per lb. of contained metal	48c. to 58c.
Ferrochromium, 6 to 8 per cent carbon, 60 to 70 per cent Cr., per lb. Cr.....	14c.
Ferrovanadium, per lb. of contained vanadium	$4.50

Ores

Manganese ore, foreign, per unit, seaboard.	20c.
Tungsten ore, per unit, in 60 per cent concentrates	$3.00 up
Chrome ore, 40 to 45 per cent Cr_2O_3, crude per net ton, Atlantic seaboard	$20.00 to $25.00
Chrome ore, 45 to 50 per cent Cr_2O_3, crude per net ton, Atlantic seaboard.....	$30.00
Molybdenum ore, 85 per cent concentrates, per lb. of MoS_2, New York	55c. to 60c.

Finished Iron and Steel.—The intimation that the Carnegie Steel Co. would announce minimum prices of 1.75c., Pittsburgh, on plates and shapes and 1.65c., Pittsburgh, on steel bars has had a steadying effect upon the steel market. Independent steel companies which have been selling at lower prices began to receive telephone calls Monday morning from customers who inquired whether contracts for fourth quarter shipment would be accepted at prevailing quotations, which average about 1.60c. for plates, shapes and bars. Generally such requests for forward shipments have been turned down, the mills preferring to take only business for immediate shipment at present prices. Whether independent mills would follow the lead of the Steel Corporation in advancing prices on plates, shapes and bars remains to be seen, but the news that such an advance might be put into effect created a feeling of hopefulness that consumers would soon realize, as some of them seemingly already do, that steel prices are "on the bottom." Jobbers and fabricators have shown more interest in the past week in buying for stock, and while the orders are not large, usually limited to about 100 tons, the total volume shows an improvement. Moreover, it is pointed out that inquiries and orders are coming from more diverse sources. The action of the American Sheet & Tin Plate Co. last week in advancing sheet prices $5 a ton, following similar action the week before by some of its independent competitors, has not spread throughout the entire sheet manufacturing trade, a few companies still quoting the old prices. However, the advance by the leading interest has stimulated buying of sheets, particularly for export to Japan, to a degree that is quite remarkable as compared with recent buying lethargy. Orders for Japan for light gage sheets have been heavier than could be booked for early shipment, especially as there was a predominance of 30½ gage. While reports continue of quotations as low as 1.50c., Pittsburgh, on plates and bars, it is difficult to confirm such transactions. A car company in the East has offered several mills an attractive specification of about 500 tons of plates, shapes and bars at 1.50c., and so far as could be learned no mill was willing to accept the order. On the other hand, a locomotive company placed 500 tons of plates with an Eastern mill at a price so attractive that competitive bids were not invited. Some mills have shown a degree of resistance to the extremely low prices, which may be strengthened by the reported action of the Carnegie Steel Co. in naming higher quotations.

We quote for mill shipments, New York, as follows: Soft steel bars, 1.88c. to 1.98c.; plates, 1.98c. to 2.03c.; structural shapes, 1.98c. to 2.03c.; bar iron, 1.98c. to 2.03c. On export shipments the freight rate is now 28.5c. per 100 lb., instead of 38c., the domestic rate.

Warehouse Business.—A larger volume of inquiries is reported generally, although purchases of small quantities still prevail. While there is undoubtedly a distinct improvement, dealers are inclined to attribute it to the usual fall buying that follows the dullness of July and August. However, the fact that there is any improvement is considered a good omen. In reply to a questionnaire sent to customers by a brass and copper mill, a majority stated that stocks were low and their purchases were made only to fill orders received. Sheets continue stiff, No. 28 gage, galvanized, being quoted in some instances for small lots as high as 5.25c. per lb., although the prevailing price is 5.00c. per lb. Warehouses that have been quoting tin plates, charcoal and wasters, without regard to the usual differentials, have revised prices on the old basis. A reduction of warehouse prices on boiler tubes is expected in about a week. We quote prices on page 858.

High Speed Steel.—Business continues to show a slight improvement, a few purchases being made by the Government and some activity being noted among automobile manufacturers. Machine tool builders and tool makers are still out of the market. Producers continue to quote 90c. to $1 per pound for 18 per cent tungsten high speed steel.

Structural Material.—Structural steel work continues to expand and September will go on record as the best month of the year. Numerous projects are being talked of which have not definitely come into the market and if actual lettings come up to expectations, the last quarter of the year will show a hopeful degree of activity. Among the new projects are a few apartment houses, one at Broadway and Ninetieth Street for Samuel H. Golding, requiring 1300 tons of steel; another at Riverside Drive and 110th Street for the Paterno interests, 700 tons, and another at Fifth Avenue and Seventy-third Street, 900 tons. Three public schools in Brooklyn soon to be set total 2400 tons and a newer project, public school No. 189 for Manhattan, will require 700 tons. A high school building for Atlantic City, N. J., up for bids, will require 1000 tons. Other projects include 400 tons for a factory building for the C. A. Reed Co., Williamsport, Pa.; 500 tons for a swing span for the Philadelphia & Reading Railroad at Atlantic City; 300 tons for an extension to a telephone building in Boston. The American Bridge Co. was awarded 200 tons for a highway viaduct at Edgewater, N. J. The Lehigh Structural Steel Co. will fabricate 600 tons for the First National Bank Building, Miami, Fla. The Hinkle Iron Co. was

awarded 250 tons for a building for the Sinclair-Valentine Co. in West 130th Street, New York.

Railroad Equipment.—The New York Central Railroads has distributed orders among several car companies for the repair of 5000 freight cars, practically doubling the orders awarded several weeks ago. The Bangor & Aroostook Railroad has ordered 200 steel-frame box cars from the Standard Steel Car Co. The Delaware, Lackawanna & Western Railroad may place an order this week for 1000 steel cars. The Monongahela road, owned by the Jones & Laughlin Steel Co., is in the market for 50 steel gondola cars.

Cast-Iron Pipe.—The city of New York awarded the contract for 210 tons of 8-in. pipe to Garabeld & Glority, local contractors. Private buying continues in fair volume for this time of year, at least on the small sizes. Practically all of the Eastern manufacturers have enough business to keep them operating at more than 50 per cent capacity for two months. We quote per net ton, f.o.b. New York, carload lots, as follows: 6-in. and larger, $47.30; 4-in. and 5-in., $52.30; 3-in., $62.30, with $4 additional for Class A and gas pipe.

Old Material.—The feature of the week was the rejection by an Eastern steel company of 75 cars of scrap which are alleged to have contained mixtures of inferior material. As a result, dealers and producers are loading cars with more care. Price trend is still upward. A Pittsburgh mill has offered $14.50, delivered, for heavy melting steel, but few dealers and brokers in this vicinity will ship because of the high freight rates and the extra hazard in case of rejection. An eastern Pennsylvania mill is reported to have offered $13.50 for heavy melting steel. Feeling continues optimistic.

Buying prices per gross ton, New York, follow:

Heavy melting steel, yard	$7.00 to	$7.50
Steel rails, short lengths, or equivalent	8.50 to	9.00
Rerolling rails	11.50 to	12.00
Relaying rails, nominal	37.50 to	40.00
Steel car axles	11.50 to	12.00
Iron car axles	19.00 to	20.00
No. 1 railroad wrought	12.00 to	12.50
Wrought iron track	9.50 to	10.00
Forge fire	5.50 to	6.00
No. 1 yard wrought, long	10.50 to	11.00
Light iron	4.00 to	4.50
Cast borings (clean)	5.50 to	6.00
Machine-shop turnings	3.50 to	4.00
Mixed borings and turnings	3.00 to	3.50
Iron and steel pipe (1 in. diam. not under 2 ft. long)	9.00 to	9.50
Stove plate	10.00 to	10.50
Locomotive grate bars	10.00 to	10.50
Malleable cast (railroad)	8.50 to	9.00
Car wheels	12.00 to	12.50

Prices which dealers in New York and Brooklyn are quoting to local foundries, per gross ton, follow:

No. 1 machinery cast	$17.00 to	$18.00
No. 1 heavy cast (columns, building materials, etc.), cupola size	15.00 to	16.00
No. 1 heavy cast, not cupola size	15.00 to	15.50
No. 2 cast (radiators, cast boilers, etc.)	10.00 to	10.50

St. Louis

ST. LOUIS, Sept. 27.

Pig Iron.—No particularly large order for pig iron was placed this week, but there was a fairly good carload business, most of which was for immediate shipment. A sale of 350 tons of Northern foundry iron for last quarter requirements is reported, shipment of which is to be made promptly, although the buyer wanted last quarter delivery. Inquiries are out for 1000 tons in scattered lots. Prices are being firmly maintained on the basis of $22, Chicago. Trade among the stove factories continues to be on the increase. An inquiry has been received from a local steel manufacturer for a car of 50 per cent ferrosilicon.

We quote delivered consumers' yards St. Louis as follows, having added to furnace prices $2.88 freight and war tax from Chicago and $5.91 from Birmingham:

Northern foundry, sil. 1.75 to 2.25	$24.88
Northern malleable, sil. 1.75 to 2.25	24.88
Basic	24.88
Southern foundry, sil. 1.75 to 2.25	24.91

Finished Iron and Steel.—The advance of $5 a ton on black and galvanized sheets made last week by several companies has been met by the American Sheet & Tin Plate Co. An unusually heavy demand was developed for sheets of all kinds, with the exception of blue annealed. Galvanized roofing sheets were in especially good demand. Stove pipe stock was another item in which there was considerable activity, being a seasonable proposition. The firmness of the lighter sheets is having a good effect on the heavier items. A number of building projects involving considerable tonnage of steel already listed in THE IRON AGE have not yet reached the fabricators' hands. The Pennsylvania Railroad bought a carload of wheels, and the Missouri Pacific purchased a small amount of tool steel, the rest of the railroad's purchases being very small. A traveling salesman has picked up a fair lot of carload orders in Arkansas for bars and structural steels. No change has been made in warehouse prices.

For stock out of warehouse we quote: Soft steel bars, 2.87½c. per lb.; iron bars, 2.87½c.; structural shapes, 2.97½c.; tank plates, 2.97½c.; No. 10 blue annealed sheets, 3.47½c.; No. 28 black sheets, cold rolled, one pass, 4.10c.; cold drawn rounds, shafting and screw stock, 4.20c.; structural rivets, $3.77½ per 100 lb.; boiler rivets, $3.87½; tank rivets, 7/16 in. and smaller, 60-10 per cent off list; machine bolts, large, 55 per cent; small, 60 per cent; carriage bolts, large, 50-5 per cent; small, 55 per cent; lag screws, 60 per cent; hot pressed nuts, square or hexagon blank, $3.25; and tapped, $3.00 off list.

Coke.—Sales of coke this week have been mostly in carload lots, which amounted to a fairly large volume. That consumers need coke is shown by their insistent demands for immediate shipments. Stove plants continue to report better business, and they are buying for their immediate needs. One of the large producers of coke in the Connellsville district has increased the price of foundry coke to $5.50 per ton, but the range is from $4.75 to the higher figure. Roberts by-product coke for domestic purposes has been increased 50c. a ton to $9. delivered.

Old Material.—Prices have made another advance during the last few days, some grades being marked up from $1 to $2 per ton. The advances brought out considerable buying, both by consumers and dealers. Among the sales reported were 3000 tons to the Commonwealth Steel Co., 1500 tons to the Scullin Steel Co., and 4000 tons to the American Car & Foundry Co. The following railroad lists are before the market this week: Texas & Pacific, 5750 tons; Chicago, Burlington & Quincy, 2000 tons; Wabash, 200 tons; Norfolk & Western, 200 tons; Chicago, Indianapolis & Louisville Railway, 750 tons, and an open list from the Cleveland, Cincinnati, Chicago & St. Louis.

We quote dealers' prices, f.o.b. consumers' works, St. Louis industrial district and dealers' yards, as follows:

Per Gross Ton

Iron rails	$14.50 to	$15.00
Steel rails, re-rolling	12.50 to	13.00
Steel rails, less than 3 ft	13.00 to	13.50
Relaying rails, standard section	29.00 to	30.00
Cast iron car wheels	14.50 to	15.00
No. 1 heavy railroad melting steel	11.50 to	12.00
No. 1 heavy shoveling steel	11.00 to	11.50
Ordinary shoveling steel	10.50 to	11.00
Frogs, switches and guards, cut apart	11.50 to	12.00
Ordinary bundle sheet	5.50 to	6.00

Per Net Ton.

Heavy axle and tire turnings	$7.50 to	$8.00
Iron angle bars	11.50 to	12.00
Steel angle bars	10.50 to	11.00
Iron car axles	20.00 to	20.50
Steel car axles	15.50 to	16.00
Wrought iron arch bars and transoms	15.50 to	16.00
No. 1 railroad wrought	11.50 to	12.00
No. 2 railroad wrought	10.50 to	11.00
Railroad springs	12.00 to	12.50
Steel couplers and knuckles	12.00 to	12.50
Locomotive tire, 42 in. and over, smooth inside	9.50 to	10.00
No. 1 dealer's forge	8.50 to	9.00
Cast iron borings	7.50 to	8.00
No. 1 busheling	11.00 to	11.50
No. 1 boilers cut in sheets and rings	7.00 to	7.50
No. 1 railroad casts	15.00 to	15.50
Stove plate and light cast	12.00 to	12.50
Railroad malleable	10.50 to	11.00
Agricultural malleable	10.00 to	10.50
Pipes and flues	8.50 to	9.00
Heavy railroad sheet and tank	7.50 to	8.00
Light railroad sheet	4.50 to	5.00
Railroad grate bars	9.50 to	10.00
Machine shop turnings	6.00 to	6.50
Country mixed iron	7.50 to	8.00
Uncut railroad mixed	9.00 to	9.50
Horseshoes	11.00 to	11.50
Railroad brake shoes	9.50 to	10.00

Buffalo

BUFFALO, Sept. 27.

Pig Iron.—About 22,000 tons of pig iron has been sold here and plus improvement in inquiry and greater furnace operation in prospect, the situation generally shows improvement. The size of orders has undergone some change and with one producer especially there is a tendency to get away from the carload scale which has prevailed and orders for 200 tons and thereabouts are now the rule. One interest sold about 10,000 tons, of which 8000 tons was made up of two orders. A producer has settled on a differential plan and announces adherence in the future. The base price is $20, and for each advance of 50 points in silicon there will be a corresponding advance of 50c. per ton. The $20 base price is firm and in proof thereof is the refusal by one interest to take a sizable tonnage where the buyer sought to place the business at $18.50. No local producer quoted less than $20. The interest now operating the only furnace blowing on basic expects to blow in a furnace to make foundry iron either Oct. 1 or Oct. 15. About 7000 tons has been inquired for with one interest—a noticeable improvement over the volume of inquiry in any week in September. The same maker sold 4000 tons, but no large order helped make this total. In sales of 3000 tons by one furnace the $20 price was firm. Four blast furnaces are now blowing in this district.

We quote f.o.b. dealers' asking prices per gross ton Buffalo as follows:

No. 1 foundry, 2.75 to 3.25 sil.	$21.00
No. 2 X foundry, 2.25 to 2.75 sil.	20.50
No. 2 plain, 1.75 to 2.25 sil.	20.00
Basic (nominal)	21.00
Malleable (nominal)	22.00
Lake Superior charcoal	31.75

Coke.—Inquiry has improved and comes from a wider circle. One interest has urged its customers to take immediate action toward filling anticipated needs.

Finished Iron and Steel.—Sheet orders have been stimulated with announcement of price advances and both black and galvanized material showed better demand. Before the advance became effective one interest booked sufficient business in various sizes to insure three weeks' rolling. Orders ranged from carload lots to 200 tons. The general observation was that all stocks were low and that notice of price advance forced many jobbers into the market. There is a dearth of structural activity and corresponding dullness in plates and bars. Pipe business has maintained a fair average but reductions in this commodity did not stimulate business to any marked extent. Tin plate demand has increased, and is probably due to harvest conditions. Bolt and nut business is good and one interest has taken an order for two minimum carloads—now regarded as unusually large business. Another inquiry for bolts and nuts of unusual size sent out by a local purchaser did not go to a local interest. In structural work only two small jobs have been awarded. The Lackawanna Bridge Co. will fabricate 100 tons for a bridge in Holyoke, Mass., and 80 tons for a bridge in Essex County, N. Y. A number of alteration and repair jobs calling for tonnages ranging from five to 15 tons have been booked. Only a few bar orders have been placed with a mill which is maintaining a price of 1.60c.

Warehouse Business.—Anticipated advances in warehouse sheet prices have brought out some satisfactory orders. The average of business generally has improved and while the best movement is in sheets, other materials have been in demand. The new schedule of sheet prices is expected within a few days.

We quote warehouse prices f.o.b. Buffalo as follows: Structural shapes, 2.90c.; plates, 2.90c.; plates, No. 8 gage, 3.25c.; soft steel bars and shapes, 2.80c.; hoops, 3.50c.; blue annealed sheets, No. 10, 3.30c.; galvanized steel sheets, No. 28, 5c.; black sheets, No. 28, 4c.; cold-rolled strip steel, 6.40c.; cold-rolled round shafting, 4.05c.

Old Material.—With one exception the largest mills have bought heavy melting steel. Most of the tonnages went for $13, but there is not much material to be obtained at this price now. The one mill which has not purchased has had considerable material on hand and it is not likely there will be any purchases in a long time. Better demand for turnings and borings is evident and there has been a more satisfactory movement of heavy breakable cast scrap and hydraulic compressed. Quick delivery is a usual condition of a purchase.

We quote dealers' asking prices per gross ton f.o.b. Buffalo as follows:

Heavy melting steel	$13.00 to $13.50
Low phos., 0.004 and under	14.50 to 15.50
No. 1 railroad wrought	12.00 to 13.00
Car wheels	13.00 to 14.00
Machine shop turnings	4.00 to 5.00
Cast iron borings	4.00 to 5.00
Heavy axle turnings	8.00 to 9.00
Grate bars	8.00 to 9.00
No. 1 busheling	9.00 to 10.00
Stove plate	11.00 to 12.00
Bundled sheet stampings	6.00 to 7.00
No. 1 machinery cast	14.00 to 15.00
Hydraulic compressed	9.50 to 10.00
Railroad malleable	12.00 to 12.50

Boston

BOSTON, Sept. 27.

Pig Iron.—Sales have increased and prices are stronger. One active eastern Pennsylvania furnace has advanced prices 50c., another $1, and a Buffalo furnace 50c. a ton. Higher silicon iron shows greater strength than lower, due to establishment of 50c. silicon differential on No. 2X and $1 on No. 1X, whereas less than a month ago differentials were disregarded. Those Buffalo and eastern Pennsylvania furnaces not advancing prices hold strongly to previously established quotations, and have turned down round tonnages rather than make concessions. Sales the past week approximate 8500 tons, including 3500 tons against the 10,000-ton No. 2 plain inquiry noted last week; 1000 tons No. 1X and a like amount of No. 2X eastern Pennsylvania by a textile machinery interest; 300 tons, silicon 1.25 to 1.75, and 200 tons No. 2 plain eastern Pennsylvania by another textile concern; 100 tons No. 1X and 100 tons No. 2X eastern Pennsylvania by still another; 700 tons Northern charcoal and 300 tons Buffalo, four grades in all, by a Massachusetts foundry; 200 tons No. 2X eastern Pennsylvania by a western Massachusetts, and 100 tons by a Rhode Island melter; 250 tons No. 2X to a Massachusetts foundry; numerous car lots of Buffalo, eastern Pennsylvania, Alabama and Virginia, mostly high silicon, without competition. Details regarding the 3500 tons are lacking. Most other lots sold were on a basis of $20.50 for silicon 2.25 to 2.75. The charcoal iron sold at $30 furnace base. As far as is known no iron was sold for 1922 delivery. Some melters who recently purchased iron and others who have not are making general and private inquiries. An eastern Pennsylvania company will blow in two small furnaces, closed since February last. Another has sold 40,000 tons for delivery between now and Jan. 1, and is practically sold up. Delivered pig iron prices follow:

East. Penn., silicon 2.25 to 2.75	$24.56 to $26.06
East. Penn., silicon 1.75 to 2.25	24.06 to 25.56
Buffalo, silicon 2.25 to 2.75	25.46 to 26.46
Buffalo, silicon 1.75 to 2.25	24.96 to 25.96
Virginia, silicon 2.25 to 2.75	29.08 to 31.08
Virginia, silicon 1.75 to 2.25	28.58 to 30.58
Alabama, silicon 2.25 to 2.75	30.16
Alabama, silicon 1.75 to 2.25	29.66

Finished Material.—The New England Structural Co., Boston, is awarded 550 tons structural steel for a 12-story office building, and 100 tons for a South Boston plant. Other business placed the past week was confined to small tonnages, of which there is an increasing amount. For the Bradbury building, Boston, 183 tons will be let this week, as will 400 tons for the Lamson Co., Syracuse, N. Y., plant. The Bath Iron Works, Bath, Me., inquiry for approximately 1500 tons of plates and shapes for five lightships has become active again. A slightly better inquiry for wrought pipe is noted with actual business in car lots. Sheets are quiet, consumers having covered before the recent advance. Deformed bars are in better demand than other kinds. The market for plates, shapes and bars is soft at 1.60c. to 1.70c., Pittsburgh.

Jobbers now quote: Soft steel bars, $2.81½ per 100 lb. base; flats, $3.83 to $3.93; concrete bars, $2.50 to $3.09; tire steel, $4.20 to $4.70; spring steel, open hearth, $5.25; crucible, $11.50; steel bands, $3.46½ to $3.98; steel hoops, $4.18; toe calk steel, $5.25; cold rolled steel, $4.15 to $4.65; structural steel, $2.81½ to $2.96½; plates, $2.91½ to $3.10; No. 10 blue annealed sheets, $3.73; No. 28 black sheets, $4.75; No. 28 galvanized sheets, $5.25; refined iron, $2.83 to $4.75; best refined, $4.75; Wayne iron, $7; Norway iron round, ¼-in. to 2½-in., 7.10c. per lb. net; other sizes, 7.75c. base.

Warehouse Business.—Consumption of iron and steel is increasing, although slowly. Individual orders placed with the warehouses usually call for small amounts of stock, but the number of orders booked daily, on the average, is gaining. At the moment activity is confined more to shapes and plates than other materials. Most warehouses have a good assortment, but small stocks. The market on galvanized cut nails has advanced 50c. per keg to $8.30 base.

Coke.—The demand from small melters for foundry coke for winter storage continues to increase, and developments in the Connellsville district have stimulated interest among the large consumers. Consumption of spot fuel also is increasing. The demand and consumption is still considerably below normal, however. The New England Coal & Coke Co. has brought in another battery of ovens, making 240 ovens in operation, and 80 out. A total of approximately 1500 tons of Connellsville foundry coke has been placed in New England since last reports at $4.50 ovens. The market on Connellsville cokes as offered here is $4.50 to $5.50 ovens.

Old Material.—The market for old material fails to reflect the activity in pig iron. That for No. 1 machinery cast is firmer, however, due to the small available supply at less than $19 delivered, and to continued dickerings on 100-ton lots. Small foundries continue to buy from local yards at approximately 70c. per 100 lb. No. 2 machinery cast appears scarce and stove plate is not obtainable at less than $15.50 delivered. The market on heavy melting steel is firm in anticipation of business. Interests recently selling to Pennsylvania mills did so at prices which will permit their placing orders here for some of the material. Slightly more inquiry is noted for machine shop turnings. A broker this week sold a car of old car wheels at $16 delivered. The old material market otherwise is without special feature.

The following prices are for gross ton lots delivered consuming points:

No. 1 machinery cast	$18.50 to $20.00
No. 2 machinery cast	16.50 to 17.50
Stove plate	15.50 to 16.50
Railroad malleable	11.50 to 12.50

The following prices are offered per gross ton lots f.o.b. Boston rate shipping points:

No. 1 heavy melting steel	$6.50 to $7.00
No. 1 railroad wrought	10.00 to 10.50
No. 1 yard wrought	8.00 to 8.50
Wrought pipe (1-in. in diameter, over 2 ft. long)	8.00 to 8.50
Machine shop turnings	2.50 to 3.00
Cast iron borings, rolling mill	3.50 to 4.00
Cast iron borings, chemical	4.00 to 4.50
Blast furnace borings and turnings	2.50 to 2.75
Forged scrap and bundled skeleton	4.50 to 5.00
Street car axles and shafting	12.00 to 13.00
Car wheels	13.00 to 14.00
Rerolling rails	9.00 to 10.00

Birmingham

BIRMINGHAM, ALA., Sept. 26.

Pig Iron.—Birmingham pig iron business continues to consist largely of small lots for prompt shipment, but fourth quarter is being covered more and more by stove makers, pipe founders, radiator works and the like. No very large tonnages have come to the surface, but high pressure pipe lettings secured by Birmingham works will soon call for them. Not as much business was done in the Middle West as during the previous week, but enough additional orders came to show that the gate has been opened. Southern makers are slow to advance because they wish to make sure of the competitive territory. The base has remained at $19 where frequently $19.50 might have been gotten. The Alabama Co. has definitely fixed Oct. 10 as the date for resumption and the Republic Iron & Steel Co. will probably blow in a stack around the same date. Stocks are so ill-assorted and so low that some interests must resume to do business at all. The Southern melt is undoubtedly increasing, radiator works, for instance, operating at 100 per cent. Gadsden car works and other foundries have gone from four to six days of operation. Oil mills and ginneries are active and calling for machinery repairs and brick and cement plants are in full operation. A lot of small business has come to the foundries and all are in the market for pig iron. The largest deal of the week was for 1500 tons of pig iron for a sanitary pipe interest, its fourth quarter supply. The iron situation becomes stronger with persistence and each added degree of strength is being nailed down by conservative policies.

We quote per gross ton f.o.b. Birmingham district furnace, as follows:

Foundry, sil. 1.75 to 2.25	$19.00
Basic	18.00
Charcoal	35.00

Cast Iron Pipe.—The National Cast Iron Pipe Co. remains at about 100 per cent of operations with continuity of new orders, the latest being 400 tons for Decatur, Ill.; 850 for Youngstown and 150 for Troy, Ohio. Base remains at $35 for 6 in. High pressure pipe is looking up. Sanitary pipe is fairly active at $40 for standard and $30 for extra heavy.

Coal and Coke.—Semet-Solvay by-product works at Fairfield will resume this week in order to supply the Alabama Co. with coke for its Alamaba City furnace. The by-product plant of the Central Iron & Coal Co. at Holt has also resumed. Standard foundry coke remains firm at $6.

Finishing Mills.—The tremendous influx of orders for nails has added impetus to the wire drawing mills. The Gulf States Steel Co. approached the end of September with 60 per cent of production in finishing mills. It was more than that at the mills of the American Steel & Wire Co. The Tennessee company is on day and night turn at the Ensley rail mill. This interest has a cargo of manganese ore coming from Brazil on the steamer Craster Hall. All steel works have speeded up.

Old Material.—The scrap dealers are holding out for an advance of $1 on No. 1 cast and some will not sell at the present quotations. Stove plate has advanced several dollars a ton. Steel remains weak on account of the limited territory within range of the Birmingham yards.

We quote per gross ton f.o.b. Birmingham district yard as follows:

Steel rails	$11.00 to $12.00
No. 1 steel	10.00 to 11.00
No. 1 cast	15.00 to 16.00
Car wheels	15.00 to 16.00
Tramcar wheels	12.00 to 13.00
No. 1 wrought	13.00 to 14.00
Stove plate	13.00 to 14.00
Cast iron borings	6.00 to 7.00
Machine shop turnings	6.00 to 7.00

Cincinnati

CINCINNATI, Sept. 26.

Pig Iron.—A number of fair-sized sales were reported during the week, the business being principally in Southern irons. A sanitary manufacturing company closed for 5000 tons at $19, base, Birmingham, for last quarter and another melter south of the Ohio bought 1000 tons. A sale of 5000 tons of Northern basic to an Indiana melter was made recently, but not then reported. Several 200-ton sales and a few 100-ton lots were made, indicating more interest in the market by melters. There are practically no inquiries from this district, other than carload lots, but the inquiry from other districts is more encouraging. It is reported that a Southern furnace has made a price of $19, base, for first quarter but no business has been booked. According to the best figures available, the average operation of foundries in the State of Ohio during September will be about 25 per cent of capacity compared with 16 per cent during August. Stove shops are running better, and jobbing foundries are showing a slight improvement. Belfont stack at Ironton will probably resume shortly, and the Republic Iron & Steel Co. will blow in one furnace in the South next month. Prices of silvery and Bessemer ferrosilicon irons have been advanced $2 by Jackson County makers.

Based on freight rates of $4.50 from Birmingham and $2.52 from Ironton, we quote f.o.b. Cincinnati:

Southern coke, sil. 1.75 to 2.25 (base)	$23.50
Southern coke, sil. 2.25 to 2.75 (No. 2 soft)	24.00
Ohio silvery, 8 per cent sil	32.02
Southern Ohio coke, sil. 1.75 to 2.25 (No. 2)	23.52
Basic, Northern	22.52
Malleable	24.02

Warehouse Business.—No change is reported in warehouse business, buyers purchasing only for immediate needs and in small quantities. A reduction of $3 per ton has been made in cold-rolled products, these now being quoted at 4.10c. for rounds and 4.60c. for flats, squares and hexagons.

Iron and steel bars, 3c. base; hoops and bands, 3.75c. base; shapes, 2.85c. base; plates, 2.85c. base; reinforcing bars, 3.07½c. base; cold rolled rounds, 1½ in. and larger, 4.10c. under 1½ in. and flats, squares and hexagons, 4.75c.; No. 10 blue annealed sheets, 3.50c.; No. 28 black sheets, 4.25c.; No. 28 galvanized sheets, 5.25c.; wire nails, $3.40 per keg base; No. 9 annealed wire, $3.00 per 100 lb.

Coke.—Increasing interest is reported in the coke market with prices stiffening. Carload sales are more frequent and at widely distributed points. One operator in West Virginia is reported to have withdrawn from the market, as he has booked all the business he cares to take on at the present prices. Connellsville foundry coke is quoted at $4.25 to $5.50, Wise County at $5.50 to $6, and New River at $7 to $7.50.

Finished Material.—Sheets continue to be the leader in the finished material market and the tonnage booked during the week was very satisfactory. Practically all of the sheet mills have now advanced to 2.50c., 3c. and 4c. for blue annealed, black and galvanized, respectively. While offers were being made to purchase sheets at the former prices for delivery during the first quarter, none of this business was acceptable to the mills, which are not quoting for delivery over a longer period than six weeks. Some small bar, shape and plate business was booked, the orders being confined mostly to carload lots. There is one inquiry, however, for 300 tons of structural material from a northern Ohio fabricator. Prices are a shade weaker in the local market, bars having been quoted at 1.60c. in less than carload lots and shapes and plates at 1.65c. Some wire and nail orders were placed at the recently advanced schedule. In the structural field an addition to the American building at Dayton calls for 100 tons. Schenck & Williams, Dayton, Ohio, are the architects. The Columbus Forge & Iron Co. awarded the contract for its new building to the Middle States Construction Co. About 300 tons is involved. The Tond Creek Coal Co., in West Virginia, awarded the contract for a mining tipple, bridge and trestle to the Kenwood Bridge Co., approximately 170 tons. The contract for the erection of the Kellogg Avenue Bridge, Cincinnati, reported last week as having gone to E. M. Sculley, Columbus, has not been formally awarded. Pending business includes an addition to the Oakley Public School, Cincinnati, estimated to cost $400,000. The Roosevelt office building at Indianapolis, which will take 600 tons, will not be up for bids before the first of the year. Plant operations in this territory will not materially change. The American Rolling Mill Co. is running at approximately 75 per cent in its sheet mills and the Whitaker-Glessner Co., at Portsmouth, at about 40 per cent. The Andrews Steel Co. and the Newport Rolling Mill Co. are still idle.

Old Material.—There is practically nothing being done in the local scrap market, though some interest is reported from other districts. No price changes have been made recently.

We quote dealers' buying prices:

Per Gross Ton		
Bundled sheets	$4.00 to	$5.00
Iron rails	12.00 to	12.50
Relaying rails, 50 lb. and up	25.00 to	26.00
Rerolling steel rails	10.50 to	11.50
Heavy melting steel	9.00 to	9.50
Steel rails for melting	9.00 to	10.00
Car wheels	11.50 to	12.50
Per Net Ton		
No. 1 railroad wrought	8.50 to	9.50
Cast borings	2.50 to	3.00
Steel turnings	2.00 to	2.50
Railroad cast	12.00 to	12.50
No. 1 machinery	13.50 to	14.50
Burnt scrap	7.50 to	8.50
Iron axles	15.00 to	16.00
Locomotive tires (smooth inside)	9.50 to	10.00
Pipes and flues	4.00 to	5.00

The Eagle Lock Co., Terryville, Conn., has placed all departments heretofore on a 24-hr. weekly schedule on a 40 hr. basis. Several departments are working on a 55 hr. schedule.

Cleveland

CLEVELAND, Sept. 26.

Iron Ore.—There is little improvement in the ore shipping situation owing to the fact that in the readjusment of shipping schedules by consumers the amount of ore that had been released during the past month for shipment this season somewhat exceeds the reductions that other consumers have made in their shipping orders during the same period. Recent inquiries for small lots of ore have evidently not yet resulted in any sales. Another inquiry has come out, this being for 15,000 tons of manganiferous ore.

We quote delivered lower lake ports: Old range Bessemer, 55 per cent iron, $6.45; Old range non-Bessemer, 51½ per cent iron, $5.70; Mesabi Bessemer, 55 per cent iron, $6.20; Mesabi non-Bessemer, 51½ per cent iron, $5.55.

Pig Iron.—One Cleveland interest took 1000 tons of No. 2 foundry iron for the Standard Sanitary Mfg. Co. for immediate shipment and another booked 1500 tons of malleable iron in southern Ohio. The Sanitary company also bought 3000 tons of foundry iron from another seller at $21.50 for No. 2X for last quarter. Another producer sold 2700 tons of foundry iron in small lots. The price situation shows virtually no change in this or the Valley district. Lake furnaces in Ohio continue to quote No. 2 foundry at $20 to $21, with the former as the most common price. For Cleveland delivery quotations range from $20.50 to $21 at furnace. The lower price might possibly be shaded, although car lot sales are reported at $21. In the Valley, $21 is apparently firmly maintained on round lot orders. Buffalo has evidently been the weakest point in the market recently, but a Buffalo steel plant advanced its price on No. 2 foundry iron from $19.50 to $20.50. Greater activity is reported in foundry grades in the East. A Cleveland interest made several sales for eastern shipment on the basis of $21 western New York furnace, or equivalent to about $20.25 Buffalo. Other sales include 700 tons of off foundry at $18.50. The basic market is inactive. Considerable small lot inquiry for low phosphorous iron has sprung up and a 300-ton lot was sold at $35. That price, however, is evidently being shaded. September shipments will show considerable gain over August.

Quotations below are f.o.b. local furnace for northern foundry iron, not including a 56c. switching charge. Other quotations are delivered Cleveland, being based on a $1.96 freight rate from Valley points, a $3.36 rate from Jackson and a $6.67 rate from Birmingham:

Basic	$21.21
Northern No. 2 fdy., sil. 1.75 to 2.25	$20.50 to 21.00
Southern fdy., sil. 2.25 to 2.75	26.17
Ohio silvery, sil. 8 per cent	30.86
Standard low phos., Valley furnace	35.00

Semi-Finished Steel.—Several independent mills this week advanced prices on sheet bars to $32. For some time $30 has been the general quotation.

Finished Iron and Steel.—Some mills are continuing their efforts to get prices on a firmer basis. The Carnegie Steel Co. this week announced that its minimum prices would be 1.65c. for steel bars and 1.75c. for plates and structural material. This is $2 a ton lower than the prices named in the last formal price announcement, but higher than the minimum prices that have been prevailing recently. However, it is too early to tell whether all the independent mills will come up to the Steel Corporation's prices. At least some are still quoting prices that have been prevailing. Steel bars in round lots can still be bought at 1.60c. and plates and structural material at 1.60 to 1.65c., the latter price being the minimum with some of the mills. Local plate mills have stiffened on their prices to 1.70c. to 1.75c. Hard steel reinforcing bars are quiet and weak. While 1.60c. is the usual quotation, this might be shaded on desirable orders. The volume of business is improving slightly, and some consumers are buying in larger lots than they have been, evidently feeling that prices may not go lower than the recent minimum. The Ford Motor Co. is understood to have placed about the usual amount of steel for its October requirements, but is not releasing orders for all the tonnage, thus protecting itself against a large inventory, should car orders fall off next month. One industry that has shown considerable improvement recently is the manufacture of steel barrels. There is little activity in the building field,

although fabricators are quoting on a few small orders. The Solar Refining Co. has an inquiry out for 950 tons of plates and structural material. The Rock Island Railroad is inquiring for 15 Mikado type locomotives requiring 700 tons of plates.

Jobbers quote steel bars, 2.64c.; plates and structural shapes, 2.74c.; No. 9 galvanized wire, 3.50c.; No. 9 annealed wire, 3.25c.; No. 28 black sheets, 3.75c.; No. 28 galvanized sheets, 4.75c.; No. 10 blue annealed sheets, 3.10c.; hoops and bands, 3.29c.; cold-rolled rounds, 3.85c.; flats, squares and hexagons, 4.35c.

Sheets.—The market has stiffened following the advance to 3c., 4c. and 2.50c. for black, galvanized and blue annealed sheets respectively made by the leading interest after similar advances by several independent mills. The advanced prices are generally quoted on black and galvanized sheets, but some mills are still quoting blue annealed sheets in all gages at 2.25c. and others are on the same basis for only No. 12 gage and heavier sheets. The Ford Motor Co. during the week placed about 3000 tons of sheets for October delivery. Little sheet business has been placed at the advance in prices, as most consumers were taken care of before prices were marked up. Sheets in tank steel quality in blue annealed gages are quoted on a plate basis of 1.75c.

Warehouse Business.—Local jobbers report an improved demand for sheets. Warehouse prices on sheets are unchanged and will not be marked up until it becomes apparent that the higher mill prices will hold.

Strip Steel.—Quotations on hot-rolled strip steel range from 2.10c. to 2.25c., the latter being the common quotation for the narrower sections. Prices on cold-rolled strips range from 3.75c. to 4c.

Cast-Iron Pipe.—On an inquiry from Cleveland for 1700 tons of 48 and 60-in. cast-iron pipe, the United States Cast Iron Pipe & Foundry Co., the only bidder, quoted $41.80 per ton delivered.

Bolts, Nuts and Rivets.—The demand for bolts and nuts is growing slowly and the market shows increasing firmness. Jobbers and some classes of consumers are buying more freely. One local maker reports that September sales will run about 33 per cent over those in August. The demand for rivets continues dull. The Champion Rivet Co. has withdrawn prices and is now adhering to 2.50c. Pittsburgh for structural and 2.60c. for boiler rivets. Minimum prices by some makers are about $5 a ton lower.

Coke.—The foundry coke market is fairly active, considerable business being booked at $4.50 and $4.75 in lots ranging from one to four cars for immediate shipment.

Old Material.—There is a fair amount of activity in the scrap market in the Youngstown district and local dealers are devoting their attention to that and other territories, as there is no demand in Cleveland. Because of the absence of sales to local consumers, Cleveland prices on items that are in any way active are based on prices that are being paid at other Ohio consuming points and this has resulted in some price changes. Dealers are paying $14 to $14.50 for heavy melting steel for Youngstown delivery and there is a good demand for machine shop turnings for Youngstown consumers, for which dealers are offering $8.25. Compressed steel is quoted at $11 to $11.25 for Youngstown delivery and sales of flashings are reported at $10 delivered at the same consuming points.

We quote per gross ton delivered consumers' yards in Cleveland and vicinity as follows:

Heavy melting steel	$12.00 to $12.50
Steel rails under 3 ft.	12.75 to 13.25
Steel rails, rerolling	14.25 to 14.75
Iron rails	11.00 to 12.00
Iron car axles	18.00 to 19.00
Low phosphorus melting scrap	12.50 to 13.00
Cast borings	7.25 to 7.75
Machine shop turnings	6.50 to 7.00
Mixed borings and short turnings	7.00 to 7.50
Compressed steel	8.25 to 8.75
Railroad wrought	12.00 to 12.50
Railroad malleable	12.00 to 12.75
Light bundled sheet stampings	4.50 to 5.00
Steel axle turnings	9.25 to 9.75
No. 1 cast	16.00 to 16.50
No. 1 busheling	7.50 to 8.00
Drop forge flashings, over 10 in.	7.00 to 7.50
Drop forge flashings, under 10 in.	7.00 to 7.50
Railroad grate bars	12.75 to 13.00
Stove plate	13.00 to 13.25
Pipes and flues	6.50 to 7.50

Philadelphia

PHILADELPHIA, Sept. 27.

Continued improvement in the iron and steel markets is noted, and while conditions are changing very slowly, the net results are encouraging to the trade. In finished steel lines, the most important development is the announcement by the Carnegie Steel Co. that its prices on plates and shapes are now 1.75c., and on steel bars 1.65c., Pittsburgh. While these prices are a reduction of $2 a ton from the last "official" quotations of the Carnegie Steel Co., they are actually an advance, as recent business has been taken at competitive prices made by independent mills. It is not likely that this announcement will have the immediate effect of putting up prices quoted by independents, but it has already stiffened the market somewhat by reducing the number of extremely low quotations. Another effect has been a sudden interest among buyers in fourth quarter contracts. Every steel company has received inquiries from its customers as to whether it would contract for fourth quarter at the current quotations, and such inquiries have been quite uniformly turned down. Likewise, there has been a greater tendency to refuse attractive business when offered at low prices. For example, a jobber has tried to place 2000 tons of plates, shapes and bars for stock at 1.50c., Pittsburgh, but apparently without success.

More makers of sheets have followed the $5 a ton advance recently put into effect by the American Sheet & Tin Plate Co. and some of the leading independents, but a 2000-ton order for blue annealed is reported to have been placed last week at 1.90c., Pittsburgh. Sheet manufacturers have been giving their customers ample opportunity to cover at the outstanding quotations before putting into effect the new prices, which are now generally observed.

A further advance in foundry pig iron places the market on a minimum basis of $20.50, furnace. Probably 25,000 tons was booked here within the past week. Among pending inquiries is one for 5000 tons of basic and another for 3000 tons of gray forge.

Payment of long standing accounts by Eastern railroad companies has had a beneficial effect upon steel companies and has placed the roads again in a position where they can use their credit more freely in making purchases of needed material.

Pig Iron.—Another advance in foundry iron has been put into effect by Eastern furnaces and the market is from 50c. to $1.50 higher than a week ago, depending upon the furnace. Nearly all of the active furnaces in this district now ask $20.50, furnace, for No. 2 plain iron, 1.75 to 2.25 per cent silicon, and $21 for No. 2X, 2.25 to 2.75 per cent silicon. For No. 1X iron the differential is $1 or more above the price of No. 2X. The Warwick furnace, which has sold its output for the remainder of the year, has virtually withdrawn from the market by naming prices higher than its competitors are asking, its schedule being $21 for No. 2 plain, $22 for No. 2X and $23.75 for No. 1X, all f.o.b. furnace. The Thomas Iron Co. has decided to put its smallest furnace, at Hellertown, Pa., in blast in about two weeks, and has named the following prices for fourth quarter delivery: No. 2 plain, $23; No. 2X, $23.50; No. 1X, $24.50, furnace. If the demand for iron is sufficient to justify it, the same company will also put in blast its Alburtis furnace in four or five weeks. Demand for foundry iron has been fairly well sustained, sales in this market during the week having totaled at least 25,000 tons, of which the greater part was booked by one furnace company. A fair volume of inquiry is pending, including that from a Westfield, Mass., machinery company for 10,000 tons of No. 2 plain upon which eastern Pennsylvania furnaces quoted. The lowest quotation from this district is said to have been $19.50, furnace. One furnace, which quoted this price, later withdrew it. So far as reported, the business is not yet placed. An inquiry for 5000 tons of basic comes from a Harrisburg company, and a Pottstown company is inquiring for 3000 tons of gray forge iron. There have been numerous sales within the week of foundry

iron in lots of 1000 tons or more, and several of 500 tons and some smaller tonnages. A favorable indication is the purchase of iron by jobbing foundries, indicating a slight resumption of activity in that industry. Malleable iron is higher, sales having been made at $22.50 and $23, furnace. Pending business in basic and gray forge will probably be negotiated at about $20, furnace. The last important sale of basic in this district was at $19.25, delivered. The attitude of Eastern producers on prices appears to be very firm, and most of them have sufficient orders on hand to await developments in the situation. If the market advances a few dollars above its present level other furnaces will undoubtedly be put in blast. The coke situation is a factor which makes for higher costs. One Eastern furnace is reported to have covered for its fourth quarter coke at $3.50, Connellsville. This adds close to $1 per ton to the cost of making iron compared with a month ago.

The following quotations are, with the exception of those on low phosphorus iron, for delivery at Philadelphia, and include freight rates varying from 84 cents to $1.54 per gross ton:

East. Pa. No. 2 plain, 1.75 to 2.25 sil.	$21.34 to $22.04
East. Pa. No. 2X, 2.25 to 2.75 sil.	21.84 to 22.54
Virginia No. 2 plain, 1.75 to 2.25 sil.	27.74 to 28.74
Virginia No. 2X, 2.25 to 2.75 sil.	28.24 to 29.74
Basic deliv. eastern Pa.	19.25 to 20.75
Gray forge	20.00 to 21.00
Malleable	24.00 to 25.00
Standard low phos. (f.o.b. furnace)	36.50
Copper bearing low phos. (f.o.b. furnace)	35.00

Semi-Finished Steel.—With prices of finished steel showing some signs of a firmer tendency there is a little more interest in rerolling billets, but no business of importance has resulted. An advance of $2 a ton on sheet bars has been announced by leading makers, making the present price $32, Pittsburgh. Billets are still quoted at $30 for rerolling quality and $35 for forging quality, Pittsburgh.

Light Rails.—Prices quoted on 25 to 45-lb. sections range from 1.60c. to 1.75c., Pittsburgh.

Plates.—Although plates continue to be the weakest and least in demand of all steel products, there is a slight improvement. One leading Eastern producer is operating its plant at a better rate this week than it has had in months. The notice served upon the trade by the Carnegie Steel Co. that its price on plates had been fixed at 1.75c., Pittsburgh, has tended to hasten the acceptance by consumers of some of the outstanding low quotations. While plates are still obtainable from independent companies at 1.60c., Pittsburgh, it is probable that fewer quotations below that price are being made this week. Some offers of orders at 1.50c., Pittsburgh, have been turned down by the mills.

Structural Shapes.—The price of shapes remains at 1.60c., Pittsburgh, but the naming of 1.75c. as the price of the Carnegie Steel Co. has resulted in a stiffening of this quotation, there being less inclination by the mills to shade that figure. Offers of stock orders by jobbers and fabricators at 1.50c., Pittsburgh, have apparently not found willing sellers. The Chestnut Street pier work, about 1000 tons, has been awarded to the Bethlehem Fabricators, Inc. Horace T. Potts is in the market for about 800 tons for a new steel warehouse. Several other important jobs are pending, including a 1000-ton school at Atlantic City and a swing span for the Philadelphia & Reading, 500 tons.

Bars.—Though 1.50c., Pittsburgh, has been freely done on reinforcing bars, it is stated that a considerable part of the current bar business is being taken at prices ranging from 1.60c. to 1.75c., Pittsburgh, the higher figures usually applying to less than carload orders. Within the past week 2000 or 3000 tons have been put up to local offices for quotations, including 750 tons for the Chesapeake & Ohio Railroad, with 150 tons of plates. An inquiry from a local construction company for a water filtration job calls for 750 tons of reinforcing bars. Demand for bar iron is light and the price remains at 1.60c., Pittsburgh.

Sheets.—Most of the independent mills have now advanced sheet prices to the new levels originally named by the Brier Hill Steel Co. and later announced by the American Sheet & Tin Plate Co. These new prices are 2.50c. for blue annealed, 3c. for black and 4c. for galvanized, Pittsburgh. Some of the makers were slow in making the advance, giving their customers full opportunity to cover at the former prices. In a few instances outstanding quotations will be given protection for a few days more. One large order placed last week by an automobile body maker called for 2000 tons of blue annealed at a price reported as 1.90c., Pittsburgh.

Bolts, Rivets and Spikes.—Track bolts are quoted at 3.75c., Pittsburgh, railroad spikes at 2.50c., Pittsburgh, structural rivets at 2.40c., and boiler rivets at 2.50c., Pittsburgh, but all of these prices are being shaded on attractive business.

Warehouse Business.—Sales of steel out of stock continue to show gains. There have been no price changes and we quote for local delivery as follows:

Soft steel bars and small shapes, 2.75c.; iron bars (except bands), 2.50c.; round edge iron, 2.80c.; round edge steel, iron finish, 1½ x ½ in., 3.05c.; round edge steel planished, 3.80c.; tank steel plates, ¼-in. and heavier, 2.85c.; tank steel plates, 3/16-in., 3.035c.; blue annealed steel sheets, No. 10 gage, 3.25c.; light black sheets, No. 28 gage, 3.75c.; galvanized sheets, No. 28 gage, 4.75c.; square twisted and deformed steel bars, 2.75c.; structural shapes, 2.85c.; diamond pattern plates, ¼-in., 4.60c.; 3/16-in., 4.785c.; ⅛-in., 4.90c.; spring steel, 4.10c.; round cold-rolled steel, 4c.; squares and hexagons, cold-rolled steel, 4.50c.; steel hoops, No. 13 gage and lighter, 3.65c.; steel bands, No. 12 gage to 3/16-in., inclusive, 3.40c.; iron bands, 3.90c.; rails, 2.75c.; tool steel, 8c.; Norway iron, 5c.; toe steel, 4.50c.

Railroad Equipment.—The Baltimore & Ohio Railroad has placed an order for 1000 steel cars, the business being divided between two companies.

Old Material.—A better demand for stove plate has resulted in an advance of $1 a ton within the week. No. 1 railroad wrought is up 50c. a ton. Other grades of scrap have not changed in price. The demand for heavy melting steel in this district is very light, due largely to the fact that steel mills still have fairly good stocks on hand, based on present operating requirements. Better prices for steel scrap in the Pittsburgh district are causing some of the Eastern supply to go to that district. We quote for delivery in this district as follows:

No. 1 heavy melting steel	$11.50 to $12.00
Scrap rail	11.50 to 12.00
Steel rails, rerolling	15.00 to 15.50
No. 1 low phos., heavy 0.04 and under	16.00 to 17.00
Car wheels	17.00 to 17.50
No. 1 railroad wrought	15.50 to 16.00
No. 1 yard wrought	13.50 to 14.00
No. 1 forge fire	10.00 to 10.50
Bundled sheets (for steel works)	8.00 to 9.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	10.00 to 11.00
Turnings (short shoveling grade for blast furnace use)	8.00 to 8.50
Mixed borings and turnings (for blast furnace use)	8.00 to 8.50
Machine-shop turnings (for rolling mill and steel works use)	8.00 to 8.50
Heavy axle turnings (or equivalent)	9.50 to 10.00
Cast borings (for rolling mills)	9.00 to 9.50
Cast borings (for chemical plants)	No market
No. 1 cast	17.00 to 18.00
Railroad grate bars	13.50 to 14.00
Stove plate (for steel plant use)	13.50 to 14.00
Railroad malleable	15.50 to 16.50
Wrought iron and soft steel pipes and tubes (new specifications)	13.00 to 13.50
Iron car axles	No market
Steel car axles	No market

Sheet Bars Advanced

YOUNGSTOWN, OHIO, Sept. 27.—Independent makers to-day advanced the price of open-hearth sheet bars from $30 to $32. It is indicated that a further increase may be expected within the next 30 days.

The Wheeling Steel Corporation posted notices in Beech Bottom, Martins Ferry and Wheeling plants of the Whitaker-Glessner Co., announcing the company is willing to resume the mills. The notice reads: "We are willing to reopen the mills of the plant. The starting of operations will depend upon the number of men reporting for work, who were employed here when the plants closed down."

British Iron and Steel Market

Lower Freights to the Far East Are a Stimulant —Tin Plate in Greater Demand—Continental Competition Less Active

(*By Cable*)

LONDON, ENGLAND, Sept. 27.

Pig iron is quiet, with an easier tendency. There is a fair demand for hematite from home consumers, but the export business is stagnant. Belgian foundry iron is quoted up to £4 7½s. ($16.28) f.o.b. Foreign ore is dull. Sellers of Bilbao Rubio ask 28½s. ($5.30) ex-ship Tees.

There is a better demand for some specifications of British steel. More sheet and bar mills are starting up, but any large business is handicapped by the chaotic state of shipbuilding. The Scottish position is still bad. The Mossend and Glengarnock works are now closed. Some Northeastern engineering and machinery works are cancelling orders, pending the removal of war bonuses heretofore paid to employees.

Continental prices are advancing, but business is declining. French merchant bars are held at £8 15s. (1.45c. per lb.) f.o.b. Sellers of Belgian merchant bars ask up to £9 (1.49c. per lb.) f.o.b. Both these quotations are based on shipments in from six to eight weeks. German merchant bars are quoted at £9 (1.49c. per lb.) f.o.b., with shipment date not specified.

French beams are being sold at £8 7½s. (1.39c. per lb.) f.o.b., but £8 10s. (1.41c. per lb.) is now asked. Belgian rails are quoted at £8 to £8 15s. (1.33c. to 1.45c. per lb.) f.o.b.

Freights to the Far East from the United Kingdom and Continent are lower; consequently German wire nails are obtainable at 23¼s. ($4.33) per pikul (1.33½ lb.) keg, cost and freight to Japan.

There is an improved demand for tin plate for both home and export delivery. Output is increasing, but prices are falling. No further drop in Welsh steel bars is anticipated. Galvanized sheets are in better demand.

We quote per gross ton, except where otherwise stated, f.o.b. maker's works, with American equivalent figured at $3.72 per £1 as follows:

Durham coke, delivered	£1 15	$6.51
Cleveland basic	7 7½ & £7 10*	27.45 & $27.90
Cleveland No. 1 foundry	7 0	26.04
Cleveland No. 3 foundry	6 0 & 6 5*	22.32 & 23.25
Cleveland No. 4 foundry	5 19	22.13
Cleveland No. 4 forge	5 17½	21.85
Hematite	7 0*	26.04
East Coast mixed	6 10	24.18
Ferromanganese	18 0 & 14 10*	66.96 & 53.94
Rails, 60 lb. and up	10 0 to 14 0	37.20 to 52.08
Billets	7 10 to 8 0	27.90 to 29.76
Sheet and tin plate bars, Welsh	8 0 to 8 10	29.70 to 31.62
Tin plate base box	1 0½ to 1 2	3.81 to 4.09
		C. per Lb.
Ship plates	12 10 to 14 0	2.08 to 2.32
Boiler plates	18 0 to 19 0	2.99 to 3.16
Tees	12 10 to 14 10	2.08 to 2.41
Channels	11 15 to 13 15	1.95 to 2.28
Beams	11 10 to 13 10	1.91 to 2.24
Round bars, ¾ to 3 in.	12 0 to 12 10	1.99 to 2.08
Galvanized sheets, 24 g.	19 0	3.15
Black sheets	16 0	2.66
Steel hoops	14 5 & 14 0*	2.37 & 2.32
Cold rolled steel strip, 20 g.	26 10	4.40

*Export price.

FURTHER EXPORT BETTERMENT

Japanese Sheet Buying Heavy—Chinese Bridge Reported Placed

NEW YORK, Sept. 25.—Inquiry continues active but buying is confined almost entirely to Japan, from which the demand for black sheets of various gages is reported very large. So great has been the number of orders for sheets of light gage (Nos. 30½ and 31 gage) that one large export corporation is reported as unable to book further orders for these gages at present. In other foreign markets there is an active interest in American products and prices, if the number of inquiries and requests for prices may be considered a criterion. Australia, New Zealand, South Africa, South American countries, China, India and the Near East are all showing a renewed interest in current American quotations.

The representative of a large British export house with a New York branch, who is traveling in South Africa, reports that little business is possible unless material is sold in small tonnages out of warehouse. Consumers there only purchase for immediate needs and can generally obtain such small quantities as are needed from the warehouses that some companies have established in the larger cities. A majority of these warehouses stock up from British sources. An inquiry from Holland for 5000 tons of basic open-hearth wire rods that first appeared about eight months ago and later was repeated has been issued for a third time in the United States. When it first came, this inquiry aroused but slight interest in export circles, as it was believed that it would undoubtedly be awarded to some Belgian or German mill, Continental prices being approximately 50 per cent of the American quotations on wire rods. Evidently it is impossible to place this order with Continental mills or for some reason American rods are preferred if the price is satisfactory.

Some exporters to the Far East report a growing tendency of Japanese buyers to demand shipments on sight draft, refusing to open letters of credit, an attitude probably influenced by the generous offers that have been made of late by Belgian and German and other European sellers.

There is a report that the contract for the construction of a steel bridge over the Yellow River on the line of the Pekin-Hankow Railroad in China has been awarded by the Government to a Belgian company, which bid $10,500,000. This report is not confirmed by consulting engineers in the United States, and there is doubt as to the financing of the project. A report appeared on Aug. 6, stating that the bridge had gone to a Belgian company, but on Aug. 24 the contract was still unplaced.

No action has been taken as yet on the tender for Formosa, involving six lines of heavy pipe, 1400 tons of tank plates, and 225 miles of transmission towers.

Representatives of German interests in the United States state that they are turning down numerous inquiries for small and fairly large tonnages of finished steel products, being unable to obtain shipment from the mills, which are filled with domestic orders and export contracts to other foreign markets. Some of these representatives report an interest among American consumers in wire and wire nails, particularly the latter, which it is increasingly difficult to obtain, as the Continental prices are advancing and the mills are filling up rapidly.

Committee Comes to Unanimous Agreement

WASHINGTON, Sept. 27.—The Committee on Emergency Measures by Manufacturers of the Unemployment Conference this afternoon reached unanimous agreement for emergency relief in the present situation. The recommendations made are not to be made public until submitted next week to the entire conference. It is reported, however, that among the measures suggested were rotation of labor, shorter hours and weeks. The wage question is understood not to have come before the entire committee. This is said to have been threshed out yesterday before the subcommittee and to have developed sharp difference of opinion with apparent understanding that it was not to be included in recommendations. The committee was the first to make a report and now will go to work on recommendations looking to permanent measures of relief.

The committee on public works is said to have recommended that Federal and State governments and municipalities co-operate and begin public works operation at once, for which the Federal Government has appropriated $75,000,000, to be used in road building.

Prices Finished Iron and Steel, f.o.b. Pittsburgh

Freight Rates

Freight rates from Pittsburgh on finished iron and steel products, in carload lots, to points named, per 100 lb., are as follows:

Philadelphia, domestic	$0.35	Kansas City	$0.815
Philadelphia, export	0.265	Kansas City (pipe)	0.77
Baltimore, domestic	0.335	St. Paul	0.665
Baltimore, export	0.255	Omaha	0.815
New York, domestic	0.38	Omaha (pipe)	0.77
New York, export	0.285	Denver	1.35
Boston, domestic	0.415	Denver (wire products)	1.415
Boston, export	0.285	Pacific Coast	1.665
Buffalo	0.295	Pacific Coast, ship plates	1.335
Cleveland	0.24	Birmingham	0.765
Cincinnati	0.325	Jacksonville, all rail	0.555
Indianapolis	0.345	Jacksonville, rail and water	0.46
Chicago	0.38	New Orleans	0.515
St. Louis	0.475		

The minimum carload to most of the foregoing points is 36,000 lb. To Denver the minimum loading is 40,000 lb., while to the Pacific Coast on all iron and steel products, except structural material, the minimum is 80,000 lb. On the latter item the rate applies to a minimum of 50,000 lb., and there is an extra charge of 9c. per 100 lb. on carloads of a minimum of 40,000 lb. On shipments of wrought iron and steel pipe to Kansas City, St. Paul, Omaha and Denver, the minimum carload is 46,000 lb. On iron and steel items not noted above the rates vary somewhat and are given in detail in the regular railroad tariffs.

Rates from Atlantic Coast ports (i.e., New York, Philadelphia and Baltimore) to Pacific Coast ports of call on most steamship lines, via the Panama Canal, are as follows: Pig iron, 55c.; ship plates, 75c.; ingot and muck bars, structural steel, common wire products, including cut or wire nails, spikes and wire hoops, 75c.; sheets and tin plates, 60c. to 75c.; rods, wire rope, cable and strands, $1; wire fencing, netting and stretcher, 75c.; pipe, not over 8 in. in diameter, 75c.; over 8 in. in diameter, 2½c. per in. or fraction thereof additional. All prices per 100 lb. in carload lots, minimum 40,000 lb.

Structural Material

I-beams, 3 to 15 in.; channels, 3 to 15 in.; angles, 3 to 6 in., on one or both legs, ¼ in. thick and over, and zees, structural sizes, 1.60c. to 1.70c.

Wire Products

Wire nails, $2.90 base per keg; galvanized, 1 in. and longer, including large-head barbed roofing nails, taking an advance over this price of $1.25 and shorter than 1 in., $1.75; bright Bessemer and basic wire, $2.60 per 100 lb.; annealed fence wire, Nos. 6 to 9, $2.60; galvanized wire, $3.10; galvanized barbed wire, $3.55; galvanized fence staples, $3.55; painted barbed wire, $3.05; polished fence staples, $3.05; cement-coated nails, per count keg, $2.45; these prices being subject to the usual advances for the smaller trade, all f.o.b. Pittsburgh, freight added to point of delivery, terms 60 days, net, less 2 per cent off for for cash in 10 days. Discounts on woven-wire fencing are 68 to 70½ per cent off list for carload lots, 67 to 69½ per cent for 1000-rod lots, and 66 to 68½ per cent for small lots, f.o.b. Pittsburgh.

Bolts, Nuts and Rivets

Large structural and ship rivets.....$2.20 to $2.50
Large boiler rivets.....2.35 to 2.60
Small rivets.....70, 10 and 10 per cent off list
Machine bolts, small, rolled threads.....70, 10 and 7½ per cent off list
Machine bolts, small, cut threads.....65 and 10 to 70 and 5 per cent off list
Machine bolts, larger and longer.....65 and 10 to 65, 10 and 5 per cent off list
Carriage bolts, ⅜ in. x 6 in.:
Smaller and shorter rolled threads..70 and 5 per cent off list
Cut threads.....65 and 10 per cent off list
Longer and larger sizes.....60, 10 and 5 per cent off list
Lag bolts.....70, 10 and 5 per cent off list
Plow bolts, Nos. 1, 2 and 3 heads....60 and 10 per cent off list
Other style heads.....20 per cent extra
Machine bolts, c.p.c. and t. nuts, ⅜ in. x 4 in.:
Smaller and shorter.....60, 10 and 5 per cent off list
Larger and longer sizes.....60 and 5 per cent off list
Hot pressed sq. or hex. blank nuts.....$4.60 to $5.25 off list
Hot pressed nuts, tapped.....4.25 to 5.00 off list
C.p.c. and t. sq. or hex. blank nuts.....4.60 to 5.10 off list
C.p.c. and t. sq. or hex. blank nuts, tapped. 4.25 to 4.75 off list
Semi-finished hex. nuts:
¼ in. to 9/16 in. inclusive.....80, 10 and 10 per cent off list
Small sizes S. A. E.....80, 10, 10 and 10 per cent off list
⅝ in. to 1 in. inclusive, U. S. S. and S. A. E., 70, 10, 10 and 10 per cent off list
Stove bolts in packages.....80, 10 and 5 per cent off list
Stove bolts in bulk.....80, 10 and 7½ per cent off list
Tire bolts.....65, 10 and 10 per cent off list
Track bolts.....3.25c. to 3.50c. base

Mill Square and Hex. Head Cap Screws

½ in. and under.....70 and 10 per cent off list
9/16 in. to ¾ in.....70 and 10 per cent off list

Mill Set Screws

½ in. and under.....70, 10 and 5 per cent off list
9/16 in. to ¾ in.....70, 10 and 5 per cent off list

Rivets

Rivets, 1c. per lb. extra for less than 200 kegs. Rivets in 100-lb. kegs, 25c. extra to buyers not under contract; small and miscellaneous lots less than two tons, 25c. extra; less than 100 lb. of a size or broken kegs, 50c. extra.

All prices carry standard extras f.o.b. Pittsburgh.

Wire Rods

No. 5 common basic or Bessemer rods to domestic consumers, $41; chain rods, $41; screw stock rods, $46; rivet and bolt rods and other rods of that character, $41; high carbon rods, $49 to $53, depending on carbons.

Railroad Spikes and Track Bolts

Railroad spikes 9/16-in. and larger, $2.35 to $2.50 base per 100 lb. in lots of 200 kegs of 200 lb. each or more; spikes, ½-in., ⅝-in. and 7/16-in., $2.60 to $2.75 base; 5/16-in., $2.60 to $2.75 base. Boat and barge spikes, $2.60 to $2.75 base per 100 lb. in carload lots of 200 kegs or more, f.o.b. Pittsburgh. Track bolts, $3.25 to $3.50 base per 100 lb. Tie plates, $2 per 100 lb.

Terne Plates

Prices of terne plates are as follows: 8-lb. coating, 200 lb., $11.30 per package; 8-lb. coating, I. C., $11.60; 15-lb. coating, I. C., $14.30; 20-lb. coating, I. C., $15.55; 25-lb. coating, I. C., $16.80; 30-lb. coating, I. C., $17.80; 35-lb. coating, I. C., $18.80; 40-lb. coating, I. C., $19.80 per package, all f.o.b. Pittsburgh, freight added to point of delivery.

Iron and Steel Bars

Steel bars, 1.50c. to 1.65c. from mill. Refined bar iron, 2.25c.

Welded Pipe

The following discounts are to jobbers for carload lots on the Pittsburgh basing card:

Butt Weld

Steel			Iron		
Inches	Black	Galv.	Inches	Black	Galv.
⅛	54½	28	¼ to ⅜	+ 3½	+22½
¼ to ⅜	57½	31	½	36½	18½
½	62½	48	¾	42½	27½
¾	66½	54	1 to 1½	44½	29½
1 to 3	68½	56			

Lap Weld

2	61½	49	2	39½	25½
2½ to 6	65½	53	2½ to 6	42½	29½
7 to 8	62½	49	7 to 12	40½	27½
9 to 12	61½	48			

Butt Weld, extra strong, plain ends

⅛	50½	33	¼ to ⅜	+ 4½	+37½
¼ to ⅜	53½	35	½	35½	23½
½	59½	48	¾	42½	28½
¾	64½	53	1 to 1½	44½	30½
1 to 1½	66½	55			
2 to 3	68½	56			

Lap Weld, extra strong, plain ends

2	59½	48	2	40½	27½
2½ to 4	63½	52	2½ to 4	43½	31½
4½ to 6	62½	51	4½ to 6	42½	30½
7 to 8	58½	45	7 to 8	35½	23½
9 to 12	52½	39	9 to 12	30½	18½

To the large jobbing trade the above discounts are increased by one point, with extra discounts of 5 and 2½ per cent.

Boiler Tubes

The following are the discounts for carload lots f.o.b. Pittsburgh:

Lap Welded Steel		*Charcoal Iron*	
1⅜ in.	26½	1½ in.	5
2 to 2¼ in.	41	1¾ to 1⅞ in.	15
2½ to 3 in.	52	2 to 2¼ in.	25
3¼ to 13 in.	57	2½ to 3 in.	30
		3¼ to 4½ in.	32

Standard Commercial Seamless Boiler Tubes

New discounts have been adopted on standard commercial seamless boiler tubes, but manufacturers are not yet ready to announce them for publication, and for that reason we publish no discounts this week.

Sheets

Prices for mill shipments on sheets of standard gage in carloads, f.o.b. Pittsburgh, follow:

Blue Annealed

Cents per Lb.		Cents per Lb.	
No. 8 and heavier	2.45	Nos. 13 and 14	2.60
Nos. 9 and 10 (base)	2.50	Nos. 15 and 16	2.70
Nos. 11 and 12	2.55		

Box Annealed, One Pass Cold Rolled

Cents per Lb.		Cents per Lb.	
Nos. 17 to 21	2.80	No. 28 (base)	3.00
Nos. 22 to 24	2.85	No. 29	3.10
Nos. 25 and 26	2.90	No. 30	3.20
No. 27	2.95		

Galvanized

Cents per Lb.		Cents per Lb.	
Nos. 10 and 11	3.00	Nos. 25 and 26	3.70
Nos. 12 to 14	3.10	No. 27	3.85
Nos. 15 and 16	3.25	No. 28 (base)	4.00
Nos. 17 to 21	3.40	No. 29	4.25
Nos. 22 to 24	3.55	No. 30	4.50

Tin-Mill Black Plate

Cents per Lb.		Cents per Lb.	
Nos. 15 and 16	2.80	No. 28 (base)	3.00
Nos. 17 to 21	2.85	No. 29	3.05
Nos. 22 to 24	2.90	No. 30	3.05
Nos. 25 to 27	2.95	Nos. 30½ and 31	3.10

Machine-Tool Dealers to Meet Oct. 19

The Machine Tool Section of the National Supply and Machinery Dealers' Association, of which L. H. Swind, Swind Machinery Co., Philadelphia, is chairman, will meet at the Hotel Astor, New York, on Wednesday, Oct. 19, coincident with the fall meeting of the National Machine Tool Builders' Association. A speaker will be selected by the National Machine Tool Builders' Association to address the dealers. Other features of the program include discussions of present business conditions. Terms of payment by dealers' customers will be discussed, this problem having become acute because of the tendency during the past six months to request long terms, which if the dealer gives must, he believes, be financed by the manufacturer. The subject of trading in old macines at too high a price will also be considered with a view to improving the present situation. There will also be time for discussion of other subjects to be suggested by the members.

Industrial Cost Association Meets

The New York Section of the Industrial Cost Association opened its fall and winter activities with a dinner-meeting at Keen's Chop House, Sept. 22. H. S. Peck, comptroller, S K F industries, and president of the national organization, acted as chairman. The contemplated program of the fall conference of the association, to be held at Pittsburgh, Nov. 2, 3 and 4, was outlined and there was earnest discussion of specific problems of cost accounting procedure which were presented for solution by various members. Among those taking part were A. Boren, Yale & Towne Mfg. Co.; J. M. Howell, General Electric Co.; H. D. Starr, N. J. Zinc Co.; C. A. Porter, Harding Co., and J. H. Ramsey, Electro-Dynamic Co.

Two papers, "Should Abnormal Burden Be Included in Current Monthly Costs?" presented at the national conference at East Aurora, N. Y., May 26, 27 and 28, by T. J. Haley, Fawcus Machine Co., Pittsburgh, and by H. B. Pavitt and W. L. Erdman, Allegheny Steel Co., Pittsburgh, were read. Discussion of the papers was scheduled for the next meeting.

Gear Manufacturers' Meeting

The semi-annual meeting of the American Gear Manufacturers' Association will be held at the Powers Hotel, Rochester, N. Y., Oct. 13 to 15. At this meeting, as was decided upon at the meeting of the general standardization committee and chairmen of sub-committees held in Niagara Falls in the spring, a definite program of activity along the line of standardization will be announced. With each committee's report there will be a special report outlining that committee's phase of standardization work.

The following program of papers has been prepared:

"Gear Tooth Wear," by S. O. White, Warner Gear Co.
"Duralumin as a Material for Worm and Other Gearing," by R. W. Daniels, Bausch Machine Tool Co., Springfield, Mass.
"First-Hand Impressions of Europe," by E. S. Sawtell, assistant general manager, Tool Steel Gear & Pinion Co.
"Tooth Forms," by H. W. Miller, Fellows Gear Shaper Co.

During the meeting the plant of the Gleason Gear Works in Rochester will be inspected and luncheon will be served at the Gleason plant.

Work has been started on the taking down and rebuilding of the trestle work for the Port Arthur, Ont., blast furnace owned by the Palatine Mining & Development Co., which acquired the furnace of the Atikokan Iron Co., at Port Arthur, some months ago. The construction work is being done by Hancock & Co., who are also rebuilding the bridges and culverts on the Pee Dee Railway between North Lake and Gunflint, to give access to the Polson mine.

The Milwaukee Department of Public Works, Sept. 25, called for bids for equipment for the new Riverside pumping station consisting of one 25,000,000 and two 22,000,000 gallon vertical triple expansion crank and flywheel type pumping engines. Bids close Oct. 24.

COMING MEETINGS

September

Annual Safety Congress. Sept. 26 to 30. Boston. Auspices of National Safety Council.

American Electrochemical Society. Sept. 29, 30 and Oct. 1. Fall meeting, Lake Placid Club, Lake Placid, N. Y. Secretary, Prof. Joseph W. Richards, Lehigh University, Bethlehem, Pa.

October

American Manufacturers Export Association. Oct. 5 and 6. Annual meeting, Waldorf-Astoria Hotel, New York. Secretary, A. W. Willmann, 160 Broadway, New York.

Society of Industrial Engineers. Oct. 5 to 7. Fall meeting, Springfield, Mass. Business Manager, George C. Dent, 327 South La Salle Street, Chicago.

National Association of Purchasing Agents. Oct. 10 to 13. Claypool Hotel, Indianapolis. Secretary, L. F. Boffey, 19 Park Place, New York.

National Implement and Vehicle Association. Oct. 12 to 14. Chicago.

American Society of Lubrication Engineers. Oct. 13 and 14. First annual convention, Chicago. Secretary, J. L. Overholt, Monadnock Block, Chicago.

American Gear Manufacturers' Association. Oct. 13 to 15. Fall meeting, Powers Hotel, Rochester, N. Y. Secretary, F. D. Hamlin, 4401 Germantown Avenue, Philadelphia.

National Machine Tool Builders' Association. Oct. 18, 19 and 20. Annual meeting, Hotel Astor, New York. General Manager, E. F. DuBrul, 817 Provident Bank Building, Cincinnati.

National Supply and Machinery Dealers' Association. Oct. 19. Meeting of machine tool section, Hotel Astor, New York. Secretary, Thomas A. Fernley, 505 Arch Street, Philadelphia.

Industrial Relations Conference. Oct. 24 to 27. Harrisburg, Pa., under auspices of Department of Labor and Industry of Pennsylvania.

November

Industrial Cost Association. Nov. 2, 3 and 4. National Cost Conference, Pittsburgh. Secretary, A. A. Alles, Jr., Peoples Bank Building, Pittsburgh.

National Founders' Association. Nov. 16 and 17. Annual meeting, Hotel Astor, New York. Secretary, J. M. Taylor, 29 South La Salle Street, Chicago.

New England Iron and Hardware Association

The New England Iron and Hardware Association held its annual fall outing at the Tedesco Country Club, Swampscott, Mass., Tuesday, Sept. 20, afternoon and evening. Approximately 70 attended. During the afternoon there was an 18-hole golf tournament, with 40 contestants.

Fred L. Avery, Avery & Saul, South Boston, president of the association, presided at a dinner following the golf tournament. He introduced Austin H. Decatur, Decatur & Hopkins Co., Boston, president National Hardware Jobbers' Association, who spoke on the value of associations. Harry L. Doten, Austin & Doten, Boston, chairman of the golf committee, made the presentation of prizes won during the afternoon.

Tin Plate Mills Resume

The plant of the Standard Tin Plate Co., Canonsburg, Pa., which has been idle since about the first of June, resumed operations at midnight, Sept. 25, 12 of the 24 hot mills and a corresponding amount of finishing capacity going on. This plant, up to June 1, has been operated in all departments under an agreement with the Amalgamated Association of Iron, Steel and Tin Workers, but under a new agreement reached with that organization only the hot mills and the tin house hereafter will be operated as union units. All other departments are on the open shop basis and wages will be on a sliding scale, based upon the average sales prices of tin plate as determined in the bimonthly wage settlement between the Amalgamated Association and the Western Sheet Manufacturers' Association. On the present basis of tin plate, common labor in this plant will be paid 28½c. per hr.

PERSONAL

Elbert H. Gary, chairman United States Steel Corporation, returned Tuesday from his visit to Mexico.

J. H. Redhead, for many years connected with the National Malleable Castings Co., Cleveland, and during the past few years assistant manager of sales of that company, has resigned to become associated with the Reliance Co., Cleveland, recently organized to promote and finance industrial enterprises and to deal in securities.

William M. Clyde, for the past 12 years Cincinnati manager of the Motch & Merryweather Machinery Co., has resigned to enter the real estate business. Mr. Clyde went to Cincinnati from Detroit 12 years ago. He will be succeeded in Cincinnati by E. A. Shriver, for some years in charge of the sales of grinding machinery at the Pittsburgh office of the Motch & Merryweather Machinery Co.

W. B. Topping, general manager of sales Republic Iron & Steel Co., Youngstown, Ohio, has gone to Canada for a vacation. He expects to be back Oct. 3.

G. Muntz, president Tropenas Co., Brooklyn, has just returned from a seven months business trip around the world, having visited Japan, China, India, Italy, Germany and Holland.

F. E. Stapleford was elected president of the Cincinnati Association of Purchasing Agents at the annual meeting on Sept. 22. J. C. Kreis was elected vice-president; G. C. Merkel, treasurer, and E. W. Simpkinson, secretary. The entire membership, numbering 80, will attend the convention of the National Association at Indianapolis, commencing Oct. 10.

A. L. Humphrey, president Westinghouse Airbrake Co., Wilmerding, Pa., has been notified by President Harding that he has been included in the appointments of members to the conference on unemployment.

Robert McKean, general manager Riter-Conley Co., Pittsburgh, recently returned to this country after an absence of two and a half years in France, where he had charge of the European interests of his own company and the McClintic-Marshall Co., an affiliated company.

Donald Tulloch, secretary Metal Trades Association, Worcester, Mass., has returned from a three months' trip abroad.

James A. Campbell, president Youngstown Sheet & Tube Co., is among those who have accepted invitations during the past week to participate in the unemployment conference which opened in Washington on Monday of the present week. Among the acceptances were those of John D. Ryan of the United Metals Selling Co.; M. F. Tighe, president of the Amalgamated Association of Iron, Steel and Tin Workers, and John A. Penton, secretary American Pig Iron Association.

Alexis Doster, assistant treasurer Union Hardware Co., Torrington, Conn., has designed to accept a position with the Torrington Mfg. Co.

George Shortmeier, formerly New York manager for the Madison Rubber Co. and later district manager at New York for the Sinclair Oil Co., has been placed in charge of the Bosch Magneto Corporation branch at New York, replacing O. S. Stanley. Charles L. Shedd is now manager of the Bosch branch at Detroit, taking the place of Roy Davey, who has been made manager of the manufacturing sales department at Springfield, Mass. Mr. Shedd was at one time promotion manager of the truck division of the Packard Motor Car Co. at Detroit, subsequently served as official distributor at Omaha for that company and still more recently acted as sales manager of the Republic Truck Corporation at New York.

William W. Wolfe has been appointed manager of sales of the Highland Iron & Steel Co., Terre Haute, Ind., with headquarters at 208 South LaSalle Street, Chicago.

George H. Lambkin, who has been associated with the Sterling Wheelbarrow Co., Milwaukee, manufacturer of equipment for contractors and foundries for the past twelve years, has been appointed manager for the New York territory, with an office at 141 Center Street, New York.

Roland H. Boutwell, Standard Horse Shoe Co., Boston and South Wareham, Mass., has returned from a three months' trip in Europe. Mr. Boutwell spent much of his time in France.

M. J. Cavalier, professor of metallurgy in the University of Toulouse, has just arrived at Columbia University to take up his work as French exchange professor. He will be at Columbia from Oct. 1 to Oct. 30. Professor Cavalier, rector at Toulouse and a widely known authority on metallurgical chemistry, comes to America as the result of arrangements for an annual exchange of professors of engineering and applied science between French and American universities.

H. D. Eller, for the past five years manager of the iron and steel department of Viele, Blackwell & Buck, 49 Wall Street, New York, exporters and importers, has been appointed New York district manager for the Newton Steel Co., Youngstown, Ohio. Previous to his connection with Viele, Blackwell & Buck, Mr. Eller was with the American Cotton Oil Co., 65 Broadway, New York. He is succeeded as manager of the iron and steel department by C. C. Marrin.

J. A. Durfee, since March 1, 1920, works manager of the Page Steel & Wire Plant of the American Chain Co., Monessen, Pa., has resigned. A farewell dinner was tendered Mr. Durfee Saturday evening, Sept. 10, by the 40 or more superintendents and foremen of the Page Works, at which time he was presented a handsome smoking set. Before actively engaging in business again Mr. Durfee will enjoy a vacation at his country home near Cleveland.

A. J. Billimoria, Bombay, India, head of the firm of managing agents of the Tata Iron & Steel Co. and of the other various Tata interests, is now in New York on business with Perin & Marshall, consulting engineers. He will return to London in October and proceed later to India.

W. W. Lukens, president Alan Wood Iron & Steel Co., Philadelphia, has resigned on account of ill health, and will give up his duties Nov. 1. His successor has not yet been chosen.

Exceptions Filed in Ferromanganese Case

Accompanied by a recommended cease and desist order, which would prevent the respondents from importing and selling ferromanganese in the United States at a price substantially less than the actual market value or wholesale price at the time of exportation to the United States after adding to the market value or wholesale price the expenses necessarily incident to the importation and sale, Trial Examiner I. E. Lambert of the Federal Trade Commission has filed exceptions to the tentative report of Examiner Edward M. Averill. The latter, in passing upon the so-called ferromanganese dumping case, held that there was nothing to substantiate the charges against the importers of ferromanganese and his recommendations, if adopted by the commission, would result in dismissal of the proceedings. Briefs of the respondents and the trial attorney are to be filed with the commission by Oct. 15, the date having been extended from Oct. 5, the one which had been originally set.

A bill in equity brought by the Moore Drop Forging Co., Springfield, Mass., against members of the Massachusetts State Board of Conciliation and Arbitration, to restrain the latter from holding a hearing respecting a labor dispute between the plaintiff and members of the labor unions, has been dismissed by the Massachusetts Supreme Court. In its opinion, the court stated that where a strike exists involving more than 25 employees the public concern in the matter is sufficient to justify an impartial investigation by an unbiased board of public officers within the bounds set forth in the statutes.

OBITUARY

HENRY J. KIMMAN, since 1902 manager of the Cleveland plant of the Chicago Pneumatic Tool Co., died in Cleveland, Sept. 7. He was born in Haarlem, Holland, in 1863 and emigrated to America with his parents and settled in Chicago in 1870. He served with the Adams-Westlake Co. and other manufacturing concerns in Chicago and the Far West. He converted the basement of his home on Nineteenth Street, Chicago, into a small machine shop, working days as a machinist for hire and working evenings for himself. Possessing an imaginative mind he designed, and in collaboration with his brother, T. P. Kimman, built the first practical portable piston air drill, known as the Little Giant. Soon after engaging in the manufacture of air drills he became associated with E. N. Hurley and they formed the Standard Pneumatic Tool Co. in 1898 and he became associated with the Chicago Pneumatic Tool Co. in the consolidation of pneumatic tool interests in 1901, at which time he became manager of the Cleveland plant of the Chicago Pneumatic Tool Co. and remained in active charge of the plant until his death.

LEWIS DEWEY COLLINS, treasurer and assistant general manager Massey-Harris Harvester Co., Batavia, N. Y., died suddenly at the home of H. W. Robinson, assistant general manager of the European office of the Massey-Harris Co., Ltd., Toronto, Can., in London, on Sept. 17. He was about to complete a European trip in the interests of his company. He began his career in the harvesting machinery business in 1884 with the Johnston Harvester Co., as office boy. He was born in Batavia, Dec. 10, 1866. For a time he worked in a hardware store. In 1910 he was elected vice-president and treasurer of the Massey-Harris company and a few months later became treasurer and assistant general manager. He was a public-spirited man, being actively interested in the public schools, the church, civic betterments and Masonic affairs.

ALTON L. DICKERMAN, mine developer, died recently at his home at Colorado Springs, Col., due to injuries received five years ago when he went down with a ship that foundered off the Virginia capes. He was 71 years old. It is said that he was the first engineer to discover ore below the dykes on the iron range in Minnesota. He was born in Stoughton, Mass., in 1850 and was graduated from Tufts College in 1869 and completed his mining education in Friburg, Saxony. He was a pioneer in the iron and copper fields of Minnesota and Michigan; later he visited the Alaskan and Mexican gold and copper fields. Following this he turned his attention to Colorado mines. He was a member of several organizations, including the Engineers' Club of New York.

ALLAN RANSOM, widely known in the machine tool trade, died suddenly at San Francisco, Sept. 21, at the age of 61. Mr. Ransom was one of the partners of the Marshall & Huschart Machinery Co., Chicago, and was vice-president of that company until poor health forced him to retire about ten years ago. He then moved to the Pacific Coast where he subsequently engaged in the machinery business and latterly manufactured pistons in Los Angeles and San Francisco. At one time he was with the Lodge & Davis Machine Tool Co. at Cincinnati and later was with the Prentiss Tool & Supply Co. at its Chicago store. The deceased was a brother of George Ransom, president Ransom Mfg. Co., grinding machines, Oshkosh, Wis.

SAMUEL S. VOORHEES, chemist with the Bureau of Standards, Washington, D. C., and chairman of the corrosion committee of the American Society of Testing Materials, died recently at a hospital in Portland, Me., following an operation.

JOHN STANTON, formerly president Delhi Specialty Co., now the John Stanton Co., metal product manufacturer, Cincinnati, died at his home in Cincinnati recently, aged 92 years.

CHRISTIAN D. WISELOGEL, founder and president Peerless Wire Works, Lafayette, Ind., died at his home in that city Sept. 16, aged 60.

DAVID H. WILSON, Wyckoff, N. J., chief electrical engineer for the Erie Railroad Co., died Sept. 16.

JAMES CRAIG STEWART, Boston, senior partner Stewart Boiler Works, Worcester, Mass., died Sept. 22, at the Peter Bent Brigham Hospital, Boston, in his sixty-fourth year, as a result of a shock. He was born in St. John's, New Brunswick. He became associated with his father in the boiler business Feb. 1, 1878, under the firm name of Charles Stewart & Son, on Exchange Street, Worcester.

WILLIAM GOLDSBOROUGH SMYTHE, sales manager American Screw Co., Providence, R. I., died at his home in that city Monday evening, Sept. 19, having never recovered from a serious illness in Atlantic City, in March, last, since which time he has not been active in business. He was born in Eastern Shore, Md., Dec. 14, 1841. Previous to associating with the American Screw Co., he was New York manager of the Russell & Erwin Mfg. Co., New Britain, Conn. He joined the Providence corporation in 1903, and shortly afterward was made a director.

JOHN B. TOWNLEY, an official of the Foster Engineering Co., Newark, N. J., belt shifters, died recently at the Hotel Marie Antoinette. He was born in Washington, D. C.

JOSEPH BRENT, superintendent of the water supply and plumbing system of the Cambria Steel Co., Johnstown, Pa., was killed in an automobile accident at a curve on the road between Johnstown and Ligonier, Sunday evening, Sept. 25. Mr. Brent was 37 years old, a native of Johnstown, and had been with the Cambria Steel Co. since 12 years of age.

High Retail Prices for Nails

The recent advance in wire nail prices has raised a question as to the relation of mill prices to those charged the ultimate consumer who buys over the counter at the hardware store. A canvas recently made brought together the prices charged by 78 retail hardware stores, about half of which are located in New York, Pennsylvania or Massachusetts. In the remainder, the States of Delaware, Maryland, Virginia, North Carolina and Georgia were represented. The most common price charged over the counter for wire nails in 1913 was 4c. per lb.; but fourteen out of the 78 stores, which in nearly all cases are located in small towns, had a pre-war price of 5c., and 17 had a pre-war price of 3c. The average pre-war price for the 78 stores was 3.95c. The average price for the 78 today figures out 6.39c. Eight out of the 78 stores are now asking 8c. per lb.; 24 are asking 7c. and 26 are asking 6c. or 6½c.

The average mill price of nails in 1913 was $1.70 per 100-lb. keg, whereas the nails now being sold at retail were bought by jobbers at $2.75 per keg. It is evident that in very many cases retail prices now being asked give an exaggerated idea of the extent to which nails and wire products have been advanced by the producers over the prices ruling in pre-war time. In other words, there has been no such readjustment of retail prices from those prevailing in war time as has taken place in jobbers' and manufacturers' prices. Ordinarily nails are to the hardware man what sugar is to the grocer; but an advance of 3c. to 4c. per. lb. in the retail price of nails, where the advance by the mills over the 1913 average is but 1.05c., would suggest that some dealers are looking on nails as a source of profit. Thus the buyer of nails over the counter is led, in the case of stores selling at 8c. and 7c. per lb., to believe that the steel industry has not readjusted its prices in proportion to those in other lines, whereas in fact, as has been shown in these columns, steel prices are nearer to pre-war prices than those in any other line save only farm products and the class designated by the Department of Labor as "Metals and Metal Products." The low position of the latter, as is well known, is due in part to the disastrous decline in copper.

NON-FERROUS METALS

The Week's Prices

Cents Per Pound for Early Delivery

	Copper, New York		Straits Tin	Lead		Zinc	
Sept.	Lake	Electrolytic	New York	New York	St. Louis	New York	St. Louis
21	12.25	12.12½	26.62½	4.65	4.45	4.70	4.20
22	12.25	12.12½	26.87½	4.65	4.45	4.70	4.20
23	12.25	12.00	27.00	4.70	4.45	4.75	4.25
24	12.25	12.00	....	4.70	4.45	4.75	4.25
26	12.25	12.12½	27.00	4.70	4.45	4.80	4.30
27	12.25	12.12½	26.75	4.70	4.45	4.85	4.35

New York

NEW YORK, Sept. 27.

A distinct improvement is reported in all non-ferrous metals and there have been advances in some quotations. Copper demand is better and there has been some fairly heavy buying. Straits tin continues to be sold in steady volume. The demand for lead persists and prices have again advanced. The zinc market shows a distinct betterment in demand and prices. Antimony is also higher.

Copper.—The feature of the week has been the buying by one large consumer of about 2500 net tons or 5,000,000 lb. of electrolytic copper at prices admitted to be 12.25c. to 12.37½c., delivered. This is the largest sale in many weeks, and the market reflects a distinct improvement in inquiry from other large consumers. Other sales are also noted for both domestic and foreign account. It is the general opinion that the limited amount of metal available at 12.25c., delivered, has been cleared up entirely and that the market is firm at 12.37½c., delivered, or 12.12½c., New York, for October delivery. These are the same quotations which prevailed a week ago, but then they were nominal and could be shaded. Some sellers are now asking 12.50c., delivered, as a minimum. For the first time in several months the end of the month has found practically no copper in weak hands. The situation on the whole is therefore better than in some time. Lake copper is quoted at 12.25c. to 12.37½c., delivered, and largely nominal.

Tin.—Straits tin has shown a moderate volume of transactions for some weeks, and the past week has been no exception. On one day at least 300 and perhaps 400 tons of spot and future shipment was sold at prices ranging from 26.62½c. for the former to 26.87½c. for the latter. Most of this business was taken by consumers. On other days, including yesterday and to-day, the market has been exceedingly quiet and at times stagnant, but the price tendency has been upward or at least firm. It is interesting to reflect that in the last month hardly a week has passed in which there has not been at least a moderate buying of Straits tin, much of it being taken directly by consumers. The quotation for spot Straits to-day is 26.75c., New York. London prices are about £2 per ton higher than a week ago, with spot standard quoted to-day at £157 2s. 6d.; future standard, £159 5s., and spot Straits, £157 12s. 6d. Arrivals thus far this month have been 2560 tons and 3025 tons is reported afloat.

Lead.—This market continues to advance, the leader being the American Smelting & Refining Co. which again raised its price on Friday, Sept. 23, five points to 4.70c., both New York and St. Louis. A steady business is reported by both the leading interest and independents, the latter selling very little metal as low as 4.70c., and quotations from that source ranging as high as 4.75c. to 4.80c., New York. The St. Louis outside market is quoted at 4.45c. to 4.50c.

Zinc.—This market has suddenly come to life and is stronger than in many weeks. The fact that the cheaper lots have evidently been eliminated and that producers are limiting their sales to output and not moving any of their accumulated stocks, as a rule, are two principal causes for the present strength of the market. Prime Western sold yesterday as high as 4.30c., St. Louis, and the market to-day is easily quotable at 4.35c. to 4.40c., St. Louis, or 4.85c. to 4.90c., New York, some sales being recorded at these prices. It is estimated in some quarters that output is below 20 per cent of capacity. It is also understood that special grades of zinc used in the manufacture of certain galvanized wire products have sold lately in liberal amounts at a marked advance over the corresponding price of prime Western.

Antimony.—The market is stronger and wholesale lots for early delivery are quoted at 4.60c., New York, duty paid, due largely to the fact that holders of spot metal recently advanced their quotations.

Aluminum.—The leading producer of virgin metal, 98 to 99 per cent pure, continues to quote 24.50c., f.o.b. plant, in wholesale lots for early delivery and the same grade from importers is obtainable at 18c. to 20c., New York, duty paid.

Old Metals.—The market is strong with an advancing tendency. Dealers' selling prices are nominally as follows:

	Cents Per Lb.
Copper, heavy and crucible	11.75
Copper, heavy and wire	11.00
Copper, light and bottoms	9.00
Heavy machine composition	9.75
Brass, heavy	6.75
Brass, light	5.00
No. 1 red brass or composition turnings	7.75
No. 1 yellow rod brass turnings	5.00
Lead, heavy	4.20
Zinc	3.25
Lead, tea	3.00

Chicago

SEPT. 27.—In a quiet market tin, lead and zinc have advanced. The rise in lead was no doubt influenced by the advance announced by the leading producer, although the usual buying movement following an advance has not yet made its appearance. There has been some buying of spelter, but prices have stiffened largely because sellers refuse to take further business at concessions. Old metal prices remain unchanged. We quote in carload lots: Lake copper, 12.50c. to 12.75c.; tin, 28.50c.; lead, 4.65c.; spelter, 4.40c. On old metals we quote: Copper wire, 7c.; crucible shapes, 7c.; copper clips, 7c.; copper bottoms, 6c.; red brass, 6c.; yellow brass, 4.50c.; lead pipe, 2.50c.; zinc, 1.75c.; pewter, No. 1, 17c.; tin foil, 18c.; block tin, 20c.; all buying prices for less than carload lots.

St. Louis

SEPT. 27.—The price of the leading interest at St. Louis is 4.70c., carlots, although other producers were quoting 4.45c. Slab zinc was quoted at 4.20c. to 4.25c. There is very little trading. In old metals we quote: Light brass, 3.50c.; heavy yellow brass, 5c.; heavy red brass, heavy copper and copper wire, 7.50c.; light copper, 6.50c.; block tin, 20c.; tin foil, 18c.; zinc, 2.75c.; lead, 3c.; tea lead, 2c. and aluminum, 9c.

Hangar Contract Awarded

WASHINGTON, Sept. 27.—The contract has been awarded to the William M. Southerland Building & Contracting Co., St. Louis, the lowest bidder for the construction of the army hangar, roadway and gas holder at Belleville, Ill. The bid of this company was $1,093,160. About 3500 tons of steel is involved.

An interesting pamphlet with both English and Japanese texts has been published by the Japanese Steel Works, Ltd., whose plant is at Muroran, Hokkaido. Illustrations of the plant are given, showing that the Muroran works are extensive and diversified. There are four blast furnaces, with an annual capacity of 160,000 tons; coal washing and coke plants; steel works with an annual capacity of 130,000 tons of ingots for gun forgings, etc.; blooming mill and finishing mill, forging presses, tempering and shrinking equipment, machine shops, etc. Other works are located at Hiroshima, where shells, breech mechanisms, torpedo tubes and steel and iron castings are manufactured, also pumping machines, refrigerating plants, ingot molds and various machine tools.

AUSTRIAN MARKET IMPROVES

Prices Advance—Import Quota to Jugo-Slavia Increased—Numerous Electric Projects

(*Special Correspondence*)

VIENNA, AUSTRIA, Sept. 4.—A slight improvement in the Austrian iron and steel market is reflected in the recent price increase for bar iron by 100 kr. to 3000 kr. per 100 kg. by the Alpine Montangesellschaft. The improvement is largely attributed to the lessening of German competition, German mills evidently being fully occupied. Moreover, German quotations have lately equalled Austrian inland prices. The Steiner iron works at Salzburg has resumed operations at its rolling mills, which have been idle for some time, and many new incorporations have lately been registered. At Breitenlee, near Vienna, a new malleable pig iron works is being established and the erection of a steel works is planned at Reutte, in Tyrol, in which German capital is interested. Several foundries, which have been idle during the recent months, have resumed operations. The Alpine Montangesellschaft is now operating three out of six blast furnaces and a fourth will be blown in shortly. The number of open-hearth furnaces in operation has increased from seven to ten. Production costs, through depreciation of the krone, are increasing and the upward tendency of prices is expected to continue. The railroads are again coming forward with moderate orders. The Jugo-Slavian Ministry of Trade has increased the agreed import quota for Austrian industrial products by 600,000,000 kr. Under the revised agreement the quota for iron, steel and manufactures has been increased as follows: Bar iron, structural shapes, beams, girders, etc., from 204,000,000 kr. to 308,000,000 kr.; steel of all kinds from 50,000,000 kr. to 100,000,000 kr.; wire nails, subject to special conditions, from 50,000,000 kr. to 100,000,000 kr.

In the machinery market the majority of the larger works, as well as the manufacturers of special machinery are well employed, although the small plants report a dearth of orders. Export trade has been fairly active but the increasing severity of foreign customs restrictions compels sellers to go to the lowest limit in quoting prices. Italy has increased duties by 400 per cent for some classes of machinery. As duties must be paid in gold, exports to Italy are burdened with a duty amounting to 60 per cent of the invoice value. Negotiations between Italy and Austria for a commercial treaty will shortly be reopened. The automobile industry has nearly completed a number of old export orders for the United Kingdom, Holland and Scandinavian countries, and is open for new business. Czecho-Slovakia and Balkan countries are taking small shipments of automobiles. For the first time an Austrian automobile works has been awarded a large contract by an American firm, the Oesterreichische Waffenfabriksgesellschaft having secured an order for 800 cars. The company's plant is at Steyr and is considered one of the best-equipped works in the country.

Notable activity prevails in the electrical industry, which is benefiting by the large electrification and hydro-electric projects under way or planned. Exports of electric material are satisfactory. The Siemens-Schuckert works has established a branch at Agram, in Jugo-Slavia, which is supplied with Austrian semi-finished products. The Vienna municipal authorities have voted 6,400,000,000 kr. for the reorganization of the heating and lighting systems of the city and environs. Another large project, involving about 10,000,000,000 kr., provides for the development of hydro-electric power on the Ybbs and the Lunz-Kienberg-Gaming canal. The completion of this project will cause a radical change in power supply for the many industrial plants in the affected districts.

CRISIS IN CZECHO-SLOVAKIA

Many Works Close Down—Keen German Competition—A New Steel Making Process Introduced

(*Special Correspondence*)

PRAGUE, CZECHO-SLOVAKIA, Sept. 5.—The crisis in the Czecho-Slovakian iron and steel industry is assuming proportions which will severely test the economic structure of the country. The situation has been growing worse during the past few months, and the fact that the Prague Iron Co. has now blown out the last of its seven blast furnaces, is illustrative of the seriousness of present conditions. This company has laid off 50 per cent of its men and further curtailment is imminent. A considerable reduction of prices was made in August by the Prague Iron Co., but the cut failed to prove a stimulant. Other works refused to follow the example, it being held that coal and coke prices must be reduced before a lowering of iron and steel prices could be considered. Negotiations have been entered into with the miners in the Ostrau mining district, but the men have adopted a rather hostile attitude toward reductions, threatening to go on strike.

New Steel Making Process

The Prague Iron Co. has closed down its ore mines and is arranging for a special process of steel production in which scrap, with small additions of pig iron, forms the charge. There are still fairly large quantities of scrapped war material available which will be used while the required pig iron will be imported from Germany, where quotations are lower than Czecho-Slovakian prices. Evidently this arrangement is not merely an emergency measure, as the company is having its open-hearth furnaces reconstructed and adapted to the new process.

Reports from other centers are equally unsatisfactory. The Branka iron works at Troppau has closed down because of labor trouble, the Witkowitz steel works has discharged 3000 men and another 2000 will be dropped should the slump continue, while the Hahn works at Oderberg and the Freistadt Steel & Iron Works have shut down completely. Other plants are working 2 or 3 days a week and production has declined to about 30 per cent of normal. The financial position of these works is precarious since some of them are operating large coke plants and the country is flooded with coke, for which there is practically no demand.

Preparations for Near East Trade

German competition, although not quite as active as formerly, is nevertheless felt and tends to accentuate the critical situation. In an effort to meet German competition in the Near East, the Prague Iron Co., in co-operation with other enterprises, has established an export warehouse at Esseg, Jugo-Slavia, and another one at Agram is to follow. Plans are also under way for an extensive working of the Turkish and South-Russian market as soon as economic conditions in those territories have somewhat stabilized, it being intended to establish sales branches at Constantinople and Galatz, Roumania. In Galatz the Skoda works is erecting stores for machinery later on to be shipped to the Don and Jekaterinoslav coal districts and it is likely that the Skoda works will also direct operations at the central bureau at Constantinople.

All these are preparatory measures, however, and there is nothing to indicate an early improvement in the tone of the market. In the engineering and metal industry, conditions are better but still far from satisfactory. Few, if any, of the works are operating on full time, though export prices are on a profitable basis. The outlook for the rolling stock industry is better since the recent voting of a government credit of 450,000,000 kr. for new rolling stock.

John E. Edgerton, president of the National Association of Manufacturers, will give a complimentary luncheon to manufacturers of the State of Ohio at the Sinton Hotel, Cincinnati, on Friday, Oct. 14. The object of the luncheon is to discuss general business conditions and industrial development.

Machinery Markets and News of the Works

SMALL RAILROAD ORDERS

Big Four, Louisville & Nashville and Erie Make Purchases

Machine-Tool Business Continues Dull—September Has Not Brought Expected Improvement

September has not brought the improvement in the machine-tool trade that was expected. Many dealers and tool builders report that their September sales have shown no gain over August. Prospects are more numerous, but it is difficult to get orders.

There is a little railroad buying, but it is scarcely important enough to lend much encouragement. The Big Four has bought about a dozen tools at Indianapolis for its Beech Grove, Ind., shops and the Louisville & Nashville has purchased a few machines. A car wheel lathe bought by the Erie railroad is the only railroad purchase of importance in the East, but the New York Central is expected to close shortly on about a half dozen tools. At Chicago the Santa Fe has issued an inquiry for several additional tools for its shops at Albuquerque, N. M. The Union Railroad, a subsidiary of the United States Steel Corporation, has revived a list of tools originally put out about a year ago.

Although there are more inquiries, few of them call for more than one or two tools and the demand for used machines predominates to a large extent. A company starting in business at Skowhegan, Me., has purchased nine used tools. The Dalton Mfg. Corporation, Sound Beach, Conn., and the Wright Aeronautical Corporation, Newark, have each purchased a few used tools.

The Durant Motor Co. is inquiring at Cleveland for six or eight single or multiple spindle drilling machines.

School business continues to look promising, though many projects of this kind are being held up. The New York Board of Education is expected to issue a new list of about 100 tools soon. The Indianapolis public schools are in the market for a few tools.

New York

NEW YORK, Sept. 27.

Purchase of a car wheel lathe by the Erie Railroad is the only railroad buying of importance that has taken place recently in this market. The New York Central, which is in the market for a half dozen tools, has taken no action, but is expected to do so soon. It is understood that prospective purchases by the Big Four have been officially approved and that instructions have been sent to Cincinnati to place orders for several machines inquired for several months ago.

Buying is confined almost entirely to single machines and used tools predominate. The Dalton Mfg. Corporation, Sound Beach, Conn., and the Wright Areonautical Corporation, Newark, have each purchased several used machines.

The New York Board of Education is expected to advertise for bids soon on about 100 machine tools for manual training departments. This is in addition to tools that will be required for Brooklyn schools.

The crane market in this district continues stagnant, although a number of small inquiries are out. Builders, who will submit bids on the cranes for the piers being erected by the city of New York at Stapleton, S. I., are reported to have decreased in number from about 30 at the start to 20 manufacturers. An inquiry is in the market from the Baldwin Locomotive Works, Philadelphia, for a traveling derrick of about 50 tons capacity. John A. Savage & Co., Crosby, Minn., recently in the market for a locomotive crane for Sagamore mine, Riverton, Minn., have purchased.

Among recent sales are: Whiting Corporation, one 30-ton, 52-ft. span overhead traveling crane with two 15-ton trolleys, to the American Trading Co., 25 Broad Street, New York, for export to China; Shepard Electric Crane & Hoist Co., 21 1-ton, 2-ton, 3-ton and 5-ton electric hoists and one back-geared motor, making a total of 40 electric hoists within the past month to Frazar & Co., for shipment to a Japanese shipyard; a 6-ton, 69-ft. span bucket crane to the Austin Co., Philadelphia, for F. W. Tunell & Co., glue and fertilizer, Philadelphia; a 3-ton, 30-ft. span, single, I beam crane to the Atlantic Ice & Coal Corporation, Atlanta, Ga., and a 3-ton, 21-ft. 4-in. span, single I beam crane to the city of Kinston, N. C.; Northern Engineering Works, four 3-ton, 36-ft. span, 3-motor overhead traveling cranes to the A. M. Castle Co., Chicago, for a new warehouse; Pawling & Harnischfeger Co., a 5-ton overhead traveling crane to the Illinois Glass Co., Philadelphia.

Machinery and equipment estimated to cost in excess of $2,000,000 will be exported to Calcutta, India, by the American Mfg. Co., Noble and West streets, Brooklyn, N. Y., manufacturer of cordage and bagging, for its new plant. The company has acquired about 35 acres at Calcutta and will remove a number of its United States plants to the new site. The works are being established at this point owing to economical labor.

The National Generator Co., New York, has been incorporated with a capital of $500,000 by W. W. Harris, W. C. Swift and S. Null, to manufacture electric and steam generating equipment. It is represented by W. J. Bloch, 317 East Eighteenth Street.

The Coilite Corporation, Utica., N. Y., has been incorporated with a capital of $100,000 by G. R. and D. A. Hughes, and J. Rothstein, Utica, to manufacture electric lighting fixtures and kindred equipment. Dunmore, Ferris & Dewey, attorneys, Utica, represent the company.

The Inwood Consumers' Ice Mfg. Corporation, New York, recently incorporated with a capital of $200,000, has acquired property at Ninth Avenue and 213th Street, 100 x 200 ft., for its new ice-manufacturing and refrigerating plant. It will be one-story, occupying practically the entire site, and estimated to cost about $300,000. R. L. Belgardo is president. The company is represented by N. F. Schmidt, 220 Broadway.

The May-Ficklern Concrete Steel Co., New York, has been incorporated with a capital of $100,000 by E. O. Gray, R. H. Ring and F. S. May, 280 Broadway, to manufacture steel reinforced concrete products.

The Crown Motors Corporation, New York, has been incorporated with a capital of $1,000,000 under Delaware laws by John T. McGovern, M. E. Nolan and E. C. Ballantyne, New York, to manufacture automobiles and motors. The company is represented by the Delaware Registration & Incorporators' Co., Ford Building, Wilmington, Del.

Hoisting and conveying machinery and other material-handling equipment will be installed by the Consolidated Forwarding & Building Supply Co., Brooklyn, at its new pier and freight house at the foot of North First Street and the East River, Williamsburg, 250 x 500 ft., secured under lease.

The Normandy Co., New York, has been incorporated with a capital of $200,000 under Delaware laws, to manufacture carbon and alloy steel products. The incorporators are Frederick Angeloch, Anson M. Beard and J. Carlisle

Swain, New York. It is represented by the United States Corporation Co., 65 Cedar Street.

The Hardwell Mfg. Co., New York, has been chartered under State laws to manufacture machinery and parts. The incorporators are T. and T. O. Bosshard, and E. G. Weller. It is represented by W. M. Bennett, 15 William Street.

The American International Corporation, 120 Broadway, New York, affiliated with Stone & Webster, Inc., and the Ulen Contracting Corporation, both of the same address, has secured a contract for the construction of 128 miles of railroad line for the Government of Bolivia, with cost estimated at $7,000,000.

Joseph W. Powell, general manager Emergency Fleet Corporation, Washington, is considering tentative plans for re-conditioning the steamship Leviathan, including engine and boiler department, and other mechanical departments. Former bids received aggregated $8,900,000 for the work. The present cost is estimated at about $7,000,000, including new machinery.

The International Wire Chair Co., Brooklyn, has been chartered under State laws to manufacture wire and metallic furniture. The incorporators are N. C. Suskin, C. S. Lubin and Monte London, 55 Liberty Street, New York.

The Victor Saw Works, Inc., Middletown, N. Y., has been incorporated with a capital of $100,000 by W. E. Cross, W. P. Jeffery and J. B. Greene, Middletown, to manufacture saws and other mechanical products. It is represented by Cornell, Lockwood & Jeffery, 2 Rector Street, New York.

Fire, Sept. 16, destroyed the plant of the Duffney Brick Co., Mechanicsville, N. Y., including engine and power house, drying plant, coal trestle, etc., with loss estimated at about $200,000.

The American Piston Co., Brooklyn, has been chartered under State laws to manufacture pistons, piston rings, etc., for automobile motors. The incorporators are J. J. and N. R. Taglin, and J. A. O'Brien, 1402 Broadway, New York.

The Standard Railway Fuse Corporation, New York, has been incorporated with a capital of $50,000 by G. E. McClure, E. D. Purcell and P. H. Miller, New York. It is represented by Newmark & Miller, 154 Nassau Street.

The Steel Blue Corporation, New York, has been incorporated under Delaware laws with capital of $75,000 to manufacture steel and iron products and is represented by Arthur W. Britton, 65 Cedar Street.

The Sinclair Consolidated Oil Corporation, 45 Nassau Street, New York, is arranging for the installation of new steel tanks, totaling 55,000 bbls., at its properties at Tulsa, Okla.

The State Ice Mfg. Co., New York, has been incorporated with a capital of $350,000 by L. and L. Jakobson, and E. J. Stern, to build an ice-manufacturing and refrigerating plant. It is represented by Schwartz & Jakobson, 150 Nassau Street.

The Progress Iron Works, New York, has leased ground floor property at 104-110 East Thirty-second Street, for a local establishment.

The Driver-Harris Co., Harrison, N. J., will build an addition on Somerset Street, one-story, 95 x 275 ft., estimated to cost about $30,000.

The Triumph Lock Co., 44 Paterson Street, Jersey City, N. J., has filed notice of organization to manufacture locks and locking devices. James O. and Wells W. Wilson, 104 Baldwin Avenue, head the company.

Fire, Sept. 20, destroyed the forge shop of Ennis Brothers, First Avenue, Asbury Park, N. J., and adjoining property of the Asbury Park Mill Co., and the Weeden Automobile Painting Co., Asbury and first avenues, with total loss of about $75,000.

A new plant for the manufacture and repair of automobile truck bodies for company service will be established by the Great Atlantic & Pacific Tea Co., Provost Street, Jersey City, N. J. A list of machinery and equipment to be installed has been arranged.

The White Metal Mfg. Co., Grand Street, Hoboken, will soon take bids for its new plant on Grand Street, to consist of a one and six-story building, 135 x 136 ft., and 58 x 65 ft., respectively. Joseph C. Schaeffler & Co., 11 East Fifty-sixth Street, New York, are architects.

William A. Jones, Washington and King streets, Mt. Holly, N. J., has plans under way for a one and two-story addition to his automobile service and repair plant, 100 x 200 ft.

The Eclipse Phonograph Co., Keyport, N. J., is planning the erection of a local factory to manufacture electrically operated talking machines and parts. For some time past it has been manufacturing at the plant of the Aeromarine Plane & Motor Co., Keyport. The company is arranging for a stock issue of $300,000, to carry out the project and for general expansion.

The Ideal Elevator Co., 20 Clinton Street, Newark, N. J., has filed notice of organization to manufacture passenger and freight elevators, and parts. M. Jackerson heads the company.

Property of the Wolkoff Machine Works, 1080 Springfield Avenue, Irvington, N. J., will be sold by Samuel I. Kessler, receiver, on Oct. 7.

The L. W. Co., Stuyvesant and Springfield avenues, Irvington, has filed notice of organization to manufacture automobile radiators and other metal products. Edwin J. Williams, 70 Washington Avenue, Irvington, heads the company.

Philadelphia

PHILADELPHIA, Sept. 26.

The Department of City Transit, 1211 Chestnut Street, Philadelphia, William S. Twining, director, will take bids up to Oct. 4, for furnishing and installing two 20-ton electric traveling cranes in new substations to be erected on Cumberland and Griscom streets.

The Westinghouse Air Spring Co., 1428 Vine Street, Philadelphia, will commence the immediate erection of its new building on property recently acquired at 2336-38 Fairmount Avenue.

The Moulton Ladder Co., Philadelphia, has acquired the five-story building, 30 x 72 ft., at 154 North Third Street, for new works.

The Columbia Steel & Shafting Co., Widener Building, Philadelphia, has acquired the one and two-story buildings on Cedar Street, on site 165 x 348 ft., for use in connection with its works.

Egnal & Motusan Brothers, North Third Street, Philadelphia, will soon commence the erection of a two-story automobile service and repair plant, 75 x 120 ft., on Woodstock Street, to cost about $75,000.

The Belgrade Wagon Works, Belgrade and Cambria streets, Philadelphia, has filed plans for the erection of a new one-story shop.

The Cobb's Creek Motors, Philadelphia, is being organized by George R. Stull and Frank L. Shallow, to manufacture motor truck and automobile parts, and operate a general repair works. Application for a State charter will be made Oct. 3. The company is represented by Reber, Granger & Montgomery, 1001 Chestnut Street.

The Curran-McDevitt Motor Co., Philadelphia, has been incorporated in Delaware with capital of $350,000 to manufacture automobile equipment. It is represented by the Corporation Guarantee & Trust Co., Land Title Building.

The Electric Manganese Steel Co., Reading, Pa., is having plans prepared by William H. Dechant & Son, Baer Building, for a new one-story foundry, 40 x 140 ft., for the manufacture of steel castings and estimated to cost about $50,000.

The Forbes Aluminum Products Co., Easton, Pa., recently organized in Delaware with capital of $4,500,000, has plans in progress for the erection of a factory, the initial unit to give employment to about 400. The company is represented by the Corporation Trust Co. of America, duPont Building, Wilmington, Del.

The Universal Iron Mfg. Co., Mount Carmel, Pa., has been incorporated with a capital of $50,000, to manufacture iron and steel products. S. E. Bergstresser, Mount Carmel, is treasurer.

Louis Kimmel, Lancaster, Pa., has acquired the plant and property of the Uniset Tool Co., Lancaster, at a receiver's sale and plans to operate the works.

The Bremer-Talis Co., Schwenkville, Pa., has plans under way for a new two-story automobile service and repair works, 60 x 125 ft., at Main and Perkimonen streets, estimated to cost about $100,000 with equipment. Schermerhorn & Phillips, 430 Walnut Street, Philadelphia, are architects.

The Keystone Supply & Mfg. Co., 927 North Ninth Street, Philadelphia, manufacturer of steam supplies, heating equipment, etc., has awarded contract to F. B. Glassmire, Bethlehem Trust Building, Bethlehem, Pa., for a new one and two-story plant, 300 x 400 ft., on East Fourth Street, Bethlehem.

The Frantz International Refrigeration Co., Reading, Pa., has been incorporated with a capital of $300,000 to manufacture refrigerating and ice-making machinery. John H. Paul, Reading, is treasurer.

The Lehigh Valley Coal Co., Mahanoy City, Pa., will commence the immediate installation of new electrically operated pumping machinery at its Buck Mountain mine. It will have a capacity of 3000 gal. per min.

A conveyor system, ovens, power apparatus and other mechanical equipment will be installed in the new plant to be erected by the Butter Krust Baking Co., Sunbury, Pa., to

be two stories, 70 x 130 ft., estimated to cost about $150,000.

The Victory Belting Co., Catasauqua, Pa., has acquired a site for a new plant to manufacture mechanical link belting. A specialty will be made of chain belting for automobile motor fans. William R. Thomas, Catasauqua, is interested in the project.

The E. & G. Brooke Iron Co., Birdsboro, Pa., is considering the installation of an aerial tramway from its French Creek mines to its Birdsboro furnaces. The cable line will be equipped with electrically operated ore buckets.

Frank A. Sieberling, head of the Lehigh Tire & Rubber Co., New Castle, Pa., is negotiating for the purchase of the plant of the Portage Tire & Rubber Co., recently placed in receivership. Upon acquisition, it is proposed to operate the plant in conjunction with the Lehigh works. Mr. Sieberling formerly was president of the Goodyear Tire & Rubber Co., Akron, Ohio.

New England

BOSTON, Sept. 26.

September will show less actual business booked than many machine-tool houses anticipated earlier in the month, and it is evident that several prospects will be carried into October, at least, due to financial reasons. Plant construction in New England, as far as it has bearing on the metal-working industry, has dropped almost to the vanishing point. The possibilities of new business therefore are limited largely to replacements, of which there are few; to the automobile accessories industry, which apparently is the most promising at the moment; to companies going into the manufacture of something new, requiring individual pieces of additional equipment with the buying tendency toward used machinery; and to concerns starting in business, usually small and unimportant. One of the largest New England plants recently transferred more than 100 machine tools from outlying plants rather than purchase new equipment.

The machines sold the past week were confined to a few houses, and included nine used tools to Skowhegan, Me., interests starting in business; a No. 8S Standard power press to a local manufacturer; motor-driven drill press to a Boston concern; power hack saw to a Fall River coal company, and a used 20-in. upright drill to a Worcester firm. New York interests have been negotiating here for automatic screw machine equipment for export, and a central Massachusetts construction company is inquiring for three or four tools, but apparently is in no hurry to purchase, while a few new inquiries on individual upright drills have come to light. The Narragansett Electric Lighting Co., Providence, R. I., bought a used 32-in. lathe for its South Street generator station.

While prospects for immediate business are not especially bright, lathe chucks, die heads, drills and other small tools are moving much better, and manufacturers of some kinds of machinery are securing orders for parts, indicating that the time is drawing nearer when purchases of new equipment must be made. Shops here and there are beginning to show life, and a few tool builders are increasing operations. For instance, the Perkins Machine Co., Warren, Mass., recently secured orders for 10 presses and has increased its working force. A Boston die and special machinery maker is running full and, although with less help than during the war, is doing a larger business. Another local company is busy on a fairly large order for dies and other equipment from Gray & Davis, Cambridge. One New England manufacturer of surface grinders is putting through a fairly good stock order, while a Lowell manufacturer of munitions is resuming operations after a period of inactivity.

Most manufacturers of hack saws have reduced prices 10 per cent, but distributing interests have been slow to take similar action, consequently there is a spread in the market from 25 to 35 per cent discount.

The Simonds Mfg. Co., Fitchburg, Mass., saws, has issued new discount sheets dated Sept. 1, showing a general downward revision in prices. The most conspicuous change is in solid tooth saws.

The Board of Education, Ansonia, Conn., will erect a trade school to cost $100,000. L. W. Robinson, New Haven, Conn., is the architect.

Bids are being asked on the construction of a one-story boiler house, 50 x 56 ft., 32-ton coal pocket, and an overhead ash bunker contemplated by the Ware Woolen Co., Ware, Mass.

Frank W. Sickles, 683 South Main Street, is president, and A. Raoul Silber, 39 Spruceland Avenue, treasurer of the Radio Development Corporation, Springfield, a $25,000 Massachusetts corporation, given a charter to develop and manufacture electrical devices, especially radio appliances.

The Rule-Form Machine Co., Worcester, capitalized for $100,000, has been granted a Massachusetts charter to manufacture machinery and appliances used in the printing industry. Owen F. Trainor, 105 Woodland Street, is president, and John F. Hjort, 1 Mars Street, treasurer.

The W. J. Hyland Mfg. Co., 151 Dwight Street, Springfield, Mass., manufacturer of heating equipment, etc., is taking bids for a new three-story plant on Liberty Street, 47 x 85 ft.

Fire, Sept. 16, destroyed a portion of the plant of the Eastern Metal & Refining Co., Charlestown, Mass., with loss estimated at $20,000.

The M. & M. Machine Products Co., 369 North Main Street, Pawtucket, R. I., has filed notice of organization to manufacture machinery and parts. James F. McCaffrey heads the company.

The Williams & Anderson Co., 33 Broad Street, Providence, R. I., manufacturer of emblems and other metal goods, has awarded contract to Bowerman Brothers, Industrial Trust Building, for a new one-story plant on North Main Street, 60 x 160 ft., with extension, 60 x 100 ft., estimated to cost about $65,000.

The Quartermaster Department, United States Army, Branford, Conn., has completed plans for a one-story automobile service and repair works on a site near the armory. It will cost $25,000.

The Lyons Mfg. Co., 101 Sabin Street, Providence, R. I., has acquired the Metal Products Mfg. Co., 195 Eddy Street, which it will merge with its organization. E. A. Willemin, heretofore connected with the latter company, will be superintendent of the metal products department of the Lyons company.

The Packard Auto Radiator Co., 293 Fountain Street, Providence, R. I., has filed notice of organization to manufacture automobile radiators and other metal products. Adolph H. Jodat, 74 Newman Avenue, Seekonk, Mass., heads the company.

The H. M. Howe Co., 417 Fountain Street, Providence, R. I., operating an automobile repair works, has awarded contract to the C. I. Bigney Construction Co., 357 Westminster Street, for a new one-story plant, 60 x 130 ft., with extension, 40 x 50 ft.

Cleveland

CLEVELAND, Sept. 26.

Manufacturers of drilling machinery report an improvement in inquiry from the automobile industry, largely in single machines, but prospective purchasers are slow in placing orders. While machine-tool builders do not expect automobile companies to purchase much equipment to increase their output, orders are looked for from this source during the next few months for considerable equipment to reduce the cost of production, as price competition among car builders is expected to be very keen. The Durant motor interests recently asked for quotations on six or eight single and multiple spindle drilling machines, but no intimation has been given as to when this business will be placed. A local builder of drilling machines reports a better volume of inquiry from the textile industry in the East.

Dealers state that the demand for machine tools is still dull and shows little change from week to week. September sales will be about the same volume as during August. An occasional order is placed for two machines, but usually sales are confined to single tools. There is a fair demand for used machinery but, according to dealers buyers insist on very low prices. The demand for electric tools shows a little improvement in orders from companies engaged in car repair work.

Makers of various lines of conveying equipment report considerable improvement in inquiry, but orders are slow in being placed.

The Van Dorn Electric Tool Co., Cleveland, will shortly place on the market a line of polyphase alternating current motors, in capacities from 1 to 15-hp. Until the present time it has manufactured motors only for its own line of electric tool equipment.

The C. O. Bartlett & Snow Co., Cleveland, has taken an order for conveying equipment amounting to about $75,000, for the coal storage plant to be erected by the Government at Mobile, Ala.

The Simonson Wire Specialties Co., Cleveland, has established a plant at 1684 Columbus Road and is manufacturing wire garment hangers and other wire specialties. A. W. Simonson heads the company.

The Woods Engineering Co., Alliance, Ohio, has completed a new factory, 63 x 125 ft., and has installed considerable machinery for the manufacture of a new type of jack for

automobiles, known as the Morrison automobile double range continuous lift jack.

The Napoleon Tool & Machine Co., Napoleon, Ohio, has changed its name to the Napoleon Products Co. and has increased its capital stock from $40,000 to $50,000. Sidney Thompson, president and treasurer Defiance Screw Machine Products Co., Defiance, Ohio, has taken an interest in the company, which is engaged in repair work, and is preparing plans to manufacture automobile parts and accessories.

The Waukon Rubber Co., Elyria, Ohio, recently organized with a capital stock of $500,000, plans to erect a factory to manufacture rubber specialties. J. W. Dewhurst will be secretary and general manager.

The J. L. Simpson Co., Bellefontaine, Ohio, will build a branch foundry in Lima, Ohio.

The National Razor Mfg. Co., Amherst, Ohio, is planning the erection of a one-story factory, 40 x 100 ft.

The Cleveland Electric Illuminating Co., Cleveland, is arranging for a power plant addition, 25 x 73 ft.

Fire, Sept. 14, damaged a portion of the plant of the Republic Rubber Co., Canton, Ohio, with loss estimated at about $22,000.

The Bail Welding & Bonding Co., Cleveland, has awarded contract to the Austin Co., 16112 Euclid Avenue, for a new one-story and basement plant, 90 x 180 ft., estimated to cost about $50,000.

The Barber-Foster Engineering Co., Swetland Building, Cleveland, manufacturer of cranes, hoists, etc., has acquired property at Conneaut, Ohio, as a site for a new plant.

Buffalo

BUFFALO, Sept. 26.

The Jamestown Metal Desk Co., Blackstone Avenue, Jamestown, N. Y., has completed plans and will take bids at once for a new one-story plant on Blackstone Avenue, 81 x 100 ft. Beck & Tinkham, Frick-McGee Building, are architects.

The Earl I. Maltby Roofing Co., Erie Avenue, Tonawanda, N. Y., is planning the immediate rebuilding of the portion of its plant destroyed by fire, Sept. 19, with loss estimated at about $25,000. The factory was new and in course of erection, with machinery installation under way. The equipment loss is estimated at $17,000.

The Iroquois Natural Gas Co., Iroquois Building, Buffalo, has plans under way for the erection of a new gas purification plant in the vicinity of the works of the Donner Steel Co., estimated to cost about $400,000 with machinery.

Reorganization plans are being considered by officials of the Buffalo Hoist & Derrick Co., Erie Street, Buffalo, manufacturer of hoisting equipment, buckets, etc. The City Trust Co. is acting as trustee for the company for the benefit of creditors and stockholders.

The Meldrum-Gabrielson Corporation, Industrial Building, Syracuse, N. Y., manufacturer of milling machines and parts, has completed foundation work for its new one and two-story plant on West Fayette Street, and will commence the immediate erection of the superstructure. It will be 60 x 160 ft. and is estimated to cost $75,000.

The Cambria Power Co., Inc., Sanborn, Niagara County, N. Y., has been granted permission to build a new electric light and power plant at Cambria.

Fire, Sept. 17, destroyed a building at the plant of the Union Cutlery Co., Olean, N. Y., with loss estimated at $20,000.

The Waterloo Water Co., East Main Street, Waterloo, N. Y., has completed plans for a new one-story, electrically operated pumping plant, 47 x 65 ft.

Cincinnati

CINCINNATI, Sept. 26.

Local dealers report continued improvement for machine tools. Inquiry is better and sales during the week were more numerous than for some time. A central Ohio manufacturer purchased three tools and is expected to close for several more shortly. The Big Four Railroad is reported to have closed for four boring mills and the Louisville & Nashville Railroad was also in the market, buying one bushing press and two upright drills. Local manufacturers have received a number of inquiries from the St. Louis and Southwestern district. The inquiry from the General Motors Corporation for Dayton plants is still active, as is one for several tools from the McCook Field, Dayton, which bought a special machine the past week. Indianapolis Public Schools are also in the market for small tools for manual training purposes. The Columbus Forge & Iron Co. will likely be in the market shortly for drop forging equipment for an addition to the plant, contract for which was let last week.

The Vonnegut Machinery Co., Indianapolis, Ind., is in the market for a motor generator set, the direct current end to be of 90-kw. capacity for 250 volts pressure, to be driven by a 100 to 125-hp., three-phase, 60-cycle, 2200-volt or 2300-volt synchronous or slip ring motor; also for second-hand motors and generators.

The Columbus Forge & Iron Co., Columbus, Ohio, has awarded contract to the Middle States Construction Co., Columbus, for an addition 70 x 300 ft. It is also the intention to remodel some of the buildings and install new machinery. The company in addition to drop forgings makes a specialty of the manufacture of anvils.

The clay mill of the Harbison-Walker Refractories Co. at Scioto Furnace, Ohio, was destroyed by fire Sept. 16. The loss to the building and machinery is estimated at $30,000.

The City Council, Marietta, Ohio, has plans under way for the erection of a new hydroelectric power plant for municipal service. G. H. Gampers, 220 New First National Bank Building, Columbus, Ohio, engineer, will call for bids at an early date.

Chicago

CHICAGO, Sept. 26.

Word comes from Indianapolis that the Big Four has purchased about a dozen machines for its Beech Grove, Ind., shops. Aside from this purchase, no railroad buying has been reported. The Santa Fe, however, has issued additional inquiries for its Albuquerque, N. M., shops, as follows: One 3-ft. radial drill, one 6-ft. radial drill, three 24-in. upright drills, one circular shear for No. 14 gage iron or less, one multiple punching machine for punching 20 gage holes, one cornice brake, one Dries & Krump No. 186 punch and shear, or equivalent, one 8-ft. squaring shear.

The market still remains quiet and it is probable that the September sales of local dealers will fall considerably below those of August. There has been little change in prices, the only reductions announced recently being 5 per cent by an Ohio manufacturer of shapers and about 9 per cent by a maker of bolt cutters. Store trade is light and used equipment is more in demand than new tools. While prospective business is light, there are a few fair-sized inquiries which are expected to develop into orders. One dealer reports he is working on an inquiry for a shaper, a milling machine, punch press, squaring shear and an automatic surface grinder. The American Steam Truck Co., 20 East Jackson Boulevard, Chicago, recently organized, is expected to purchase some equipment in the near future. It has taken possession of part of the Geyser Electric Washer Co.'s plant, Bloomingdale Road, Chicago, and at present is confining its work to assembling parts contracted out to other manufacturers. Later it expects to expand the scope of its operations.

The Burrell Co., 201 East Avenue, Kankakee, Ill., has been incorporated with $15,000 capital stock by W. C. Burrell, E. G. Canham and Charles Hyer to manufacture plumbers' supplies, tools and machines.

The Improved Oil Cup Mfg. Co., 300 North Wells Street, Chicago, has been incorporated with $6,000 capital stock to manufacture oil cups. The incorporators include Max B. Schneider, Anton K. Fixary and L. R. Rhomberg.

The Electric Units Corporation has been incorporated by F. J. Maas, Samuel Labow and Robert H. Stoll to manufacture heating elements for electrical heating appliances. It has secured space on the second floor of the building at 3511 Lincoln Avenue, Chicago.

The Chicago, Burlington & Quincy Railroad will build a machine shop, 30 x 50 ft., at Herrin Junction, Ill.

The National Stamping & Electric Works, 424 South Clinton Street, Chicago, has purchased the property of the Lindstrom-Smith Co., 3212-40 West Lake Street, and contemplates the erection of a $60,000 addition, 130 x 155 ft., to be ready by Jan. 1. The plant purchased includes the machinery and equipment of the Lindstrom-Smith Co. It is 135 x 250 ft. and with the contemplated annex will be 405 ft. long.

The Superior Welding Co., 313 Knoxville Avenue, Peoria, Ill., has purchased 56 ft. of adjoining frontage. An addition which will practically double the present facilities will be started next spring.

J. M. Schaab, 1601 Fourth Avenue, Rock Island, Ill., has let a contract for a one-story garage, 62 x 150 ft., to cost $50,000.

The General Iron Works Co., 1720 California Street, Denver, Colo., expects to take bids in December on an iron foundry at Thirty-third and Blake streets, to cost $500,000.

The Milwaukee Avenue Motor Sales Co., 2051 Milwaukee Avenue, Chicago, has let contract for a one-story garage, 110 x 150 ft., 2518-28 Milwaukee Avenue, to cost $100,000.

The O. K. Battery Co., Gary, Ind., has plans under way for rebuilding the portion of its electric storage battery plant recently destroyed by fire with a loss of $30,000. It will be one-story, 100 x 200 ft.

The Atchison, Topeka & Santa Fe Railroad Co., 80 East Jackson Boulevard, Chicago, will commence the immediate erection of a new reinforced-concrete power plant at its Albuquerque, N. M., works, to cost about $150,000.

The Waukegan Foundry Co., Terminal Building, Waukegan, Ill., has been incorporated with a capital of $60,000 by Andrew K. Barr, Elmer T. Kidmore and Elmer Olavey, to manufacture iron, steel and other metal castings.

The Cabinet Range Co., Granite City, Ill., is planning the erection of a new plant to manufacture stoves, ranges, etc., estimated to cost about $250,000, with machinery. A. Holloway heads the company.

The Badger Concrete Mixer Co., Winthrop Harbor, Ill., has revised plans nearing completion for its new plant, one-story, 80 x 260 ft., and estimated to cost about $60,000, for the manufacture of concrete-mixing machinery and parts. Bids will be asked at an early date. Headquarters of the company are in the Majestic Building, Milwaukee.

The Silica Brick & Engineering Co., 175 West Jackson Boulevard, Chicago, has leased for 10 years the plant of the Winchester Repeating Arms Co., at 5821 West Sixty-sixth Street, for the establishment of a new plant.

The Henningson Engineering Co., National Building, Omaha, Neb., is preparing plans and will soon call for bids for a new municipal electric power plant for the city of Madison, Neb., estimated to cost close to $75,000.

Baltimore

BALTIMORE, Sept. 26.

The Republic Boiler & Radiator Co., Woodberry, Baltimore, is reported to be planning expansions and the installation of additional equipment to cost about $1,000,000. E. L. Stock is president.

The Floatless Carburetor Co., 916 Munsey Building, Baltimore, recently incorporated with $100,000 capital stock, is understood to be planning the establishment of a factory. R. Contee Rose is interested.

The Baltimore Car & Foundry Co., Curtis Bay, Baltimore, has arranged an improvement program at its plant and will place work under way at once, to include the installation of new equipment, repairs to present machinery, etc.

A one-story machine shop, 35 x 50 ft., will be erected by the Canton Co., Water Street, Baltimore, in connection with a new plant for the Cooknut Corporation at First Avenue and Fifteenth Street, Canton. The works will cost about $90,000.

Herbert S. Michael, Inc., 1701 North Charles Street, Baltimore, has been incorporated with a capital of $100,000 by Herbert S. Michael, LeRoy R. Hatter and Clayton C. Dobbs, to manufacture mechanical products.

The Auto Parts Co., Inc., 104 North Front Street, Baltimore, has been incorporated with a capital of $100,000 by John and George Beck, and Joseph N. Nechamkin, to manufacture automobile parts and other equipment.

The Shore Transit Line, Salisbury, Md., is planning the erection of a one-story repair shop and service works for its motor trucks, with department for parts manufacture.

The Western Maryland Railroad Co., Continental Building, Baltimore, has filed plans for additions to its local works estimated to cost about $350,000.

The Automobile Mfg. Co., 1301 Fidelity Building, Baltimore, has been incorporated with a capital of $50,000 by John D. Nock, Irvin J. Sullivan and Frank P. de Hoff, to manufacture automobile parts and equipment.

Lyon, Conklin & Co., 13 Balderstone Street, Baltimore, manufacturers of sheet metal products, are perfecting plans for the erection of a new factory totaling about 100,000 sq. ft. of floor space. It is proposed to break ground early next year.

The Hughes Engineering & Construction Co., 316 West Redwood Street, Baltimore, has been chartered under State laws to manufacture engines, power house equipment and other machinery. The incorporators are Charles H. Gunther, Charles C. Sweglar and Theodore J. Robinson.

The Curtis Motor Co., 116 Richmond Street, Baltimore, has been incorporated with a capital of $50,000 by Leslie H. Curtis, Thomas R. Moore and Walton B. Booker to manufacture automobile and truck parts, and operate a general repair works.

The L. R. Roberts Typewriter Co., Wilmington, Del., has been incorporated with a capital of $3,500,000 to manufacture typewriters and parts, calculating machines, etc. It is represented by the Corporation Trust Co. of America, du Pont Building.

The Standard Bolt Corporation, Wilmington, Del., has been incorporated with a capital of $5,000,000 to manufacture bolts, nuts, rivets, etc., and is represented by the Corporation Service Co., Wilmington.

The Common Council, Pilot Mountain, N. C., is planning the erection of a new municipal electric power plant. Bonds will be issued.

Fire, Sept. 13, destroyed the planing mill and machinery at the plant of the Whiteville Lumber Co., Whiteville, N. C., with loss estimated at $100,000. It will be rebuilt.

The Harris-Brockman Mfg. Co., Greenville, S. C., manufacturer of pumps and pumping machinery, is planning the installation of a number of machine tools and other equipment. It has recently increased its capital to $200,000.

The Hayward Rubber Co., Wilmington, Del., has been incorporated in Delaware with capital of $200,000 and headquarters at Philadelphia, to manufacture automobile tires and other rubber products. The incorporators are William C. and L. T. Zimmerman, Philadelphia; E. C. Boyd, Wilmington. It is represented by Harry P. Joslyn, Ford Building, Wilmington.

Fire, Sept. 20, destroyed the plant of the Central Sash & Door Co., Macon, Ga., with loss estimated at about $150,000, including machinery, power equipment, etc.

The James Robertson Mfg. Co., Richmond, Va., recently organized with a capital of $350,000, will operate a local plant for the manufacture of pipe and steam specialties, gas fitters' supplies, etc. Louis Miller is manager.

Anheuser-Busch, Inc., St. Louis, will make additions and improvements at its ice-manufacturing plant at Norfolk, Va., to cost about $250,000. A large portion of this amount will be expended for new equipment. Ophuls, Hill & McCreery, Inc., 114 West Forty-second Street, New York, is engineer.

Milwaukee

MILWAUKEE, Sept. 26.

Although improvement in the demand for machine tools exists, business is of small volume and distributed over a wide area. Inquiry is slowly increasing but is decidedly spotty. Makers of milling machines are receiving more frequent requests for prices, which indicates to them better prospects, but transactions are still few and limited to single tools. Locally, the call for metal-working equipment is mostly for repairs or replacement. Some large shops which have little or no work in hand are employing the time overhauling plants in preparation for resumption of production. This is developing some demand in a small way for new machines. There still are a great many used tools on the market and purchasers hold out for material concessions, which limits business.

The Horel-George Metalware Co. of Eau Claire, Wis., has been incorporated with a capital stock of $25,000 to manufacture metal products, principally utensils. The incorporators are Ira S. Horel, John W. George and S. E. Horel.

The Wisconsin Iron & Wire Works, 1660 Booth Street, Milwaukee, will build an addition to its power plant and install several new boilers, the whole to cost about $12,000.

The V. Krefi Co., Eagle River, Wis., has filed articles of incorporation, the capital stock being $75,000 and the incorporators, Victor Krefi, Ben Sohr and Edward Hammes. It is a reincorporation of the V. Krefi Mfg. Co. of Two Rivers, Wis., which is transferring its factory and offices to Eagle River, where a new plant will be erected immediately. It manufactures shock absorbers, bumpers, spot lights and other automobile accessories.

The Galloway-West Co., 24 West Division Street, Fond du Lac, Wis., has engaged Martin Tullgren & Sons, architects, 425 East Water Street, Milwaukee, to design a four-story addition, 60 x 160 ft., to its cold storage warehouse and dairy products plant, which will require supplemental generating, boiler and refrigerating equipment. Details are not yet available. M. E. West is manager.

The Merrill Wood Products Co., Merrill, Wis., is erecting a two-story addition, 30 x 50 ft., and will install a self-feed rip saw with 40-hp. motor, a cut-off saw and a new automatic lathe. A second addition is planned for early spring and will require one electric elevator and some conveyor equipment.

The Davis Light & Power Co., Galesville, Wis., has been incorporated with a capital stock of $60,000 to take over the commercial light and power department of the Davis Milling Co., which is investing about $45,000 in new hydroelectric generating and transmission equipment. Incorporators of

the new company are Ben W. Davis, Alfred N. Sagen and W. S. Wadleigh.

The Ke-No Co., Sheboygan, Wis., manufacturer of furniture novelties and specialties, will invest about $50,000 in the construction and equipment of an addition at Pennsylvania Avenue and East Water Street. Plans are being completed by W. C. Weeks, local architect, who will take bids in about two weeks.

The Fire & Police Alarm Post Co., Milwaukee, has been organized with $25,000 to manufacture a patented type of cast iron and steel standard for municipalities. It takes over the business established some time ago by William R. Callahan, chief purchasing agent, city of Milwaukee, who appears as incorporator with W. F. Thanhauser, P. J. Hayes and Thomas E. Hayes.

The Dort Motor Car Co., 242 Fourth Street, Milwaukee, will build a $35,000 garage, service and sales building, 120 x 120 ft., one story, at Mason and Van Buren streets. The architect is A. C. Eschweiler, 141 Wisconsin Street.

The Universal Toy Mfg. Co., Milwaukee, has been organized with a capital stock of $50,000 to build a factory for the manufacture of wood, metal and mechanical toys. The incorporators are Stephen A. Park, Jr., George F. Hayden and H. H. Hering, 674 Fifty-second Street, Milwaukee.

The Oshkosh Tractor Co., Oshkosh, Wis., has let contract for the substructure of its new machine shop and assembling plant, 150 x 500 ft., to A. Nielson & Son, Neenah, Wis. Auler & Jensen, local architects, are now asking bids for the erection of the superstructure of brick and steel, with sawtooth roof. It will cost about $275,000 and is to be ready Dec. 1. A. D. Paine is president and general manager.

The Cataract Mfg. Co., Milwaukee, is a new $25,000 corporation organized to manufacture water pumps, gasoline engines and other hydraulic equipment for farms, industrial and domestic purposes. The incorporators are John F. Dunphy, Leo W. Slensby, attorney, and Frank R. Lueck, 1306 Wells Street, formerly second vice-president Fabricated Ship Corporation, Milwaukee.

The Brunett Perfect Heating System, Inc., Rice Lake, Wis., expects to let contracts Oct. 1 for the erection of its new plant, of brick and steel, 100 x 200 ft., one story and part basement, for the production of hot air furnaces designed especially for farms and isolated localities. It is incorporated with a capital stock of $1,200,000 in Minnesota and has been granted a Wisconsin charter.

The La Crosse Washer Co., La Crosse, Wis., manufacturer of domestic washing machines, which suspended production in 1917 because of war conditions, has completed arrangements to resume operations Jan. 1, 1922. Materials are now being contracted for and the factory is undergoing a general overhauling.

Detroit

DETROIT, Sept. 26.

The Oakland Motor Car Co., Pontiac, Mich., will resume work at once on the erection of its new one and two-story plant for engine manufacture and other automobile construction. Foundation work was placed under way some months ago and later discontinued owing to business conditions. It will cost in excess of $2,000,000 with machinery. The duPont Engineering Co., McKerchey Building, Detroit, is engineer and contractor.

The True Mfg. Co., Eaton Rapids, Mich., has been incorporated with a capital of $100,000 by C. O. Brownell, C. C. Hall and J. C. Dreher, Eaton Rapids, to manufacture agricultural machinery and equipment. It is completing plans for a local factory and will commence erection at an early date.

The Grand Rapids Show Case Co., Grand Rapids, Mich., has awarded a contract to John McNabb & Son, Murray Building, for a five-story addition, 100 x 132 ft., estimated to cost about $80,000. S. D. Young is president and general manager.

The Peaubien Ice & Coal Co., 4205 West Jefferson Avenue, Detroit, will take bids at once for a new one and two-story ice-manufacturing and refrigerating plant on Twelfth Street. The George B. Bright Co., 103 Marquette Building, is engineer. S. P. O'Brien is president and general manager.

The Fort Shelby Garage, care of Albert Kahn, 1000 Marquette Building, Detroit, architect, has awarded contract to the John Bollin Co., 1257 Book Building, for a new four-story automobile service and repair plant, 130 x 150 ft., estimated to cost about $300,000. A complete machine and repair department will be installed. John Gillespie is head.

The Sand & Lime Products Co., Detroit, has acquired the plant of the Fairview Brick Co., foot of St. Jean Avenue, and will use the works for the manufacture of pressed brick, developing a capacity of about 40,000 brick per day. T. C. Taylor is president and L. H. Tussell, treasurer.

The Atlas Drop Forge Co., Lansing, Mich., has commenced the erection of a one-story addition.

M. R. Carrier, president Federal Drop Forge Co., Lansing, Mich., states that his company has just received a $20,000 order for drop forgings from a Lansing automotive plant.

Contract for the new Ford Motor Co.'s body plant at Iron Mountain, Mich., has been let to the Worden-Allen Co., Chicago. Construction will start immediately.

The Wireless Vacuum Cleaner Co., with offices in the Book Building, Detroit, has been organized to manufacture wireless vacuum cleaners. Production is being carried on in temporary quarters, but negotiations for a factory are nearing completion. The officers are W. S. Richards, president; F. D. Siebert, vice-president; F. W. Edward, treasurer, and A. F. Stryker, secretary.

The Rogers Foundry Co., Detroit, has been incorporated with $35,000 capitalization by C. O. Rogers, Monroe, Mich., Alex Hungler and William Reinhold, 448 Yale Street, Detroit, to operate a foundry and machine shop.

The Gulf States

BIRMINGHAM, Sept. 26.

The Mexia Refining Co., Telephone Exchange Building, Mexia, Tex., has completed plans and awarded a contract for its new oil refinery to Charles B. Miller & Co., Fort Worth, Tex. It will have a daily capacity of 3000 bbl., and is estimated to cost about $300,000, of which about $150,000 will be expended for machinery. A power house will also be erected.

The Bear Rubber Mills Corporation, San Antonio, Tex., has been incorporated under Delaware laws with capital of $1,000,000 by Donald E. Cameron, Charles Massey and Claude J. Kelly, San Antonio, to manufacture rubber products. It is represented by the United States Corporation Co., 65 Cedar Street, New York.

The Harrisburg Machine Co., Harrisburg, Tex., has been chartered under State laws to manufacture machinery and parts and operate a general repair plant. The incorporators are F. D. French and R. A. Fenzi, Harrisburg.

The Bonnie Coal Co., Tuscaloosa, Ala., recently organized, has plans under way for the installation of electrical, power house and other mechanical equipment at its properties. C. C. Huckaby, Blocton, Ala., is consulting engineer in charge. William Jones is president and manager.

The Southern Cement Block Machine Co., Orlando, Fla., is contemplating the erection of a new plant to manufacture machinery for cement block production. Samuel Lindsey heads the company.

The Dallas Co-operative Ice & Mfg. Co., 907½ Commerce Street, Dallas, Tex., will take bids in November for its new one-story plant on Spring Avenue, 65 x 200 ft., estimated to cost about $75,000. O. J. Bouis, company address, is engineer.

The Darco Co., du Pont Building, Wilmington, Del., a subsidiary of the du Pont Powder Co., has acquired about 160 acres at Marshall, Tex., as a site for its new plant for the manufacture of Darco, a product produced from lignite. The initial works are estimated to cost about $1,500,000, and will give employment to approximately 500.

The Arcadia Compress Co., Arcadia, La., is planning to rebuild the portion of its cotton compress plant, destroyed by fire Sept. 7, with loss estimated at about $65,000.

The Fort Payne Light & Power Co., Fort Payne, Ala., has preliminary plans under way for a new power house to serve the coal-mining district in this vicinity. A. A. Miller heads the company.

Fire Sept. 18 destroyed a portion of the car shop, tool works, and other mechanical buildings of the Gulf Refining Co., Fort Tampa City, Fla., with loss estimated at $35,000.

The Standard Scale & Fixture Co., Tampa, Fla., has been incorporated with a capital of $50,000 to manufacture scales, balances and kindred products. A. L. Franklin is president; and James A. Miller, treasurer and general manager.

The Washington Ice Co., 611 Louisiana Street, New Orleans, will take bids in about 60 days for the erection of a new ice-manufacturing and cold storage plant.

Fire Sept. 14 destroyed a portion of the plant of the Central Cotton Oil Co., Jackson, Miss., with loss estimated at about $75,000, including machinery.

The Grass Fibre Pulp & Paper Corporation, Leesburg, Fla., will commence the immediate erection of its new pulp and paper mill, to have an initial daily output of about 40 tons. The company was organized recently with a capital of $1,000,000. W. F. Stovall is president, and E. R. Lacy, vice-president and general manager.

Pittsburgh

PITTSBURGH, Sept. 24.

The local machine-tool market is quiet but not without encouraging features. Chief among these is the revival of a list put out a year ago by the Union Railroad, the interplant system of the Steel Corporation in the Pittsburgh district. Bids are still being received against the list recently issued by the Western Penitentiary and awards are expected in a couple of weeks. A fair amount of business continues in individual tools from dealers' stocks and in some instances it has been found necessary to call upon makers to fill an order. New developments are lacking in the crane market. No new inquiries have been received and negotiations still are in progress on those against which bids were asked two or three weeks ago. Competition for crane orders is so sharp that the price advantage is largely with buyers.

The Rust Engineering Co., 1905 Fifth Avenue, Pittsburgh, is completing plans for a new oil refinery for the Leonard Oil & Gas Co., Newark, Ohio., J. W. Leonard, president. It will be one-story, and with machinery is estimated to cost about $200,000.

The Denk Engineering Co., Pittsburgh, has been incorporated under Delaware laws with capital of $150,00 to manufacture mechanical products. The incorporators are F. J. Denk, Leo J. Schaedle and A. H. Peabody, Pittsburgh. It is represented by the Capital Trust Co., Dover, Del.

The P. Wall Mfg. Supply Co., Pittsburgh, has been chartered under State laws to manufacture iron and steel products. H. E. Leety, 6320 Philips Avenue, is treasurer.

The American Sheet & Tin Plate Co., Pittsburgh, is making extensions and improvements at its works at New Castle, Pa., to cost about $60,000.

Edward Hazlett, 35 Twelfth Street, Wheeling, W. Va., has had plans prepared for a new two-story automobile service and repair works. Construction will commence at an early date. Edward B. Franzheim, 1425 Chaplaine Street, is architect.

The Windsor Coal Co., Wheeling, W. Va., is planning for the installation of electric and other mining equipment on properties in Brooke County, recently acquired.

The Schoolfield-Harvey Electric Co., Charleston, W. Va., has been chartered under State laws to manufacture electrical products. The incorporators are Raymond R. Schoolfield and Leonard P. Harvey, Charleston.

The Duquesne Light Co., Pittsburgh, has preliminary plans under way for a new electric plant in the Bellevue district.

In connection with the installation of new electrical and mechanical equipment, the Hess Coal & Coke Co., Morgantown, W. Va., is planning the reconstruction of its coal tipple at the Granville, W. Va., mines, with new operating machinery.

Indianapolis

INDIANAPOLIS, Sept. 26.

The Victor Bearings Co., Indianapolis, has been organized with a capital of $300,000 to take over the Modern Die & Tool Co., at Georgia and Pennsylvania streets, and has plans under way for the erection of new works at Steele Street and Massachusetts Avenue, estimated to cost about $50,000. It is proposed to have the plant ready for operation within 90 days, and the present works will then be removed to this location. W. L. Sandage, heretofore president of the Modern Die company, will also head the new organization. R. G. Wolcott is vice-president and H. A. Schlotzhauer, Jr., treasurer.

The Sullivan Boiler & Mfg. Co., Sullivan, Ind., has been incorporated with a capital of $50,000 by J. W. Lindley, C. H. Bedwell and W. T. Mellott, Sullivan, to manufacture boilers and other plate products.

The Active Coal Co., Indianapolis, a subsidiary of the Gale Grain Co., 607 Board of Trade Building, P. M. Gale, president, is taking bids for its new coal-handling plant at Senate and Fourteenth streets, estimated to cost about $50,000. Bacon & Teislow, 30 West Ohio Street, are engineers.

The Batesville Cabinet Co., Batesville, Ind., has had plans prepared for a new three-story and basement addition, 100 x 162 ft. Contract for construction will be awarded at an early date. Martin Fisher, Brighton Bank Building, Cincinnati, is architect.

The Swivel Joint & Shaft Co., Plymouth, Ind., has been incorporated with a capital of $75,000 by A. W. and William O'Keefe and C. A. Abrahams, Plymouth, to manufacture shafts, special joints, and other steel specialties.

The Coats-Steamer Automobile Co., Indianapolis, recently organized in Delaware with capital of $5,000,000 to manufacture automobiles, is negotiating with the Chamber of Commerce, Terre Haute, Ind., for a site for the erection of a new plant. The proposed works will be about 75 x 600 ft.

The Repel-Arc Furnace Co., Indianapolis, has been organized to take over the manufacture of the repelling arc furnaces heretofore produced by the Industrial Electric Furnace Co., under the Von Schlegell patents. The new company will be operated under the direction of Easterline & Angus, Indianapolis, consulting engineers. Furnaces will be manufactured at a local plant in sizes from ½ to 2 tons.

The Columbus Steel & Tube Co., recently organized, is equipping a plant at Columbus, Ind. The principal stockholders are Q. G. Noblitt, Frank H. Sparks and Albert G. Redmond, officers of the Indianapolis Air Pump Co., 1625 Bellefontaine Street, Indianapolis.

Robert Sharon is president of the Gould Motor Co., Marion, Ind., recently organized to manufacture the Gould motor. The company is seeking a location for a plant.

The Guttman-Rawley Furniture Mfg. Co., Shirley, Ind., has leased the plant of the McClure Mfg. Co., North Marion, Ind., and will move its factory there. In addition to furniture it will manufacture automobile tops and will equip the plant with a new line of machinery.

The Central South

ST. LOUIS, Sept. 26.

The Kansas City Light & Power Co., Kansas City, Mo., has acquired a site at Glasgow, Mo., for its new electric generating plant, estimated to cost about $1,000,000.

The City Ice Co., Campbell and Twenty-first streets, Kansas City, Mo., has plans under way for a new one-story mechanical shop at Harrison and Twenty-third streets, 100 x 140 ft.

The Standard Underground Cable Co., Westinghouse Building, Pittsburgh, has awarded contract to the Widmer Engineering Co., Syndicate Trust Building, St. Louis, for the first unit of its new St. Louis plant, to be one and two stories, 300 x 525 ft.

The Cosden Refining Co., West Tulsa Street, Tulsa, Okla., is planning for the erection of additions to the steam power plant at its oil refinery, estimated to cost about $100,000.

The Oklahoma Producing & Refining Co., Tulsa, Okla., has plans under way for additions to its refinery to increase the output about 20,000 bbl. per month. The storage department of the plant will also be enlarged. The work is estimated to cost about $150,000, including machinery.

The Hart Cotton Machine Co., Chickasha, Okla., is said to be planning for the early rebuilding of its factory, recently destroyed by fire with loss of about $90,000.

The State Board of Public Affairs, Oklahoma City, Okla., George F. Clark, chairman, will build a new power house at the State Confederate Home, Ardmore, Okla.

The Chicago, Rock Island & Pacific Railroad Co., 137 West Van Buren Street, Chicago, has awarded a contract to T. S. Leake & Co., 608 South Clark Street, for an addition to its shops and engine house at Eldon, Mo., to cost about $50,000.

The National Wire & Steel Co., 2100 Baltimore Avenue, Joplin, Mo., has broken ground for its new one-story building, 50 x 200 ft., at 513 East Fifth Street.

Fire, Sept. 20, destroyed a portion of the plant of the Southern Boiler & Tank Works, Memphis, Tenn., with loss estimated at $100,000, including machinery.

The Heron Metal Bed Co., Main and Chestnut streets, Chattanooga, Tenn., is planning the erection of additions, with improvements in present works, estimated to cost about $22,000.

The Board of Education, Kansas City, Mo., is arranging a list of machinery and equipment for installation in the Woodland High School. J. B. Jackson is secretary.

Conveying machinery, ovens, boiler and other mechanical equipment will be installed in the new plant to be erected by the Smith Baking Co., 437 West Park Street, Oklahoma City, Okla., to be one-story and basement, 100 x 150 ft., and estimated to cost about $150,000. H. P. Anthony, 1109 Waldheim Building, Kansas City, Mo., is architect.

The Hadley Fire Cement Co., Chattanooga, Tenn., with headquarters at Providence, R. I., C. B. Hadley, president, is contemplating the erection of a new local plant to manufacture refractory furnace linings, fire brick cement, etc.

The Clarksville Ice & Coal Co., Clarksville, Tenn., is planning to rebuild the portion of its ice-manufacturing plant, recently destroyed by fire with loss of about $50,000.

The Progressive Auto Service Co., 207 West Broadway, Louisville, recently organized, has preliminary plans under way for a new two-story building, to include a machine shop department. L. H. Prescott is president and manager.

The Missouri, Kansas & Texas Railroad Co., Railway

Exchange Building, St. Louis, has awarded contract to T. M. Johnson, Sedalia, Mo., for a one-story addition to its machine shop at Parsons, Kan., to cost about $18,000.

H. M. Jones, El Dorado, Ark., and associates, have plans under way for the construction of a new two-unit oil refinery with a daily capacity of about 500 bbl.

The Common Council, Stuttgart, Ark., has preliminary plans under way for the construction of a municipal electric light and power plant.

California

LOS ANGELES, Sept. 20.

The Western Pipe & Steel Co., 444 Market Street, San Francisco, is planning for the early occupancy of its new plant at South San Francisco, comprising the former works of the Shaw-Batcher Shipbuilding Co. It is expected to give employment to about 500 for initial operations.

The Davis Radio Signal Co., Los Angeles, has been incorporated with a capital of $25,000 by Charles L. Davis and Louis Gastineau to manufacture signals and signal devices. Gates & Randles, 514 San Fernando Building, represent the company.

The Los Angeles Fabricating Co., Los Angeles, has awarded a contract to the Austin Co., Los Angeles, for its new one-story steel fabricating plant, 90 x 160 ft., estimated to cost about $80,000.

The Big Four Truck Co., Sacramento, Cal., manufacturer of automobile trucks and parts, has plans under way for its new works at Richmond, Cal. The site totals about 11 acres and the main building will be 70 x 350 ft. Electric traveling cranes will be installed.

The Dyeson-Hickox Co., 2062 Santa Fe Avenue, Los Angeles, has filed notice of organization to manufacture machinery and parts. Elmer Hickox and J. G. Dyeson head the company.

Directors of the Modesto and Turlock Irrigation District, Turlock, Cal., have approved plans for a new hydroelectric generating plant at the Don Pedro dam, estimated to cost in excess of $150,000. Bids will be called for at an early date. R. V. Meikle, Turlock, and Percy Jones, Modesto, are joint engineers for the project.

The Pacific Sanitary Mfg. Co., Fifth and Hensley streets, Richmond, Cal., manufacturer of sanitary ware, has awarded contract to Carl Overa, 2105 Roosevelt Street, for a one-story addition, 150 x 300 ft.

The Potts Stove & Burner Co., 2826 South San Pedro Street, Los Angeles, has filed notice of organization to manufacture stoves and heating equipment. H. S. and T. E. Potts, 790 East Forty-first Street, head the company.

The Star Truck Co., Los Angeles, has had plans prepared for a new plant on Commercial Street, including a two-story structure, 42 x 90 ft., and two one-story buildings, 40 x 110 ft., and 28 x 100 ft., respectively. Construction will be placed under way at once. John J. Frauenfelder, 1116 Story Building, is architect.

The Utah Iron & Steel Co., Salt Lake City, Utah, has arranged for an increase in capital from $2,500,000 to $5,000,000, and 50,000 shares of common stock without par value. The proceeds will be used for additions to the company's plant at Midvale, estimated to cost in excess of $2,500,000.

Canada

TORONTO, Sept. 26.

The machine-tool market continues fairly active. The chief demand, however, is for equipment for replacement purposes with little or no buying for new plants. Inquiries are increasing and many look like real orders. The railroads have again started to buy limited quantities of equipment and dealers are of the opinion that the demand will increase in the early future. The announcement that the Durant Car Co. has taken over the plant of the Leaside Munitions Co., at Leaside, Ont., has caused much interest among dealers who expect to derive considerable benefit from this and other like undertakings. Small tools have not improved to any extent, but a steady volume is moving.

The Georgetown Woolen Mills, Georgetown, Ont., are in the market for a 15-hp. Fairbanks-Morse motor, slow speed.

The Canadian Automatic Carburetor Co. will establish a plant at the corner of Royce Avenue and Dundas Street, Toronto.

The Canadian Gary Motor Trucks Corporation will establish a plant at Fort William Ont., to supply the Western Canada trade. It is a new subsidiary of the American company and will be incorporated for $4,500,000.

Dodge Brothers, Detroit, have purchased 35 acres at Sandwich, Ont., with 350 ft. water frontage, and propose to erect an assembling plant.

IRON AND INDUSTRIAL STOCKS

Steels Show More Consistent Firmness Than Do Other Issues

Two significant things have transpired since last reports. First, Eastern Federal Reserve banks reduced commercial rediscount rates from 5½ to 5 per cent. Second, many million dollars' worth of equipment trust certificates, purchased from the Railroad Administration, were resold to individual investors. The first is conclusive evidence of an easing in the general banking situation. The second denotes confidence in our railroads at a most trying period in their history. With these two developments have come an increased demand and better prices for iron and industrial stocks without abatement in the absorption of bonds in general as well as long and short-term notes. Steel stocks show more consistent firmness than most other groups of issues. Investors evidently are attracted by the sound financial condition of steel companies, as contrasted with others, while the revival of buying of steel products is believed by many to be a forerunner of higher prices for same. The recovery in stocks of late has been less rapid than it was prior to the recent setback, and therefore more satisfactory from the standpoint of the banking institutions and the real investor.

The range of prices on active iron and industrial stocks from Monday of last week to Monday of this week was as follows:

Allis-Chalm. com.	33½- 34⅝	Int. Har. com.....	77½- 80⅞
Am. Can com.....	26⅜- 28¼	Int. Har. pf.....101	-101¼
Am. Can pf.....	79 - 80	Lackawanna Steel.	40⅞- 43
Am. C. & F. com.	125½-128	Midvale Steel.....	25¼- 26¾
Am. C. & F. pf...	108 -109	Nat. E. & S. com.	35½- 37¼
Am. Loco. com....	88½- 91	Nova Scotia Steel.	23⅞- 25⅜
Am. Loco. pf.....104	-104½	Press. Steel com..	55 - 58⅞
Am. Steel F. com.	24½- 25⅛	Press. Steel pf....	— - 85⅛
Am. Steel F. pf...	— - 83	Ry. Stl. Spg. com.	82½- 83¾
Bald. Loco. com..	86½- 90⅝	Replogle Steel.....	23½- 25½
Bald. Loco. pf....	— - 98	Republic com.....	49⅞- 53⅝
Beth. Steel com..	51½- 51¾	Sloss com.....	37 - 40¾
Beth. Stl., Cl. B..	52⅜- 56⅛	Sloss pf.....	— - 71
Beth. Stl., 8% pf..	98½-100	Superior Steel.....	28½- 32¾
Chic. Pneu. Tool..	52 - 52⅜	Transue-Williams.	— - 36
Colorado Fuel.....	24½- 25¼	Un. Alloy Steel...	25 - 26
Cruc. Steel com...	60 - 64⅝	U. S. Pipe pf.....	15 - 15½
Cruc. Steel pf.....	— - 81	U. S. Steel com...	77½- 80¼
General Electric..121¼	-127	U. S. Steel pf.....109	-109½
Gt. No. Ore Cert..	28 - 29	Vanadium Steel...	30 - 33⅝
Gulf States Steel.	37 - 40½	Westingh'se Elec.	44 - 45⅞

Industrial Finances

Westinghouse Electric & Mfg. Co. quarterly of 2 per cent on the common stock payable Oct. 31, to stockholders of record Sept. 30; also regular quarterly of 2 per cent on the preferred stock, payable Oct. 15, to stockholders of record Sept. 30.

Directors of the Trumbull Steel Co., Warren, Ohio, have declared a dividend of 15c. per share on the non-par value common stock and $1.75 per share on the preferred stock, both payable Oct. 1 to holders of record Sept. 20. The dividends are the same as were paid July 1 last for the second quarter.

The Scripps-Booth Motor Car Co., Boston, Mass., has filed a voluntary petition in bankruptcy. The liabilities total $43,203.

William Henkel has been appointed receiver for the Dobbins Core Drill Co., Inc., 147 West Forty-second Street, New York.

A petition in bankruptcy has been filed against the Columbia Tool & Machine Co., Fourth and Brown streets, Philadelphia, by a number of creditors.

Walter S. Butler has been appointed receiver for the Lorrain Car Co., Richmond, Ind., manufacturer of automobiles. The liabilities are said to total $35,000.

Government Requirements

Government departments and bureaus are advertising for bids as follows:

Bureau of Supplies and Accounts, Navy Department: 15,000 lb. sheet lead, opening Oct. 18; 100 tons foundry pig iron for Norfolk, Va., opening Oct. 11; 50 forward finished propellers and 50 after finished propellers for torpedoes, opening Oct. 11.

Air Service, U. S. Army: 1115 pieces of terne plate for McCook Field, Dayton, Ohio, bids until Sept. 30.

Bureau of Yards and Docks, Navy Department: 10-ton hand-operated overhead crane, for Yorktown, Va.; extension to cast iron water supply main at Quantico, Va.

Lighthouse Service: 2500 lb. round head steel rivets. Address Lighthouse Inspector, Third District, Tompkinsville, N. Y.

Current Metal Prices

On Small Lots, Delivered from Merchants' Stocks, New York City

The quotations given below are for small lots, as sold from stores in New York City by merchants carrying stocks.

As there are many consumers whose requirements are not sufficiently heavy to warrant their placing orders with manufacturers' for shipment in carload lots from mills, these prices are given for their convenience.

On a number of articles the base price only is given, it being impossible to name every size.

The wholesale prices at which large lots are sold by manufacturers for direct shipment from mills are given in the market reports appearing in a preceding part of THE IRON AGE under the general heading of "Iron and Steel Markets" and "Non-ferrous Metals."

Iron and Soft Steel Bars and Shapes

	Per Lb.
Bars:	
Refined bars, base price	2.78c.
Swedish bars, base price	10.00c.
Soft steel bars, base price	2.78c.
Hoops, base price	3.88c.
Bands, base price	3.43c.
Beams and channels, angles and tees 3 in. x ¼ in. and larger, base	2.88c.
Channels, angles and tees under 3 in. x ¼ in., base	2.78c.

Merchant Steel

	Per Lb.
Tire, 1½ x ½ in. and larger	2.75c.
(Smooth finish, 1 to 2½ x ¼ in. and larger)	2.95c.
Toe calk, ½ x ⅜ in. and larger	3.45c.
Cold-rolled strip, soft and quarter hard	6.75c. to 7.75c.
Open-hearth spring steel	4.25c. to 6.00c.
Shafting and Screw Stock:	
Rounds	4.38c. to 4.53c.
Squares, flats and hex.	4.98c. to 5.03c.
Standard cast steel, base price	14.00c.
Extra cast steel	17.00c.
Special cast steel	22.00c.

Tank Plates—Steel

¼ in. and heavier	2.88c.

Sheets

Blue Annealed

	Per Lb.
No. 10	3.28c. to 3.53c.
No. 12	3.33c. to 3.58c.
No. 14	3.38c. to 3.63c.
No. 16	3.48c. to 3.73c.

Box Annealed—Black

	Soft Steel C. R., One Pass Per Lb.	Blued Stove Pipe Sheet, Per Lb.
Nos. 18 to 20	3.80c. to 4.05c.	.....
Nos. 22 and 24	3.85c. to 4.10c.	4.50c.
No. 26	3.90c. to 4.15c.	4.55c.
No. 28	4.00c. to 4.25c.	4.65c.
No. 30	4.25c. to 4.50c.	.....

No. 28, 36 in. wide, 10c. higher.

Galvanized

	Per lb.
No. 14	4.10c.
No. 16	4.25c.
Nos. 18 and 20	4.40c.
Nos. 22 and 24	4.55c.
No. 26	4.70c.
No. 27	4.85c.
No. 28	5.00c.
No. 30	5.50c.

No. 28, 36 in. wide, 20c. higher.

Welded Pipe

Standard Steel	Black	Galv.	*Wrought Iron*	Black	Galv.
½ in. Butt...	—55	—40	¾ in. Butt...	—30	—13
¾ in. Butt...	—60	—46	1-1½-in. Butt.	—32	—15
1-3 in. Butt..	—62	—49	2 in. Lap.....	—27	—10
3½-6 in. Lap.	—59	—45	2½-6 in. Lap.	—30	—15
7-8 in. Lap...	—55	—41	7-12 in. Lap...	—23	— 7
9-12 in. Lap..	—54	—40			

Steel Wire

BASED PRICE* ON NO. 9 GAGE AND COARSER	Per Lb.
Bright basic	4.00c.
Annealed soft	4.00c.
Galvanized annealed	4.75c.
Coppered basic	4.50c.
Tinned soft Bessemer	6.00c.

*Regular extras for lighter gages.

Brass Sheet, Rod, Tube and Wire

BASE PRICE

High brass sheet	15¼c. to 18¼c.
High brass wire	16¼c. to 20¾c.
Brass rod	13¼c. to 19¾c.
Brass tube, brazed	26½c. to 30½c.
Brass tube, seamless	18 c. to 19½c.
Copper tube, seamless	19½c. to 21¾c

Copper Sheets

Sheet copper, hot rolled, 24 oz., 19½c. to 22½c. per lb. base.

Cold rolled, 14 oz. and heavier, 2c. per lb. advance over hot rolled.

Tin Plates

Bright Tin		Coke—14-20		
			Primes	Wasters
Grade "AAA" Charcoal 14x20	Grade "A" Charcoal 14x20	80 lb...	$6.80	$6.55
		90 lb...	6.90	6.65
		100 lb...	7.00	6.75
IC..	$10.75	$9.25	IC...	7.15	6.90
IX..	12.00	10.75	IX...	8.15	7.90
IXX..	13.75	12.25	IXX...	9.15	8.90
IXXX..	15 50	14.00	IXXX...	10.15	9.90
IXXXX..	17.00	15.75	IXXXX...	11.15	10.90

Terne Plates

8-lb. Coating 14 x 20

100 lb.	$7.50
IC	7.75
IX	8.00
Fire door stock	11.00

Tin

Straits, pig	29c.
Bar	36c. to 40c.

Copper

Lake ingot	15c.
Electrolytic	15c.
Casting	15c.

Spelter and Sheet Zinc

Western spelter	6c. to 6¼c.
Sheet zinc, No. 9 base, casks	11½c. open 12c.

Lead and Solder*

American pig lead	5¾c. to 6¼c.
Bar lead	6¾c. to 7c.
Solder, ½ and ½ guaranteed	20c.
No. 1 solder	18c.
Refined solder	15½c.

*Prices of solder indicated by private brand vary according to composition.

Babbitt Metal

Best grade, per lb	80c.
Commercial grade, per lb	40c.
Grade D, per lb	35c.

Antimony

Asiatic	6¼c. to 6½c.

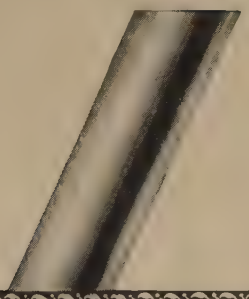
Aluminum

No. 1 aluminum (guaranteed over 99 per cent pure), in ingots for remelting, per lb	29c. to 31c.

Old Metals

The market continues strong with an upward tendency. Dealers' buying prices are as follows:

	Cents Per Lb.
Copper, heavy and crucible	10.25
Copper, heavy and wire	9.25
Copper, light and bottoms	7.75
Brass, heavy	4.75
Brass, light	3.75
Heavy machine composition	7.50
No. 1 yellow brass turnings	4.25
No. 1 red brass or composition turnings	6.50
Lead, heavy	4.00
Lead, tea	2.50
Zinc	2.25



MAKE it a point to use Stanweld Steel Tubing wherever there is need of a structural material that must be rigid, light and trim appearing. Its quality is uniform. Every foot is carefully inspected to guarantee the same fine strength and clean finish.

Below is a representative list of products using Stanweld Steel Tubing to provide utmost strength and serviceability at moderate cost. Investigate. Find out how Stanweld Tubing can serve *you* with advantage.

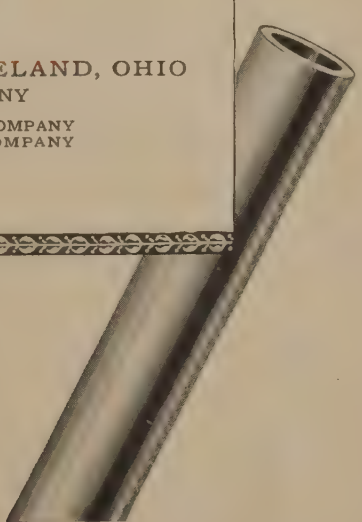
Motor Cars	Tent Poles	Burial Devices	Screw Machines
Motor Trucks	Cash Registers	Display Racks	Air Rifles
Airplanes	Machine Tools	Golf Clubs	Railings
Tractors	Die Stock Handles	Farm Implements	Typewriters
Motorcycles	Lamps	Metal Furniture	Bushings
Bicycles	Magazine Tubes	Telephone Stands	Tricycles
Tripods	Speedometers	Adding Machines	Gas Engines
Vacuum Cleaners	Printing Machinery	Washing Machines	Stoves
Lawn Mowers	Gravity Carriers	Models	Conduits
Go-Carts	Invalid Chairs	Elevator Cages	Tire Pumps

Stanweld

Tubing

THE STANDARD WELDING COMPANY, CLEVELAND, OHIO
DIVISION OF THE STANDARD PARTS COMPANY

OTHER DIVISIONS ARE: THE PERFECTION SPRING COMPANY
THE BOCK BEARING COMPANY, THE EATON AXLE COMPANY



HORIZONTAL FLUE

SEMET-SOLVAY CONSTRUCTION

Showing ease of observation of flue

THIS, the basic principle of the Semet-Solvay Oven assures steady and uniform gas flow; proper temperature at top of oven; economy in fuel consumption due to efficient conduction of heat; low operating maintenance; ease and accessibility in control of heating system.

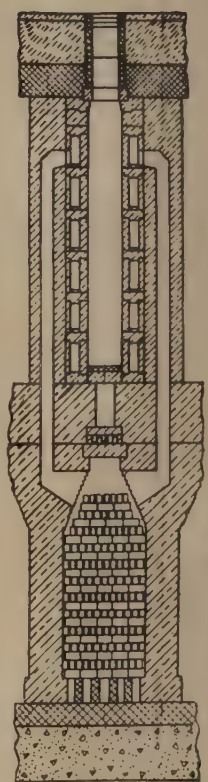
These advantages are obtained in their highest degree thru HORIZONTAL FLUE (Semet-Solvay) construction.

Correspondence is invited

Address
Plant Development
Department

SEMET-SOLVAY COMPANY
Syracuse, N. Y.

1892—Pioneer in the development of the By-Product Coke Oven—1921



Typical cross-section of Semet-Solvay Regenerator Oven

SEMET-SOLVAY BY-PRODUCT COKE OVENS